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 *March 2009*

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:

What Was It Like To Fly Cargo Gliders?

Russ "Erbman" Erb
Tuesday, 17 March 2009
1700 hrs (5:00 PM Civilian Time)
USAF Test Pilot School Auditorium
Edwards AFB, CA

DATELINE: SOMEWHERE IN THE SOUTH OF ENGLAND, 5 JUNE 1944. You're getting ready to climb into a wood, tube and rag aircraft built by people who used to build refrigerators, furniture, and pipe organs. Your passenger is a Jeep securely tied down in Row 2. You've completed the Weight and Balance to find that this ersatz homebuilt has a takeoff weight of 7500 pounds. You realize that is half again as much as **Bill Irvine's Cessna 310** loaded for bear, which is odd since nobody around you knows who Bill Irvine is yet and Cessna is still building the Bamboo Bomber.

What's really weird is that your powerplant is a Nylon rope 11/16" in diameter and 350 feet long, attached to the tail cone of a Douglas C-47. You've looked up the NOTAMs for your landing field in France and it calls for scattered standing telephone poles and obstructions on and around the landing zone. I don't see what could possibly go wrong.

As the pilot of this cargo glider, what are you up against? Can you communicate with the tow pilot? How far can you glide after you release? What are the flying qualities like? IF you get safely to the ground, what do you do then?

Since the Way-Back machine is Parts+20, we're going to have to use our imaginations. Guiding us on this journey back in time is **Erbman** who came into some flight manuals and training guides some years back from **Erb The Elder**.

After **Erbman** finally gets tired of hearing himself talk, we will adjourn to the **Bravo Kilo Dead Cow Emporium** for more lies and tall tales. There **Stormy** will update us on his efforts to see in the dark from the mighty RV-8B.

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

Dues Delinquents!

According to the ***Project Police Bylaws*** (as amended), **March** is the month when **Evil Editor Zurg** collects and publishes the list of names of the **Ne'er-do-wells** amongst our fold who are **slacking** and **sponging** off the rest of the ***PPOs***, thinking somehow that a government stimulus check will show up at the chapter to pay their dues. That's right—it's the dreaded **Dues Delinquents** list! The punishment of public humiliation by confrontation has been very successful at getting those slackers to pay up ($20). This year's list of slackers is long and undistinguished:

Miles Bowen, Tim Brien, Lee H. Erb, Chuck Firth, Shawn Fleming, George "Knife" Gennuso, Francis Gentile, Bob Hartunian, Mason Hubbard, Bill Irvine, Paul Minnicks, Terry Pierce, John Ready, Kevin Reilly, David Setser, Rich Turner.

To get off this list, send your $20 in to the treasurer (see back page). Or go to http://www.eaa1000.av.org and click on the Paypal® button.

Last Month's Meeting

EAA Chapter 1000
USAF Test Pilot School, Scobee Auditorium
Edwards AFB, CA
17 February 2009
Gary Aldrich, Presiding

The February meeting of 2009 was held at the Test Pilot School auditorium at Edwards, AFB, with a dozen members and guests in attendance. Our newest member **Hellmuth Steinlin** whom we signed up last month actually showed up again. Unfortunately, he did not bring samples of his firm's products (PRP Wine International, Inc.). Accordingly, we relied on our usual rations of soda, C3's, chips and salsa.

The evening's featured speaker was **Bill "Flaps" Flannigan**, frequent guest and another good friend of the chapter. Flaps is retired from both the Air Force and Northrop Grumman as a Flight Test Engineer having flown on the SR-71, the B-2 and other notable projects.

Flaps edu-tained us with a 150 slide presentation on the Moscow Air Show (MAKS 2007) he attended in August of that year. Arranged through the St. Petersburg Travel Agency (and I don't mean Florida, either), owned by **Olga "X"**, former personal translator for **Vladimir Putin** while head of the KGB (so you don't really want to know her last name). It cost **Flaps** about $3900 plus $1200 airfare for the experience.

