

THE LEADING EDGE

NEWSLETTER OF MUROC EAA CHAPTER 1000

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

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July 2003

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:



Vintage Sailplane Hangar Inspection

Jeff Byard

Tuesday, 22 July 2003

1900 hrs (7:00 PM Civilian Time)

FOOD! FOOD! FOOD!

Mountain Valley Airport
Tehachapi, CA

This month we have a real treat for you! You can take the third Tuesday of the month and spend the time building/flying your airplane since we will be having our July meeting on the FOURTH Tuesday of the month...22 Jul for you military types. Of course, since there are five Tuesdays this month the meeting is still on the second-to-

last Tuesday...but I digress. We'll be hosted at the hangar of **Jeff Byard** at Mountain Valley Airport (L94). Some of you old-timers may remember that Jeff is the president of the Vintage Sailplane Association and gave a very entertaining talk to our Chapter a few years back on the development of early gliders. Jeff has an impressive collection of rare, historically significant, and beautifully restored gliders and sailplanes in his hangar. Most of these machines are flyable!

But wait, there's more! (*oh, krap...how did an infomercial get into my newsletter? Hmmm...*) Jeff has a BBQ grill (perhaps the match of the Chapter Grill?) and will have it fired up for the event. The chapter will be providing meat to grill, snacks, C³, and beverages for a nominal donation. Grill-space will be made available to those wishing to grill their own meat (don't go there). This

promises to be the highlight of the Chapter Grilling Season!

To give everyone time to dispatch to Mountain Valley Airport (N 35 deg 06.06', W 118 deg 25.39') we will set a rendezvous time at

Note Schedule Slip! 1 Week, 2 Hours to the right!

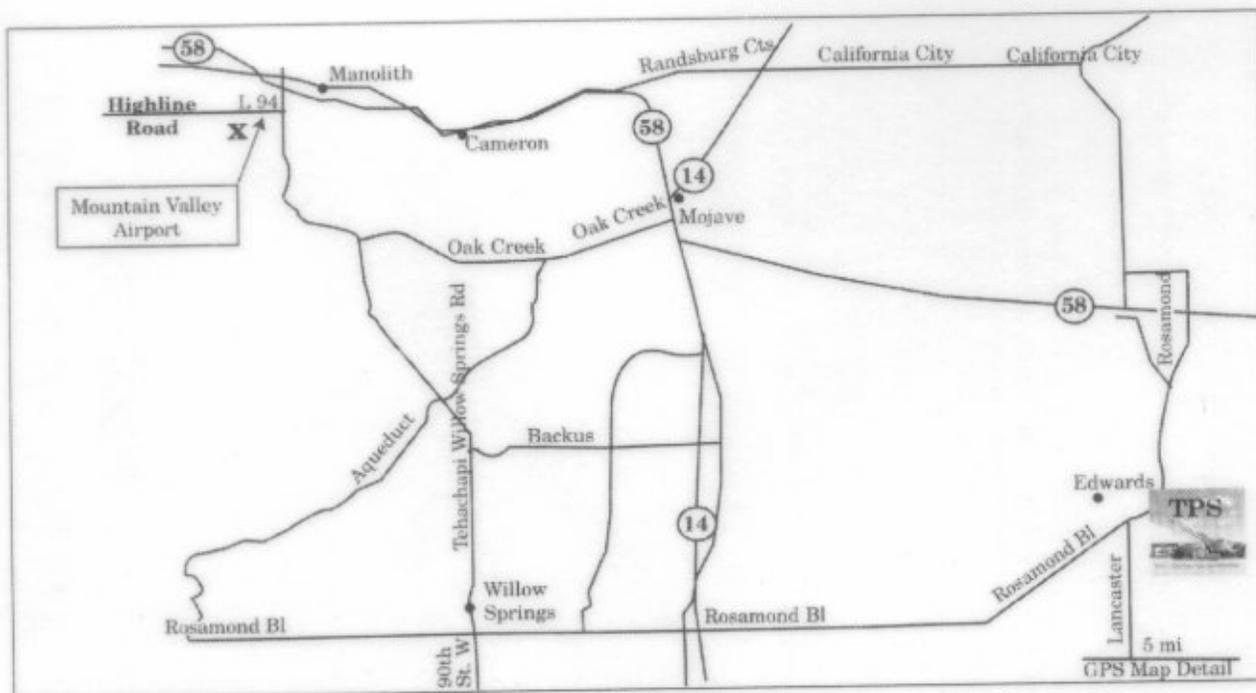
1900 hours local. (*If you can't make it at 1900L, then come at 7:00 PM*) If you can be there a little early you can plan on helping set up the BBQ. Throw a couple of lawn chairs in the trunk just in case we run out of chairs. While we munch we'll be entertained, thrilled, and enlightened by Jeff's excellent briefing on the history of his air machines and gliding in general.

