Central States Association

A Product of Creative Minds

Volume 30 April 1993

Editorial

Terry Schubert - The strong winds blew down a tree in front of the house last night and we set another low temperature record. I was beginning to wonder if winter would ever end. Then I got a letter from Sid Stiber who wrote of all the upcoming summer flying plans he had: Mojave, Sun-n-Fun, **KCGIG 93,** OSH in a biplane, etc.

In the same mail came the agenda for the CSA Spring Fly-in organized by Mike Bem. *(See page 2 for details.)* Then I remembered that Sun-n-Fun is just days away, with the Wright/ Atkinson Bahamas trip right on its heels. *(See page 30 for deatils.)* Thanks to all of you hard working CSA members I feel better. Spring and better flying weather are definitely coming soon.

The better weather, your creativity, and our sharing of information will allow you canard enthusiasts to expand both your equipment technology and your experience horizons.

Thanks to our networking, at least 14 people received a very good price on the Mini-FuelWatch computer installation. This issue shows how a low cost digital tachometer can be had. Another article describes a low cost warning system you can make and install. Read about how David Timms set a new world altitude record with help from an electronic ignition system. It seems the electronic technology is making our birds safer and with more capability.

The increased capability has enticed us to try greater flying adventures. The Northeast Flyers have a new adventure each weekend. Many of you have reported trips to Alaska and many more are planning the same. There are even those planning an EZ trip to Russia. I'm sure there are those of you working on new ideas to set further world records.

Yes, spring is coming and with it comes opportunity for adventure and growth. I'm proud to be associated with such a great group of achievement motivated people as you are. As each of you makes a contribution to our canard flying technology the whole group profits. Thank you for caring enough to make the contributions.

SAFETY-POXY SAFETY BULLETIN

The latest Canard Pusher described a recent OSHA ruling which suggested we should stop using Safety-Poxy. You might wish to review the CP or call OSHA (202) 523-9667 for details. Essentially, it stated that Hexcel's Safety-Poxy hardener (2183 or 2184) contains sufficient quantities of MDA to be toxic to the human liver as well as being suspect as a carcinogen.

Fully cured articles made with MDA are exempt from this ruling.

Insuring a protective system would be too costly for even Scaled Composites so they have tested over 70 possible alternative epoxies and have found at least one that satisfies all structural, pot life, and wet-out characteristics. Fuel compatibility tests are now in process. It contains **no** MDA and meets current OSHA requirements for safe use.

The resin is PR2032 and the hardner is PH3660-2. The mix ratio by weight is 100 parts resin to 27 parts hardner. By volume, the mix ratio is 3.2 to 1 (resin to hardner). This is not the same as Safety-Poxy but Michael's Engineering is working on a method to convert your current Safety-Poxy ratio pump to correctly ratio the new epoxy. I hope to have that information printed in this publication if it is received by press time. If not, contact RAF at Building 13, Airport, 1654 Flight Line, Mojave, CA, 93501. Please note that RAF's address has changed with the addition of **1654 Flight Line.** The post office will not deliver your mail if you don't have that on your letter.

Don't Forget OSH 93 Date Change

Don't forget this year OSH 93 will **start** on **Thursday, July 29** and will end on Wednesday, August 4.