The airshow was at the Zhukovsky Research Center/Ramenskoye Flight Test Center (the rough equivalent of Dryden/Edwards AFB) at an airfield about 20 minutes outside Moscow, with tickets at about $300. Flaps described MAKS as a combination of the Paris Air (Trade) Show, Oshkosh and the Van Nuys Air Fair, and then throw in a display of armor, air to air and small arms weapons, and then include Davis-Monthan in the description due to the number of derelict airframes on the field. Sounds like a pretty good time.

There was a surprisingly large USAF contingent with a B-52, F-15, and F-16, with flight demo's by the F-15. The big Russian hardware draws were the Tupolev Tu-95 Bear and Tu-160 Blackjack bombers, the Tu-144 Supersonic Airliner (Concordski), the Mikoyan-Gurevich MiG 25 and 29 and Sukhoi SU-27 fighters, several vectored-thrust aircraft, plus everything else in the Russian military and civilian inventory.

Flaps commented on the excellent food selection, beer and vodka available (much better than at US air shows), and the distinct lack of security with people and kids crawling all over the aircraft. He also noted a large group of Chinese engineers closely inspecting and photographing everything. A young lady from the group was interviewed on "Moscow Today" television who went out of her way to say that the group were "not spies". Of course not. Why would she think that the Russians were even thinking that.

Flaps wrapped up the slide show with a photo of him sitting in the cockpit of a Sukhoi SU-24 Fencer, the Russian version of the F-111 which he flew in during his blue suit time (would that make the SU-24 the Aardvarkski?), and followed that with a couple of clips from some DVD's he bought at the air show featuring the Russian Air Force Knights flying SU-27's.

The **Kommandant** declared that Flaps had significantly advanced the cause of aviation and that "Victory!" and been achieved, the secret signal to abandon the facility and reconvene at the BK lounge. **Flaps** was rewarded with a lavish "supersized" dinner. The chapter spares no expense in bringing only the best speakers for our membership.

- Kent "Cobra" Troxel
Minister of Propaganda

Kommandant's Korner

Greetings from seat 9C. I've just departed the massive expanse of concrete known as Dallas-Fort Worth Airport (or, according to **Erbman**, "Fort Worth-Dallas") on the last leg of my semi-annual pilgrimage to Wright-Patterson AFB. Having arrived in 15 deg F Dayton on Monday, it was really nice to wake up to 60-ish temps this morning in Dallas. No heinous airline stories to speak of this time (I know **E²Z** will be disappointed at that.) Of course, the possibility still exists for some misadventure in the next three hours or so, followed by the ever-thrilling Friday drive back up to the AV from Burbank.

As always, I scan the weather out the MD-80's windows, subconsciously evaluating whether this trip would have been possible in the **Fightin' Skywagon**. Generally speaking, my guess is that it would have been possible, though it would have been a long haul to Ohio just for three days of meetings. Alas, the **VC-180** remained in her cozy hangar this time and American Airlines got the airlift mission. That's not to say that **'05K** has been neglected. I talked **Erbman** into riding shotgun last Saturday evening while I attempted to remember how to fly by the light of the moon. The maximum "legal" time had nearly elapsed since my last night landing, providing the mission requirement for surly-bond slipping. Rather than just make the requisite three quick bounces around the pattern we elected to shoot some of the local IFR procedures, starting with the relatively new RNAV06 approach to WJF. The waxing crescent phase of the moon, coupled with the scattered high cloud layer, provided sufficiently limited visibility to make for a good simulation of actual IMC conditions. While I had been teaching instrument procedures to young TPS studs for the past month or so, it was obvious by my performance that talking about it and actually doing it are not necessarily the same. I managed to buffoon the buttonology on the GNS530W, somehow dumping the approach and convincing the autopilot that we wanted to fly to some far-off unknown location. Co-pilot **Erb** was quick to point out my deficient skills and assisted me in herding the ship back onto the straight and narrow. It's always comforting when the pilot in the other seat casts you a quizzical glance

and casually remarks, "**What the hell did you do?**" The winds were calm and the Fox Tower controller was bored so he allowed us to continue the approach to a stop-and-go. Guidance on this approach is at the "LPV" level, providing both vertical and horizontal signals to the CDI. The on-board generated glideslope indication is rock-solid…unlike so many ILS glideslopes that are subject to multipath and other RF oddities that cause the needle to twitch. Anyway, the landing was quite acceptable given the rust on my night-flying skills.