Car-pooling is encouraged, as is plane-pooling (?). If you would like to fly in, be advised that L94 does not have runway lighting and that official sunset is 2001 hours local. However, Tehachapi Municipal Airport (TSP) does have lighting, and; with sufficient coordination, could result in flyers being picked up and ferried to L94 for the festivities. Contact the **Kommandant** if you wish to explore this possibility.

See you there!

- Gary Aldrich
Kommanding

So Just Where Is Mountain Valley Airport?



Last Month's Meeting

EAA Chapter 1000

High Cay

Rosamond Skypark, Rosamond CA

17 June 2003

George Gennuso, Presiding

The June meeting was held at High Cay, located at the secluded and scenic Rosamond Skypark, graciously hosted by **Doug and Gail Dodson** (of the **Rosamond Dodson's**).

A dozen chapter members were present to view the featured west-coast premiere (DVD) of **"Flying Route 66: a Sky Bum's Tour of the Mother Road"** by world-renowned aviation author and photographer **Russell Munson**. The video provided a tour by air of the entire path of Route 66 from Chicago to Santa Monica via the author's Piper Super Cub. Our own beloved Edwards Lakebed was even seen during the bonus showing of "What Is A Super Cub."

Ever the gracious hosts, **Doug and Gail** provided refreshments of "Bratwursts and Beer" (copyright pending), grilled to perfection by **Master Grillmeister** and **Vice-Kommandant George "The Knife" Gennuso**.

As the **Kommandant** was Absent WithOut Leave (AWOL), nor in attendance, the members present threw caution to the wind and dispensed with any semblance of Parliamentary procedure. Past, present and new business were indignantly ignored with reckless abandon and replaced with the swilling of mass quantities of the free beer. The Vice-Kommandant, rising to the occasion (from a drunken stupor), seized command and declared Victory!, summarily concluding the meeting. Subsequent to the

meeting, considerable after-action action was reported by reporters.

These are the facts as they may have happened. All in all, just a typical meeting.

- Kent "Cobra" Troxel

Secretary

Kommandant's Korner

Greetings,
Eh!

As promised, I'm here to regale you with the latest Skywagon adventure...this time to the land



of Sgt Preston and his faithful dog Yukon King (anybody old enough to remember that one?). Yes, last month saw N61691 parked over 1100 nm away from the hot, dry winds of the Antelope Valley. The trip began with a leisurely flight up the San Joaquin to Sacramento Executive (KSAC) on a Friday morning to visit daughter number two; who was beginning her career as an assistant music director for the local theater group. After a fine visit, during which she demonstrated that the financial ties to Mom and Dad have not been severed, **Mrs. Kommandant** and I made the short (40 min) hop over the mountains to Reno (KRNO) and the Hilton for the night. On a whim, we decided to park at Jet West on the west (what else?) side of the field. This turned out to be a good decision as the level of service and friendliness was noticeably higher than our previous visits to Reno and Mercury Air Center. (Fuel: \$2.99/gal w/AOPA discount)

We arrived at the Hilton (site of a couple of previous **Project Police** bivouacs) in time for a nice dinner and an opportunity to contribute to the local economy at the blackjack tables.

Saturday morning dawned clear and calm, offering us our choice of the many runways. As it turned out we used two...one for the first takeoff and another for our quick return to the field to secure the oil service door (D'oh!). Anne asked me why I didn't log the 15 minute out-and-back, to which I replied, NO ONE would ever know of the buffoonery, so why document it? (*your secret is safe with us...after all, does anyone read this stuff anyway?*) After this short hiccup in the schedule we were on our way to Boise, Idaho (KBOI) for our first (official) stop. The change to Mountain Time and the 2.9 hour flight time conspired to generate a lunch expedition. The FBO kindly ferried us over to the local Copper Kitchen where we replenished our internal fuel tanks. The Skywagon's tanks took 30.5 gallons at a cost of \$3.03 per. The next stop was Spokane International (KGEG), and we arrived there after 2.3 hours of cruise over some pretty desolate countryside. This trip inaugurated the use of our Nelson portable aviation oxygen system that we purchased at last year's AOPA convention in Palm Springs. The system worked flawlessly, allowing comfortable long-duration cruise between 11,000 and 13,000 ft MSL without the usual fatigue and headache issues.

At Spokane (\$3.16/gal...notice a trend?) we paused only long enough to adjust the c.g. of the crew, the airplane; and to address the bureaucratic necessities of international air travel. This entailed a review of the aircraft and pilot documentation (Registration, Medical Certificate, Pilot Certificate, passports, Radiotelephone Operators Permit, U.S. Customs sticker, Aeronautical Radio Station License) as well as a call to Canadian Customs at 1-888-CANPASS. The call, unfortunately, did not go well and necessitated some fevered negotiation and a couple more phone calls to secure the necessary arrangements for our arrival. This was due to the very non-aeronautic fact that I was carrying a small survival firearm and I ran headlong into some very strong personal politics. I won't spend the space here to detail the issue as it is well to the side of the story "track", but suffice it to say that eventually we were assured of a routine welcome in Calgary. (For the price of a beer I'll tell you all the sordid details...)