Long-EZ - Vukos Style Part 2

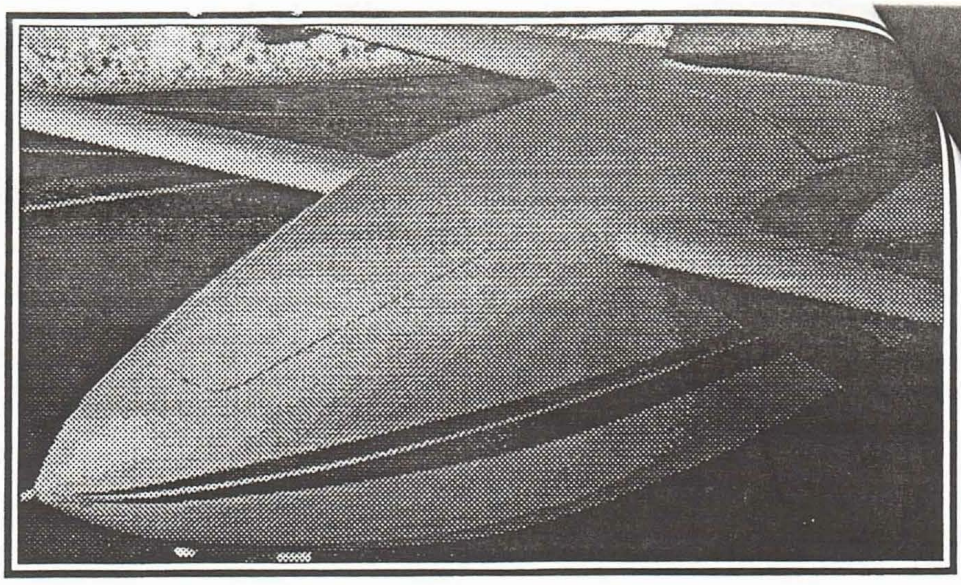
In recent Long-EZs builders, like John Vukos, have been moving toward cooling drag reduction methods such as using armpit scoops to collect cooling air. The first time I recall seeing this concept was on the US Army Long-EZs in the mid 80's. Dave Ronneberg, Berkut designer, has refined that concept and has proven its value.

John's conversation with Dave Ronneberg concerning inlet size plus a little "tractor factor" produced cooling inlets with nine square inch area.

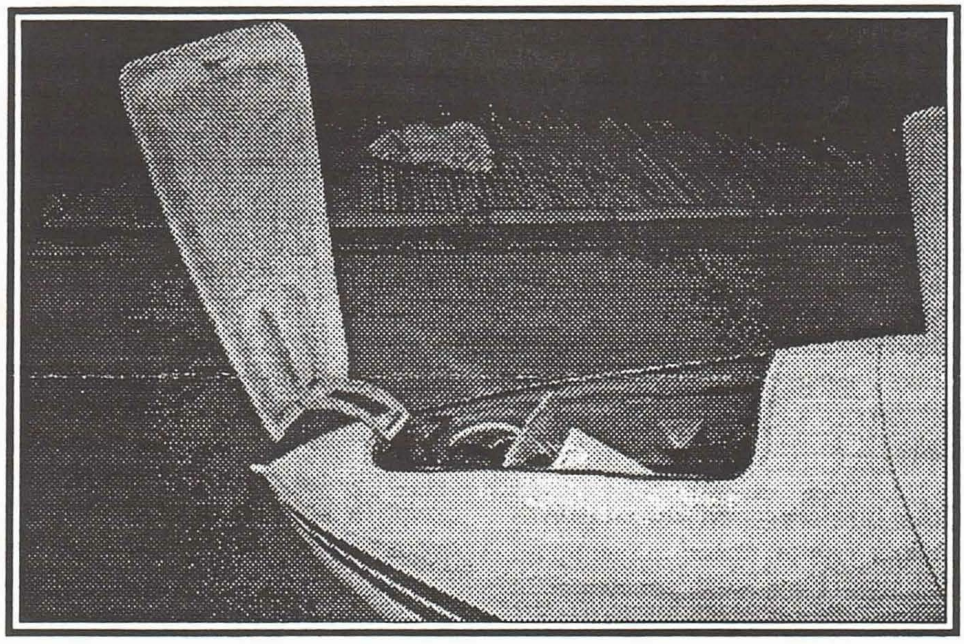
John described the armpit scoop fabrication as just sticking on some foam after fitting the cowl well. He covered the fuselage and cowl with plastic wrap to allow easy digging out of the foam. The foam shape was covered with plastic wrap and then plies of BID were laid up to complete the scoops. After the layups, he cut the cowl/fuselage joint, removed the cowl, dug out the foam, and cut out the opening into the cowl. The airstream is directed at the cylinders. The oil cooler is mounted aft of the carb and ducted to the aft baffle. This location eases cowl removal as the oil cooler does not have to be dealt with.