Still smarting from my poor GPS procedure I employed a time-honored CFI technique and informed **Erbman** that he would fly the next approach and I would critique his performance (*i.e. cheating...*). So, back to Joshua we went to fly a radar-vectored ILS to runway 25 at Palmdale. **Erbman** quickly demonstrated that he was an expert at following directions (probably a skill he picked up during his undergraduate studies in Colorado Springs.) The resulting approach was flown to near-ATP standards…until about the 1 mile point on final when the pesky glideslope needle took a quick dive toward the bottom of the case (a characteristic of this particular approach I was aware of, but kind of 'forgot' to tell Russ about). Despite the wayward glideslope needle it was obvious at the 200 foot decision altitude that we could have safely landed on the 12,000 foot runway…with room to spare, so we declared the missed approach and climbed back toward the Palmdale VOR for more practice.

Joshua agreed with our request for the full VOR-B approach to Fox Field, which commences at the PMD VOR. **Erbman's** brain did not appear to be full so I resumed the good-co-pilot role; setting up radios and briefing the approach while he meandered toward "URGED" intersection which serves a both the initial and final approach fix. This is a busy approach that requires lots of simultaneous time, turn, tune, descend, slow down stuff. Again, the **seasoned Skywagon crewdog** showed his prowess by arriving at the missed approach point and minimum descent altitude just as the timing expired. I wrestled the controls from him at this point to complete the left circling approach to runway 24 for (another) satisfying stop-and-go.

On downwind for the last pattern Russ observed that the dreaded "**Prong-o-Matic**" Cessna landing gear hadn't created any exciting arrivals this evening. This was obviously a calculated response to my failure to mention the quirky glideslope and it had the intended effect as I demonstrated how much energy the big spring gear legs can generate when you drop it in from a couple of feet. Re-setting up the flare from ten feet or so, I managed to make the second touchdown without requiring a third…or fourth and we taxied in to the hangar row.

All in all a pleasurable way to spend a couple of hours and a demonstration of the reason the Feds require us to go out and practice our skills on a regular basis. It's not just a good excuse to go fly…it's common sense.

Fly Safe and Check 6!

- Gary Aldrich, Kommanding

(*Erbmans' response—I stand ready at any time to demonstrate flying instrument approaches not quite as well as the Kommandant so as to help him feel good about his skills*)

Operation PHOENIX NOISEMAKER... continued

When last we left the story of **Erbman's** engine inspection turned overhaul, he and **Bill Irvine** had found that just about everything that could be worn was indeed worn. The solution was to send everything to an exclusive engine spa (aka machine shop) to be reworked in appropriate ways. In this case, the crankshaft, counterweights, connecting rods, and rocker arms were sent to Aircraft Engine & Accessory (http://www.aea-precision.com) in Dallas TX. Another popular engine spa is Aircraft Specialties Services (http://www.aircraft-specialties.com/) in Tulsa OK.

The rocker arms and connecting rods were simple enough to wrap in paper and stuff in a box. The crankshaft presented a bigger concern. It is fairly large, heavy, and has a lot of precisely machined surfaces that are very expensive to get fixed if they get damaged. Not only that, but this "little" piece of fancy steel costs about $4500 to replace. So how do you ship such a thing? First you call up your engine spa of choice and ask them to send you a crankshaft box. They do this frequently enough that they have access to boxes and foam inserts specifically designed to hold and protect a crankshaft. Here you see my crankshaft nestled in its little shipping container.