The leg to Calgary International (CYYC) by way of Cranbrook was spectacular. We passed over the eastern edge of the Canadian Rockies, over an increasingly dense cloud layer, at 13,500 to 14,500 ft MSL. These relatively "young" mountains were snow-capped, craggy, and very pristine (read remote). Holes in the clouds revealed heavily forested valleys and lots of vertical rock faces. The newly overhauled Continental didn't even go into "auto-rough" at the seeming dearth of emergency fields, though the pilot's nerves began to tense somewhat. The rugged terrain also prevented reliable radar coverage and even the radio was occasionally silent. About 50 Km out of Calgary we began a gradual letdown into the vast Canadian prairie. Calgary "Terminal" (TRACON) vectored us around extensively to allow every airliner in western Canada to

land and then cleared us to a runway with a 25 knot crosswind! The wind really wasn't as bad as reported (Canadian Knots being worth about a third less than the American variety) and the landing was uneventful. Progressive taxi instructions were provided to the Customs area where we were met by a pleasant gentlemen who stamped our passports and scrutinized my firearm.

After Customs clearance we quickly determined that neither of the FBOs on the field were equipped or welcoming of "little" airplanes. Ramp space with chocks or exorbitantly expensive hangar space was all that could be had. Fortunately, a friendly lineman at Shell directed us to a small area on the south side of the field where small aircraft could be tied down to an anchored cable. A quick taxi to this spot revealed the necessary space to secure the **Fightin' Skywagon** for the week. Of course, at 1900 on Saturday evening, the place was pretty deserted and Anne and I began to wonder just how we were going to get to Enterprise to pick up our rental car. This dilemma was solved when two local pilots noticed a couple of forlorn and bewildered Americans standing in a puddle of luggage and offered to take us to the rental agency. Since my cell phone's battery had "expired" and Anne's Nextel couldn't speak Canadian, the assistance of our fellow aviators was much appreciated and I promised to return the favor if they ever came to our neck of the woods.

The hour-long drive to Canmoor and our condo gave us our first ground-level view of the auspicious Rockies and **Banff Provincial Park** in the gathering dusk (sunset at 50 deg North latitude is after 2200 hrs!). The ensuing week of sightseeing and eating our way around **Lake Louise** and **Banff** was an awesome experience worthy of an article way more detailed than this, so I'll save most of the details for when I see you at the meeting...and I'll have lots of pictures of scenery and wildlife to bore you with.

A couple of items, though, are worthy of mention. One is that the whole area was experiencing a shortage of tourists. The shopkeepers allowed as how mid-June was a tad early in the season due to the variability of the weather; but also, the "triple-whammy" of September 11th, the SARS-scare, and the Mad-Cow disease issue had combined to severely curtail the tourist population. What this meant to us was short waits at all the restaurants and attractions, low prices due to the exchange rate, and a pleasant, uncrowded atmosphere to enjoy the magnificent vistas. Secondly, speaking of vistas...before this trip I would have told you that my vote for the prettiest mountain landscapes in North America were the Grand Tetons. Well, I'm afraid the Canadians have us beat. I have never seen such gorgeous panoramas of mountains surrounding verdant pine forests, pristine glacial lakes, and seemingly endless white snow fields. The trip was over way too fast, leaving a huge number of local beers and restaurants un-tried.

Just shy of a week after our arrival we were back at CYYC to start the trek homeward. We found the Skywagon waiting patiently in the grass, and, after loading all the luggage and souvenirs, taxied back to the Shell-Canada FBO to fuel and file an ICAO flight plan. We took on 97.65 liters of 100LL for a cost of \$118.91 CDN. To save you the math, gas was approximately \$3.49 US/gal.



Auto fuel was running \$0.71 CDN/liter, or about \$2.10/gal (regular octane). Once again, the obligatory call to Customs (this time, U.S.) was made and the standard questions answered. Our port of entry would be Cutbank, Montana (KCTB), about 30 nm south of the border. The Customs Agent was dispatched from a little town on the border called Sweetgrass. The flight to Cutbank was uneventful, under 5,000 ft scattered to broken clouds and light winds. Though we were cautioned a week earlier by FSS that we would be required to squawk a discreet transponder code and maintain radio contact with ATC during the border crossing, the radar could not oblige and we were summarily dismissed by Canadian ATC well



before the border and unable to pick up Seattle Center until well after penetrating U.S. airspace. So much for security. Cutbank was sporting a gusty 20-kt wind that was pretty much down one of the two runways. Taxiing into the yellow-striped customs area adjacent to the vacant terminal building, we were met by the Customs Agent. He inspected all those documents mentioned above and officially welcomed us back home.