The uncluttered instrument panel is possible because of the Rocky Mountain Instruments installation. John reported the kits were easy to assemble and work well. He has the uMonitor for all engine monitor instruments and the uEncoder for IAS, TAS, altitude, VSI, OAT, etc. Call John for details if you are interested in either of these instrument systems.

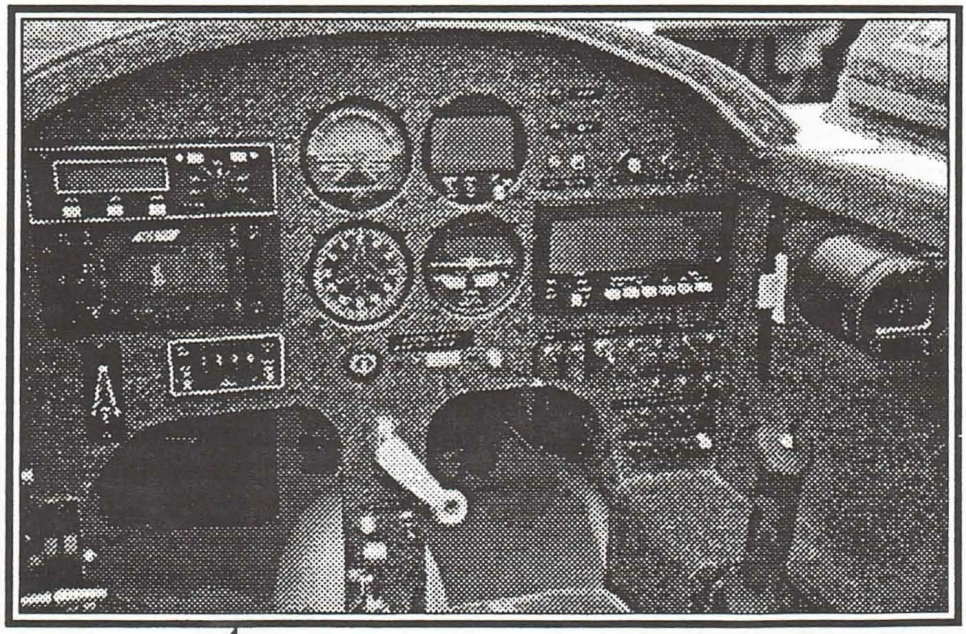
The WagAero ICS plus navcom got mixed reviews as the features were very desirable but he has sent six of the radios back for exchange, due to defects, so far. He feels it will be necessary to carry a hand held on longer trips as a backup.



The ever popular Ronneberg nose and large baggage door.



The marvelous uncluttered electronic instrument panel. Where's the airspeed indicator? the altimeter? the VSI?



Canard.Com Update on the John Denver Crash
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NTSB Suspects Design Flaw in Denver Crash

By Dave Higdon And Michael Sweeney MONTEREY, California - Singer John Denver may have lost control of his Long-EZ because of a nonstandard fuel-selector valve in a nonstandard location.

"It could be as simple as that," said George Petterson, the National Transportation Safety Board's lead investigator in the crash that killed the popular entertainer last month.

Working from wreckage that he said "shattered into millions of pieces," Petterson is headed toward the conclusion that Denver lost control of his experimental airplane and died on impact when he crashed into Monterey Bay Oct. 12.

Petterson is a 7,000-hour pilot, IA, EAA member, and owner of a Beech A36 Bonanza and a pristine Piper J-3 Cub. He has investigated hundreds of aircraft accidents, including the fatal crash of another Burt Rutan design, the Pond Racer, in September 1993. Petterson told GA News & Flyer Nov. 7 that evidence is mounting from examinations of Denver's wrecked N555JD, comparisons with Mike Mellville's globe-circling Long-EZ, and meetings with Long-EZ designer Burt Rutan.