The fine folks at AEA inspected the parts and decided on a course of action. The crankshaft main journals were ground and polished to .006 undersize. The crank journals were ground and polished to .003 undersize, just enough to remove any damage. After machining the crankshaft was nitrided, a casehardening technique using nitrogen at elevated temperatures.

The gear at the end of the crankshaft was inspected and rejected for excessive wear. They did clean it up real nice and return it to be used as a cool aviation-themed paperweight. It was replaced on the crankshaft with a serviceable gear.

All of the worn bushings were replaced and reamed as required. These included bushings in the crankshaft,

counterweights, connecting rod small ends, and rocker arms. The counterweights were reassembled on the crankshaft (not a trivial procedure).

While waiting for those parts to return from their Texas vacation, **Bill Irvine** and I carefully inspected the remainder of the parts. We started with the camshaft, which is always a prime suspect for wear. At least two of the lobes (including the rearmost lobe, which seems to be the one most likely to wear for some reason) showed some wear, breaking through the hardened, polished surface right at the point where there is the greatest load against the lifter. While they may have been okay for running another couple hundred hours, this was rapidly turning into a major overhaul with an expected time before the next overhaul of 2000 hours. Based on that thinking, the cam lobes weren't going to make it. The kicker was when we inspected the gear teeth on the integral camshaft gear (rightmost gear in the picture below). Many teeth of the gear showed definite signs of wear breaking through the hardened surface. In fact, later we would find out that this gear was in much worse shape than the crankshaft gear that was rejected by the professionals. Therefore, it was time to order a new camshaft.

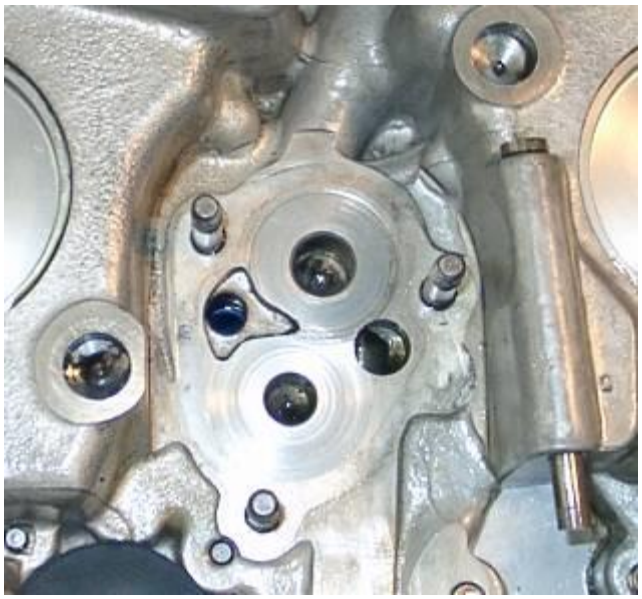
A fun little note in the overhaul manual stated that anytime the camshaft was reground and rehardened or simply replaced *ALL* of the lifter bodies must be replaced. Fortunately, these are sold in a kit with the new camshaft.

Inspection of the idler gears showed that they were no better off in the wear department than the crankshaft or camshaft gear. Makes sense since they were all in constant contact with each other. What doesn't make sense is that while the new camshaft costs about $800, a new idler gear cost about $700! I don't know if that is a difficulty of manufacturing issue or simply a low demand issue. We decided that we would replace the idler gear fitted with the fuel pump cam since it drives the camshaft. In my installation, since I removed both of the magneto drive gears, the remaining idler gear drives nothing. Since it will be essentially unloaded, we will reuse the worn gear. It's simpler to put it in than to try to block off the oil galley to the gear shaft.

As a side note, folks very familiar with Lycoming engines will note in the above picture that the two idler gears are swapped in position. We didn't do that—that's the way it was assembled before. Good thing I didn't want to use an engine driven pump—there was no cam over the plunger to make it work! One more reason to support the conclusion that doing a complete overhaul was a good idea.

Here's the accessory case with the oil pump removed.