The next leg, from Cutbank to Jackson Hole (KJAC), Wyoming turned out to be the most challenging of the trip. The terrain rapidly rose to average about 9,000 ft MSL. At the same time, the cloud cover became nearly solid at 10,000 ft MSL, or so. The tops appeared to run around 15,000 ft MSL and the potential for icing in them was reported to be significant. Further, a line of rain showers with embedded thunderstorms was developing over the highest terrain in a line that pretty-much described my desired flight path. This necessitated a bit of maneuvering to stay over the lower terrain while trying to make headway toward KJAC. The GNS-430 really shone in this environment, allowing continued situation and position awareness while making significant heading changes.

The "hole" in Jackson Hole refers to the fact that the valley and its airport are nearly surrounded by the Grand Tetons on the west, and similarly statuesque peaks on all the other sides. Entry to the valley is gained by flying down the Snake River canyon over Yellowstone Lake, to the north, or sneaking through the Teton Pass (8400 ft MSL) on the southern end. As the northern route was pretty well hammered with "TSRA" and low ceilings, I chose to stay VFR to the west of the Tetons and do an "end run" by way of Idaho Falls, Driggs, and then through the Teton Pass. This plan, while stretching the flight time significantly, was ultimately successful. For our efforts, we were rewarded with a landing fee (\$15), and ramp fee (\$7.50) and fuel at \$2.96/gal. Since the credit card was still working, we accepted a ride to our Bed and Breakfast in Teton Village and set off to explore the area. We had a "million-dollar" steak dinner in the Million Dollar Cowboy Bar, and retired to the B&B (after cruising the shops, of course).

The next morning (Sunday) dawned with foreboding clouds resting on the mountains in all quadrants. After a leisurely breakfast in our room we were ferried back to the airport to see what we could see. DUAT and the local

pilots were all forecasting a small break in the cloud cover around 1100-1130 hrs. Filing IFR was an option, but not a good one as the MEAs in all directions were 15,000 ft and there were no reports of where the tops of these soggy clouds were. The freezing-level was firmly anchored at 9000 ft. We passed the time doing what pilots do best...staring out the window at the clouds and willing them to go away. Finally, around 1115 I chose to "go take a look" as the radar showed building storms to our south that threatened to cut us off from our intended destination, Logan, Utah. Flying down to the south end of the valley allowed a look through Teton Pass. Ceilings in the pass allowed about 1500 ft of clear daylight so we sneaked through to the southwest. Thereupon, the ceilings continued to fracture and scatter as we moved south in the face of a northerly-moving wet storm system. By the time we neared Logan (KLGU), the clouds had risen to 12,000 ft MSL, leaving bumps, but no moisture. We borrowed the airport car for a quick trip into town for a wholesome lunch among tables surrounded by lots and lots of tow-headed kids (what's up with that?). While we were gone, the lone airport attendant filled the Skywagon with 14.7 gal at \$2.92 per.

Leaving Logan saw further improvement in the cloud situation, accompanied by further increases in the thermal and orographic turbulence. The GPS ground speed readout dropped to the low 100's due to the northerly flow around the low pressure area. Despite the slow progress, we arrived in the vicinity of St George, Utah (KSGU) after about 2.5 hours. I say vicinity, because the AWOS was reporting 26-29 kt direct crosswinds on their single runway. I asked Anne if we could press on and she allowed as how she could probably stand it rather than wrecking the airplane in St George. Turning westerly gave a slight, but welcome increase in ground speed and we arrived at North Las Vegas Air Terminal (KVGU) with a total elapsed time of 3.4 hours...the longest leg of the trip. After a short stretch in their luxurious pilot lounge (and gas at the self-serve pump at \$2.52/gal) we departed over familiar terrain towards Fox Field. The winds allowed a reasonable cruise at 8500 ft MSL for about 1.9 hours total. We landed at about 1930 hr and wearily put the trusty Skywagon to bed, ending a terrific aviation adventure.

I'm sure I left something out...so hit me up at the meeting if you want any more details on any aspect of the trip!

Fly safe and check six!

- Gary Aldrich
Kommanding



Young Eagles Update

Good publicity and GREAT weather combined to result in THE most fruitful Young Eagles rally in the 2-1/2 years I have been coordinator, with 90 (yes, NINETY!) Young Eagles and

many parents being introduced to the joys of flight.

The Antelope Valley Press published the press release on the back page of the first section, and as a result my phone barely stopped ringing from Thursday morning through Friday evening before the rally. A press release was also published in the Mojave paper, and several of you helped out by distributing flyers in your local areas.