"The fuel-selector control was located by the original in a nonstandard location, behind the pilot's left shoulder instead of in front of the pilot, as originally designed," Petterson explained. In that position, Petterson said, Denver had to release his right hand from the Long-EZ's control stick, reach across and behind his left shoulder, and find the fuel-selector control to change tanks.

"Denver had borrowed a pair of vise grips, either to give himself additional reach or to give himself additional leverage," said Petterson, who has interviewed other pilots who flew N555JD. Adding to the scenario Petterson is developing, questions remain as to how much fuel was on board the Long-EZ when Denver departed Monterey Peninsula Airport.

"The best we can determine, there were about 15 gallons in the plane when John left Santa Maria Airport (where John purchased the airplane) on his hour flight to Monterey the day before the crash," Petterson said.

"John declined fuel before he took off (Oct. 12), saying he was going out only for about an hour. He didn't have much fuel." Furthermore, the location of the EZ's simple fuel-quantity indicators - two sight gauges located on the cockpit sides and behind the front seat - may have contributed to the accident, Petterson explained.

"The mechanic who helped Denver before takeoff loaned him a mirror so he could see the sight gauges," Petterson said.

"We have some known problems: the fuel was what I would consider to be low; the location of the fuel-selector valve made it difficult to manipulate the selector valve; the fuel-quantity gauges were out of sight, maybe out of mind; and John was reported to be between 300 and 500 feet, so he was very low."

Could Denver simply have run a tank - or the airplane - dry; fumbled with the mirror, the vise grips and fuel selector; lost control and plunged into the shallow water?

"It could be that simple, that John was so focused and was so low that it got away from him," Petterson said.

Supporting Petterson's developing view of the crash are multiple eyewitness accounts of the plane changing direction during its rapid descent.

And given the complete disintegration of the airframe, any fuel on board should have left a light slick on the water's surface.

"But divers who were on the scene almost immediately found no slick to indicate there was any gas left," Petterson said.

There are some caveats to go with Petterson's scenario, details he hopes to settle when some parts of the wrecked plane are analyzed by the NTSB's laboratory in Washington, DC.

Lab tests should help determine whether the selector control broke before the crash or because of it. Other tests should show whether an identical engine will develop power with the fuel flow constrained by the selector valve's half-open position.

Theories of a bird strike or canard failure can be neither confirmed nor refuted, even though divers recovered 95% of the shattered plane's remains.

"We recovered no canopy, no leading-edge surfaces, and without those surfaces, it's hard to confirm a bird strike - or eliminate it," Petterson said.

But Petterson has come to some conclusions about experimental aircraft, and he wants to share them with other pilots, owners and builders. "This fuel-selector question points out how important it is to stick with the blueprints," Petterson said.

"I can't stress enough the importance of builders complying with the designer's intents, particularly with something critical that's out-of-sight, out-of-mind."

This much is known so far:

* Denver died on impact, Deputy Chief Coroner Joe Grebmeier of the Monterey County Coroner's Office told GA News & Flyer.

* The Long-EZ plunged into Monterey Bay and struck rocks that are submerged just below the water's surface, according to Petterson.

* Denver was not decapitated, as earlier reported, Pacific Grove Police Lieutenant Carl Miller told GANews & Flyer. Miller is also a member of the

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Monterey County search-and-rescue unit that recovered Denver's body.

* Suicide has been ruled out, according to Grebmeier, and Denver's body sustained severe trauma.

* Toxicology tests on Denver's remains found no traces of alcohol or drugs, not even legal prescription or over-the-counter medications, according to earlier coroner reports.

* The engine was running, or was at least in running condition, at the time of the crash, according to earlier NTSB reports.

* The fuel-selector valve was found frozen only half open from the left tank and half open to the engine, and the control linkage was broken, according to Petterson.

* Long-EZ N555JD did not fully comply with FAR 91.9, which dictates that placards in the cockpit identify systems and controls, according to Petterson.

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* Feathers found in the cockpit wreckage were determined to be goose down from a pillow Denver used to boost him higher in the front seat, according to Miller.