Inspection of the oil pump was like a "Little Shop of Horrors." The drive gear looked brand new and was of the proper type according to the famous Lycoming Oil Pump AD. That's where the good news ended. The driven gear was an old aluminum gear, a combination originally allowed but now required to be replaced "at the next overhaul" by the AD. Inspection of the oil pump housing and the accessory housing showed excessive scoring where the gears had rubbed on the sides, as seen here.



The worst was the oil pump drive shaft, which drives the gear with two flats. These flats were rounded off so bad (like when you round off a stuck nut using the wrong wrench) that only half of the flat was still flat, and you could poke a welding rod in the gap that was left. I ordered up new oil pump gears (they only come as a set) of the proper type, a new housing, and a new drive shaft. That is to say, a new oil pump.

At the other end of the engine, the two gears that drive the propeller governor from the front of the camshaft were also excessively worn. These two gears, small enough to

hold both in one hand, cost way more than should be allowed to be printed in a family newsletter. More new parts. All of these engine parts were ordered from the curiously named outfit A.E.R.O. (http://www.aeroinstock.com/) in Granite City IL (just across the river from St. Louis MO), which is the same place that I ordered the cylinders from. Great company and great customer service—the parts they didn't have in stock they had drop-shipped from the Lycoming factory directly to me. Highly recommended.

About the time that "Cranky and Friends" were boarding the big brown truck to return from Texas, Mr. "**Attention To Detail**" Irvine pointed out to me that with the exception of parts like the intake tubes or pushrods we had reworked or replaced every major part of the engine...except the crankcase. I didn't know you could do anything to a crankcase, but you can. Seems a shame to stop just short of doing the equivalent of a factory remanufacture because you didn't spruce up the crankcase. Bill's biggest concern was that the bearings might not seat just right in the old bearing saddles.

On my behalf, Bill contacted Chuck Ney Enterprises Inc (http://www.chuckneyent.com/) in Tulsa OK to ask the appropriate questions. Looking at their website, it appears that Chuck Ney found his niche in aviation by developing and offering services in refurbishing crankcases. He even has a large stock of crankcases to sell you if yours becomes unserviceable. Bill tells me that Chuck Ney is very well respected around the Cessna Pilots Association. He's also been in business since 1969, so he seems to be doing something right. Once again, I called him and asked him to send me a suitable box for shipping my crankcase.

So what can you do to a crankcase? Of course there is cleaning all of the exposed surfaces and flushing out all of the oil galleys, along with the inspection for cracks and welding any found (mine had none). Then they smooth and flatten the mating surfaces (called "facing" for some reason). Of course, doing this brings the two halves ever so slightly closer together, so the main bearing saddles and the camshaft bearings are line bored back to their original size, which also restores them the roundness and makes them perfectly aligned. This model of narrow deck crankcase also receives some added dowels around the through studs, which apparently addresses a problem with fretting around the bearing saddles. I'll know better when I see the results.

We also had him remove all of the cylinder studs and re-face the cylinder mounting pads that showed a very slight wear. These studs are also refurbished and receive a nice new cadmium coat that is properly baked in place.

One very cool "upgrade" that I opted for was the "Ney Nozzle." Mr. Ney holds an STC to install nozzles in the lifter oil galleys that spray oil on the camshaft. Mr. Lycoming had always figured that the camshaft would get enough lubrication from oil haphazardly slung its way by the crankshaft, but history has shown this to not always be sufficient, especially when the engine is not run frequently. I don't know that I would remove and disassemble an engine just to have these installed (especially given the $800+ of "must replace" parts, like connecting rod bolts and gaskets), but for an engine already getting an overhaul for other reasons, it seemed like a really good idea for just under $300.

I took this opportunity to send the accessory housing with the crankcase so that they could re-face the oil pump area. Additionally, the new oil pump gears use a shaft that rotates in the accessory housing instead of a fixed shaft that the gear rotates around. As a result, a new oil galley has to be drilled in the accessory housing to lubricate this shaft. I had the nice folks in Tulsa accomplish this change as well.