Pilots and aircraft participating in last Saturday's rally and number of Young Eagles flown by each are as follows:

Pilot	Type	#YE
Don Gates	Mooney M20C	10
Wen Painter	Cessna 182	12
Kim Cummings	Cessna 172	9
Ed McKinnon	Mooney 231	13
Bob Hoey	BD-4	4
James Roberts	Bellanca Cruisemaster	9
Bill Hoverman	Mooney 231	12
Shel Simonovich	Cessna 150	5
George Sandy	Cessna 177RG	10
Paul Rosales	RV-6A	5
Miles Bowen	Cessna 170B	1

Total this rally: **90**

Total this year: **243**

This is a bit shy of half way to our goal of 500, but historically we have flown more in the last half of the year than the first half, so we're well on our way!

Just to prove that what goes around comes around, Bob Hoey was recognized by one of the Young Eagle parents whose older daughter had participated in the Kitfox program several years ago. Because of that, she specially requested that Bob be the one to fly her younger daughter at the Mojave Rally.

We were ably assisted by the following ground crew:

Amanda Bowen	Registration
Rebecca Bowen	Registration
Miles Bowen	Aircraft Assignment
Linda Smith	Certificate Production
Karen Steinaway	Certificate Production
Carol Flores	Certificate Production
Mary Beth Gates	Photos and Certificate Presentation
Victoria Rosales	Photos and Certificate Presentation

Thank you **Wen** and **JoAnn Painter** for suggesting Mojave as a Young Eagles rally site, and your efforts in coordinating with airport management and security to help make this a successful rally!

While we really appreciate and want to recognize all participants in our local Young Eagles program, I want to specifically recognize the Tehachapi Society of Pilots for the special efforts they have been making recently. Rallies are announced at its meetings, reports are published in its newsletter, and its members participate. As you can see, 28 Young Eagles were flown by **Kim Cummings**, **James**

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Roberts, and George Sandy. Kudos to them for recognizing that young people ARE aviation's future.

I would also like thank X-COR for providing the post-rally entertainment. For those fortunate enough to be able to stay, X-COR provided a tour of their hangar (including the EZ-Rocket) and a demonstration firing of their alcohol-nitrous oxide thruster.

Respectfully submitted,

Remaining Rallies for 2003

Jul 26	Fox Field Terminal Building	8:00am
Aug 16	Fox Field Terminal Building	8:00am
Sep 20	Rosamond, A. V. Aviation	8:00am
Oct 18	Tehachapi Muni, Benbow Aviation	8:00am
Nov 15	Fox Field Terminal Building	9:00am
Dec 13	Cal City Muni, Terminal Building	8:00am

- Miles Bowen

EAA Chapter 49/1000 Young Eagles Coordinator
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(661)822-0806 (home)
(661)275-6528 (work)

If That Horowitz Guy Wasn't At The Fly-In, What Has He Been Up To?

(an e-mail conversation...)

Houdu,

Mike Good forwarded your e-mail to me. My e-mail address is scott.j.horowitz@nasa.gov.

Hope all is well with you.

"Doc"

All is well with me. I am officially homesteaded here at TPS and run the Qual-Eval program in addition to the usual FTE flying duties. Gail has finished teaching her first AV College class.

What I want to type to you about is your EAA Chapter 1000 dues. The **Project Police** volunteered me to hit you up for it since you were my TPS classmate. How's that for good news?

Anyway, I'm sure you would want to pay a meager \$20 to retain the honor of having our annual fly-in named after you. We did miss you at the fly-in and reminisced about the various times you dropped in. Being that you typically did that unannounced, we were never sure if you were going to show or not. Made for some fun conversation that day.

How are you staying busy these days, and how is Lisa?

-Houdu

EAA Chapter 1000 Treasurer
4431 Knox Ave
Rosamond, CA 93560

Houdu,

Sorry I've been remiss. Life has been anything but peaceful since 1 Feb (I spent a month in East Texas doing what no one should ever have to do again). Since that time I have been on the road almost non stop. I will try to sit down this weekend and send in my dues. Sorry I missed the fly-in (I actually had planned on taking leave and flying out there in the Tri Q-200).

Thanks, "Doc"

Lisa, Arielle, and the twins are doing well, but life is definitely more interesting!

I figured you were pretty busy... didn't know you were actually out in the field on the recovery effort. Anyway, the **Project Police** have a very short memory so don't worry about grudges :)

Keep up the good (if not fun) work.

Oh, I thought I remembered a kid, but 3? Including twins? That's news to me. Belated congratulations!

-Houdu

Analog To Digital In US Aircraft

Growing up as an Army brat in Southern Germany, I can remember hearing the sonic booms of F-104's breaking the sound barrier above the little town where we lived. My parents both worked at a US Army communications base. Sonic booms overhead were a common occurrence during those times. The F-104 Starfighter was (and still is) one of my all-time favorite airplanes - "the missile with a man in it" as it was called. I got a plastic model of it for a Christmas present and my Dad helped me put it together. I enjoyed countless hours zooming all over the world with that plastic model.