Next up for Petterson, after the lab tests, is further work with eyewitnesses and a reexamination of the Long-EZ wreckage. "We've still got a long way to go before anything is settled, and we're going to go until we're certain of what we've got," he said.

Velocity-IVO Prop Accident

Rick Lavoie- Velocity *Views Newsletter - (FL)* I urge everyone to please stick to the facts released either by the NTSB or the factory. In IVO's defense, my understanding is that IVO had approved their prop for the Franklin engine powered Velocitys only. Use on the Lycoming was experimental, as far as IVO and Velocity Inc. were concerned. A couple of Velocity builders (including Mark Ewart) had agreed to try the IVO on their Lycoming under this assumption. This was explained to me by Mark Ewart himself. If Mark were alive today, he would tell you how much he loved flying his Velocity!

Duane Swing Article: From V13
Velocity Views:

I just returned from the funeral of Mark and Nancy Ewart and their two teenage daughters. All were tragically killed when their Lycoming powered Velocity crashed into a heavy wooded area near Florence, South Carolina. This is the kind of thing that makes me want to give up anything that has to do with aviation and live out my life in a rocking chair. It is important, however, that you receive as much of the facts as we know them so that we can learn from their sacrifice. Keep in mind that the official NTSB report will not be available for some time and some of the things that have been said, that may be said in the future, will have to be reviewed, retractions made if necessary, and the facts presented accurately based on the official report.

For me, this story started on Wednesday afternoon, November 26th. At about 1:30 I received a call from Mark asking if I had an electric motor assembly I could ship to him to replace a defective one on his IVO prop. Mark said the pitch was stuck in the takeoff position and he couldn't make it change with the toggle switch. He said he was going to remove the prop and adjust the pitch to a neutral position and continue his flight as a fixed pitch. He wanted me to send the motor assembly to his destination and he would replace it on Friday. Thursday afternoon I received the news that Mark and his family died in the crash of his airplane at about 4:45 PM Wednesday near Florence, South Carolina. Mark had been in communication with the Florence airport and reported north of the airport that he was experiencing engine trouble and then reported the engine was not running. There was some radar vectoring given to Mark, however, he never reached the airport. There was also little communication during his glide and no indication of any control problems.

The NTSB confirmed that Mark had removed the prop in Savanna Georgia, re-adjusted the pitch manually, reinstalled the prop using a torque wrench, and safety wired the prop bolts. There is no way of knowing if the torque was adjusted properly. There was also, apparently, no testing of the torque after a 30-minute ground run as required by IVO. What we do know is that one of the blades of the 3 bladed prop was not found at the accident site. The engine was still attached to the engine mount and the mount to the firewall. The mount had, apparently, suffered some cracking due to the vibration when the blade departed the airplane. This is probably when Mark shut the engine down as the NTSB confirmed the engine was not turning when the plane struck the ground. The NTSB will be conducting tests on the IVO propeller to see if there are any serious problems with the design of the blades and/or the retention system.

So, where do we go from here? First of all, until all the facts are known, we shouldn't jump to any conclusions. I will, however, recommend that further flights using the Lycoming IO360 200 HP engine and the IVO propeller be terminated. It may be that your history with this combination and your ability to monitor the prop will give you the confidence that I lack at this point. For those of you with the Franklin engine using the IVO, I would strongly suggest you check your prop torque prior to every flight and use the REQUIRED metal tapes between the blades and check them often.

Mark, Nancy and their two daughters will be missed by all of us who knew them. They were all Godly people who have now found a new home in heaven. The angels rejoice.