Meanwhile, back at the ranch...er...house, Cranky and Friends had returned looking *VERY* nice in their freshly cleaned state. They were joined by boxes of must-replace parts and new bearing inserts of the proper size to match the newly resized crankshaft. Having purchased a scale capable of measuring to the gram, I decided to weigh my new pistons and refurbished connecting rods. This was an interesting exercise in multiple weighings and statistical distributions, since the indication to the nearest gram was inside the uncertainty range of the scale. Measured weights varied a few grams between weighings. This was significant because the differences between pistons and between rods were on the order of a few grams. When I was done, I was able to find combinations of rods and pistons where the difference in total mass for each paired set of crank throws was 0.25 to 0.75 grams.

Since the connecting rod not only goes side to side but the big end also goes up and down with the crankshaft, it was of interest to "weigh the big ends," which was really more of an exercise in confirming that all rods had similar cg locations. To do this I used the setup shown above.

The rod was built up with the new bolts, nuts, and bearing inserts. The actual measured value was not important, but that the values for all of the rods were similar. No, I couldn't change anything based on this information, but there are just some things that engineers need to know.

(*No, I don't think this rod is possessed by Satan regardless of the value shown.*)

Proving that there is a great force that desperately tries to keep everything in balance, the current total of what I have spent on this engine is within one percent (1%) of what I would have paid for a new engine. The good news it that it will essentially be a new engine.

So what's the status as of this writing? The crankcase is still being held hostage in Tulsa OK, waiting for a ransom of a few studs to be released from the plating shop. I'm told that all of the work came out really well. After the stud issue is sorted out, the crankcase and accessory housing will board the big brown truck and return to me. Then it's back to **Bill's** hangar to start reassembling the engine.

- Erbman

Operation PECOS CRAYOLA

Charter Kommandant Jim Piavis' RV-7 is currently being painted in Dallas TX. It is expected to be completed sometime between when you receive this newsletter and our next meeting. Here we show you the intended final result and some pictures of the painting in progress:

Groveling Can Be So Unbecoming...

Well, **Russ**, the joke's on YOU! You paid your 2008 dues on 26 Aug 08. Now you're paid up through 2010. The best part is you'll forget and send another $20 in next year!

- Evil Editor Zurg

Project Police Aircraft(?) Spotters Quiz

Evil Editor Zurg has once again uncovered photos of an aircraft...uh...car...uh, he's not really sure. Anyway, the Master of the Obscure submits them to you to see if any of you self-proclaimed wizzes can properly identify it. If you have absolutely no clue, make up a funny story describing how this vehicle came into being. For the engineering geeks in the audience, tell him why this propulsion system probably isn't a real good idea. (No, it's not "Chitty Chitty Bang Bang...)

Send your desperate guesses to **Evil Editor Zurg** at eez@pobox.com or snail mail it to the address on this newsletter. Next month we'll tell you who (if anyone) was correct and also any guesses that were sufficiently funny.

Web Site Update

As of 7 March 2009, the hit counter showed **125730**, for a hit rate of 16 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.

Chapter 1000 Calendar

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

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

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

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

May 5: EAA Chapter 49 Monthly Meeting, 7:00 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

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

May 16 (subject to change): Seventeenth Annual Scotty Horowitz Going Away Fly-In, Rosamond Skypark (L00), Rosamond CA. (661) 256-3806

May 19: No meeting. Go to Fly-In instead

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

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

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Jul 25 – Aug 1: Bearhawk/Skywagon Deployment to OSH. Sign on now! (661) 609-0942 or (661) 256-3806

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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THE LEADING EDGE
MUROC EAA CHAPTER 1000 NEWSLETTER
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http://www.eaa1000.av.org

ADDRESS SERVICE REQUESTED

THIS MONTH'S HIGHLIGHTS:
REGULAR MEETING 17 MAR @ TPS
KOMMANDANT BUFFOONS APPROACH?
OPERATION PHOENIX NOISEMAKER
OPERATION PECOS CRAYOLA

EAA™
The Leader In Recreational Aviation