When I was older, I joined the USAF with the dream of becoming a fighter pilot. I was young, eager and ready to do what needed to be done. The vagaries of nature ruined those plans. I didn't have 20-20 eyesight without glasses and that was enough to disqualify me for USAF pilot training. Unfazed, I enlisted anyway. Pre-enlistment testing had indicated a high aptitude for electronics so that is where my recruiter suggested I concentrate my efforts. The Air Force wasn't going to let me fly airplanes but I knew one thing, if I couldn't fly them then the next best

thing would be to work on them. I just wasn't real sure exactly what it was I wanted to be doing when it came to fixing airplanes.

Did I want to work on engines, instruments, airframes, bombs, missiles? There were a thousand different career fields to choose from and I finally selected a career field that had the most impressive sounding name. "Avionics Inertial and Radar Navigation Systems Specialist". Wow! That sounded like a real humdinger. It must be something real technical and I can learn a lot from that, right?. Won't Mom and Dad be impressed by that!

Not too long after that I found myself in basic training at Lackland AFB, Texas. Then it was off to Keesler AFB Mississippi and technical training in the selected career field. Turns out that the Avionics Inertial and Radar Navigation Systems area was one of the better careers you could have chosen. As students in the finer aspects of avionics and weapons systems in US aircraft, we measured the superiority of each, particular career field by the length of time you spent in classes. I felt pretty good about my choice knowing we would be in specialized classes for something around six months. We learned a lot about aircraft systems used in a variety of aircraft in the US inventory.

I wound up at George AFB in Southern California. I thought I must have done something wrong to have gotten stationed there and now I was being punished for whatever it was I did wrong. "What the heck had I done to deserve this kind of assignment"? I had visions of crawling over sand dunes crying out "water! water!" It was in the desert, after all! But I was going to be working with inertial navigation and bombing systems on F-4 Phantoms and I had to do my duty.

Inertial navigation didn't need to emit or receive radio signals in order to navigate in enemy territory so it was considered a better system than some others that depended on transmitters located on the ground or in the aircraft. Also, inertial navigation systems were integral to many weapons systems so I think that is why we wound up working the bombing and missile release systems in addition to inertial navigation systems. One type of system already in the process of being phased out was the Janus Radar system. Janus radar worked by emitting four beams of radio energy from each quadrant of the aircraft. Each of four beams would be directed to the left front, the right front, the left rear and right rear of the aircraft. By measuring the time it took radio signals to bounce back to the aircraft it was possible to arrive at a solution for wind correction angle, wind speed at your elevation, ground speed, true airspeed, altitude, etc. It depended a lot on the type of terrain you were flying over. If your flight was over smooth water you might have some problems with the system as the reflected radio waves didn't bounce back to the aircraft too well. Still, combined with inputs from other aircraft systems, it was possible to arrive at a pretty comprehensive solution to your navigation problems. The considered weak point was that you were emitting radio energy and thus the enemy could detect your transmissions.

It wasn't long before we began to realize that as Avionics Inertial and Radar Navigation Systems Specialists, we were responsible for a host of different

aircraft systems. Our responsibilities ranged from stellar navigation systems in the SR-71, MADARS (Malfunction Detection and Recording System) in the C-5 Galaxy and a number of different Inertial Navigation Systems used in a variety of aircraft. Much to our surprise, we were also charged with weapons systems such as Anti Radiation Missiles (AGM-65) for the Wild Weasels, the Bendix CP-805 bombing computer used in the F-4 Phantom fighter and other similar systems. The amazing thing about these systems was that they were analog in their operation. All of these systems worked on very complex analog principles.

The methods used in these older, analog systems rank more as a work of art in achieving what was then a high tech solution to the problem of navigating to your target and then dropping bombs accurately. We were able to guarantee bombing accuracy to within a 300ft CEP (circular error probable). In actual practice, the pilots could do better than that by altering bomb coefficient of drag settings to make the bomb drop slightly later or sooner than what the computer would otherwise command. This is one of the reasons that lots of practice was so important. If any of the system units were replaced, then the settings the pilot used to compensate for any inaccuracy of the system had to be learned all over again and this took lots of practice. During Red Flag competitions we would spend hours fine tuning each bombing system in order to wring out the maximum performance possible. We would remove virtually every part of the bombing system and calibrate them as a unit. Our F-4 pilots would do pretty well by holding their own against F-15's and F-16's. Ultimately, the newer jets would win out because of the digital systems they had.



The contrast between these analog systems and today's digital systems, gives you a real appreciation of the complexity and sophistication of the analog methods that were used to arrive at navigation solutions and bomb dropping calculations. It's dammed near difficult to impossible for the uninitiated to appreciate the differences between the old analog and the new digital systems. It's a true testament to the abilities of our engineers that they were able to design, build and make analog computer systems work as well as they did. The F-4 is still flying so who knows, these systems may still be in use.

By fate I found myself uniquely positioned in time such that I've seen the maturity of the analog systems while being present for the evolution of the digital computer and its use in aircraft. The superiority of the digital systems is clearly seen in the changed course of modern warfare. Just consider the outcome of the Gulf War or Operation Iraqi Freedom and the role of smart weapons. These smart weapons live by the digital computer.

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The digital computer is fast, accurate and with the right software, very reliable. Imagine, for a moment, how a modern computer arrives at a solution for bomb release. Air speed, ground speed, vertical velocity, pitch angle, coefficient of bomb drag, slant range, type of bomb and a host of other quantities are each expressed by a digital number. Those numbers are input to a mathematical formula the computer uses to calculate the exact moment for bomb or missile release. More modern systems couple this with infrared sensors and GPS. The older, analog systems actually used discrete voltage levels, phase differences, gear positions, summation amplifiers and feedback loops that represented the bomb dropping calculation. Imagine trying to represent a complex mathematical formula with the use of gears and voltage levels and you can begin to appreciate the difference between the older systems and the newer, digital systems. The navigation and bomb dropping formula was solved by representing each, individual portion of the bomb dropping equation by the position of a precision gear that interlocked with a sine and cosine gear that represented another part of the solution which then interlocked with another gear that might represent ground speed and bomb drag coefficient. Some these quantities were then summed with and integrated in analog amplifiers whose discrete voltage levels added up to the correct bomb release times. Does this sound complicated? Trust me, it was. This description might even be oversimplified but I think it gives an insight into how these analog systems worked.

In actual practice, the pilot, having dialed in his aircraft systems for the particular type of bombing run and type of bomb used, would simply hold his "pickle button" while the analog computer would calculate the bomb release time. If you could look into the computer as it was actually working you would see a mass of gears connected to syncros, servos and potentiometers all moving in sync with any change in attitude, speed, vertical velocity, slant range, etc. During maintenance in the shop, we would simulate bombing runs while we watched the system at work. It was an amazing sight to see this mass of gears move together to solve the bomb dropping equation. These old systems were far more complex than a modern computer and, to me, they rank somewhere with works of art. If we were to build these systems today I think we would have a hard time affording them. Still, the best accuracy you could get was a bomb hit to within a circular error probable of about 300Ft.



It's not too much of a stretch to look at these systems as the ultimate development of the Swiss watch. These analog bombing systems represented the state of the art in analog based weapons systems before the advent of the modern, digital computer.

With today's digital systems you can put a bomb in a 55-gallon drum all day long or navigate to your destination with an error measured in feet. The old analog computer measured about 7 inches square and about two feet deep. Today, that same bomb dropping solution exists as a bunch of numbers in a chip that might be no bigger than the pointy end of a pin.

- Frank Haertlein

Party!

There will be a "**100 Years of Powered Flight Celebration**" hangar party on **Saturday, 19 July**, co-hosted by **Gail Dodson** and **Leigh Kelly** in the hangar at **High Cay** (aka the Dodson's residence at



Rosamond Skypark). The party starts at 4. Dinner will be pot-luck. For dinner, please bring something to grill and a side dish or salad to share. The hosts will provide a grill, beverages (draft beer and canned soft drinks), eating implements, an official "100 Years of Powered Flight Celebration" cake, and a live band. The band will perform from 6 to 9. So, mark your calendar for 19 July, 4 pm, 4431 Knox Ave at the Rosamond Skypark, and get ready to celebrate Wilbur's and Orville's great achievement that made aviation possible! Please call Leigh at 256-1616 or Gail at 256-7276 to RSVP so that we can get a head count to ensure an adequate supply of cake and beverages.

- Leigh Kelly

New Members

Well, we've gotten way behind on welcoming our new members, so it's time to catch up before Evil Editor Zurg takes action.

Frank Haertlein first joined us at the big wingtip suckenation-fest in April at **Waldo's**. You've probably noticed him already—he was the guy flying the Yak-52 around the Rosamond Skypark pattern during our fly-in in May. He lives in California City, but I'm not sure where his airplane lives (seems like it was at the Cal City airport). He spends his days as a laboratory analyst and research assistant. He has a private pilot license with a complex and high performance endorsement. **Terry Pierce** is responsible for introducing Frank to the ways of the **Project Police**.

Tina Visco also came to us that same day at **Waldo's**, brought by **PPO Ron Wilcox**. Tina works with Ron at NASA's Dryden Flight Research Center as an Aerospace

Engineer. She recently moved to the Antelope Valley after a stint in Ohio at NASA's Glenn Research Center.

Returning to the *Project Police* virtual station house and hangar is **Vince Sei**. Those of us who have been *PPOs* longer than we care to remember (that's, like, forever...) know that Vince is a former Vice Kommandant, having served under **Kommandant Pelletier**. **Kommandant Aldrich** is particularly aware of this fact, since it was Vince's departure from his post that led to Gary being elected Vice Kommandant, which led to his current Kommandantship on Mike Pelletier's departure. Vince has come back to the hot bed of flight test to serve as the Performance Branch Chief at the USAF Test Pilot School. One of the downsides of this job is he has to work closely with **Erbman**, but Vince claims he is up to the task. When not harassing TPS students, Vince is at home in Rosamond (just down the street from **Hojo**) riveting together his F-1 Rocket kit that just arrived earlier this month. He's even learned how to borrow tools from Erbman. As his greatest aviation accomplishment, he lists "have not killed myself yet." In the process of not killing himself, he has accumulated a Commercial Pilot certificate with ratings for instrument, single engine land, multi engine land, single engine sea, multi engine sea, and an instructor certificate for airplanes, instruments, and multi engine airplanes. Ask him sometime to compare the flying qualities of the Twin Bee and the Grumman Albatross.

Well, that should about do it, at least until you bring in some more new *PPOs*!

More Vintage Sailplanes?

Listen at this month's meeting to **Jeff Byard** for more info on the Vintage Sailplane Association's National Rally in Tehachapi, 23 August to 1 September 2003.

Project Police Aircraft Spotters Quiz

Evil Editor Zurg is happy again—the difficulty level of the spotters quiz is back up again. As usual, *PPO Jim Piavis* was the only respondent to last month's quiz. Also as usual, *PPO Piavis* was correct. Boy, this guy is tough!

To refresh your memory, here is last month's picture:



From *PPO Piavis*:

"Zurg's Whipping Boy,

Karnack submits a **Lockheed C-40B** (the sole example of the species). This one was fairly difficult, even for the master... Close to chasing down leads as a Beech C-45, but the cockpit just didn't look right. Hummm, maybe

Lockheed Lodestar? Good lead. Electra? Baby Electra? Model 12A? Found this interesting site with a different photo.

<http://www.flightjournal.com/fj/articles/electra/electra5.asp>

Almost fell for the XJO-3 version which tested early tri-cycle configuration off of carriers for the Navy but further investigation revealed a different variant.

Hey, can I go now? I need to get back to feeding the new munchkin....until next month Zurg!"

The original caption from *The Lockheed P-38 Lightning* by Warren M. Bodie (where I found this photo) was "One Lockheed Electra Jr. (Model 12) was tested with the XP-38 style nose gear after XP-38 was lost. It was designated C-40B. The Navy tested nearly identical XJO-3 version on a carrier. Main wheels were nonretractable."

Very well then. In the interest of encouraging participation, Zurg has directed that we include some easier pictures for you to identify. Here's one so easy that even the **Kommandant** can identify—or at least he better be able to, since I bet we'll find this very aircraft in his log book.



Special bonus points for additional data, such as identifying the location (airfield), who's flying, who owned the airplane, what happened to the airplane, etc.

Now for the **Piavis** stumper, or at least the **Piavis** puzzler:



Standard rules apply. Identify the pictured airplane and describe its significance. Bonus points for web page references to additional information. Send your guesses in to **Zurg's Whipping Boy** at erbman@pobox.com. Alternatively, send your guess by any other acceptable means of communication.

Web Site Update

As of 3 Jul 03, the hit counter stood at **83780**, holding the hit rate at 21 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

Jul 22: EAA Chapter 1000 Monthly Meeting, 7:00 p.m., Mountain Valley Airport, Tehachapi, CA. (661) 609-0942

Jul 26: Young Eagles Rally, 8:00 am, General William J. Fox Field, Lancaster, CA. (661) 822-0806

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

Aug 16: Young Eagles Rally, 8:00 am, General William J. Fox Field, Lancaster, CA. (661) 822-0806

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

Aug 23 – Sep 1: Vintage Sailplane Association National Rally, Mountain Valley Airport, Tehachapi, CA (661) 609-4848

Sep 2: EAA Chapter 49 Monthly Meeting, 7:30 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

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

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

Sep 20: Young Eagles Rally, 8:00 am, Rosamond Skypark, Rosamond CA. (661) 822-0806

Oct 7: EAA Chapter 49 Monthly Meeting, 7:30 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

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

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

Oct 18: Young Eagles Rally, 8:00 am, Tehachapi Municipal, Tehachapi CA. (661) 822-0806

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:

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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!

THE LEADING EDGE

MUROC EAA CHAPTER 1000 NEWSLETTER

C/O Russ Erb

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

ADDRESS CORRECTION REQUESTED

THIS MONTH'S HIGHLIGHTS:
MEETING 22 JUL IN TEHACHAPI
KOMMANDANT IN BANFF
ANALOG TO DIGITAL AVIONICS
TWO MYSTERY PLANES



The Leader In Recreational Aviation