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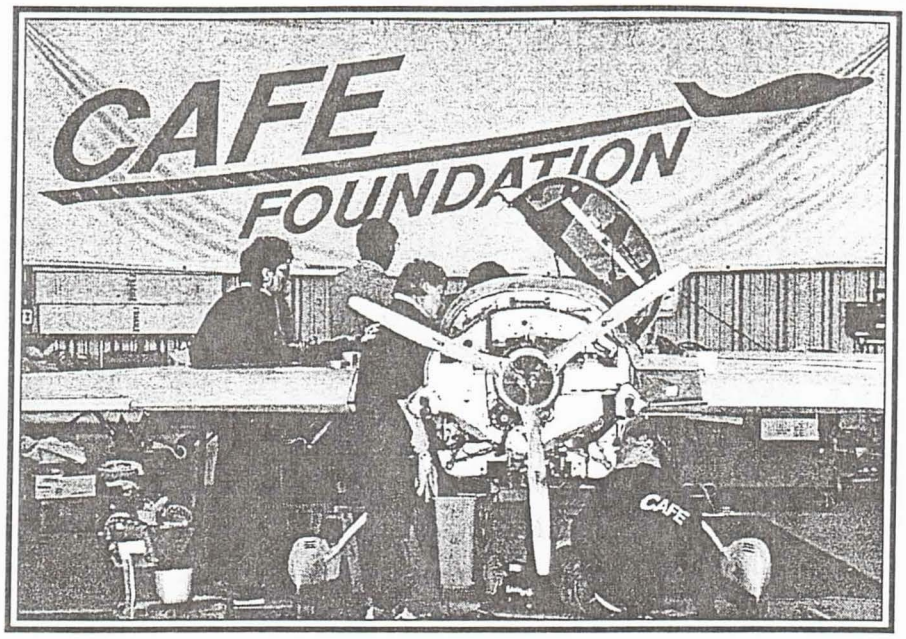
My Experiences with CAFE

Mark Beduhn (AR) - I was sitting under the wing of my plane at AirVenture '98 when Brien Seeley came by and introduced himself as a member of the CAFÉ foundation. He said they were interested in testing a Cozy Mark IV, and asked me to consider allowing them to use my plane. Brien explained that they would do a weight and balance on electronic scales, have a professional test pilot explore the flight envelope of the plane, and then publish the results in Sport Aviation. He then gave me a packet of information, and asked me to think about it. It didn't take me long to conclude that this was a unique opportunity that I should take advantage of.



CAFE volunteers attaching sensors to N494CZ

C.J. Stephens (top) and Brien Seeley (bottom) remove cowl

The information that Brien gave me included instructions on building the wing cuffs that hold some sophisticated instruments to the wing of the plane. Although they didn't look too difficult to make, I decided to allow myself a couple of months, to make sure that I had enough time. I confirmed a test date with Brien, and then ordered the materials that I needed. It took me about 3 weeks to build the wing cuffs which I mailed to CAFE foundation. I then got ready for the 1600 NM trip from Conway, Arkansas to Santa Rosa, California.

The weather for the trip was perfect, and I arrived on Friday afternoon at around 3:00 PM. The first thing that had to be done was to determine the empty weight of the plane. My Cozy was emptied, the fuel was drained, and we then rolled it on to the electronic scales which were built into the floor of the hangar. The scales are so sensitive that we had to close all of the doors and practically stop breathing while the measurements were taken.

A laptop computer attached to the scales so that the CG of the plane could be instantly calculated whenever the plane was being weighed. After the initial weight and center of gravity were measured, the fuel truck came and topped off the tanks. After filling the tanks C.J. Stevens (the CAFE test pilot) and I went for a familiarization flight. Since C.J. has flown practically every thing with wings, and also owned a Vari-Eze for 10 years, I didn't expect it to take long for him to get used to my plane. I was correct. He seemed very comfortable with the plane after only a few minutes. We flew for a half hour or so, landed the plane, and rolled it back into the hanger.

Several more CAFE volunteers had arrived while we were flying and immediately started working on the plane after we climbed out. Everyone had their assigned task. It was like watching a racing pit crew in action. The cowling was removed and numerous instruments were installed. A video camera and laptop computer were mounted in the cockpit for gathering data. The wing cuffs that I had built in preparation for this testing were attached to each wing, and the sensors were installed in them. At about 7:00 PM I went to the hotel exhausted, but the CAFE people continued to work on the airplane until around midnight.

When I arrived back at the hangar on Saturday morning, C.J. was already on the third test flight. Every time he landed, a flight parameter was changed. They changed either the

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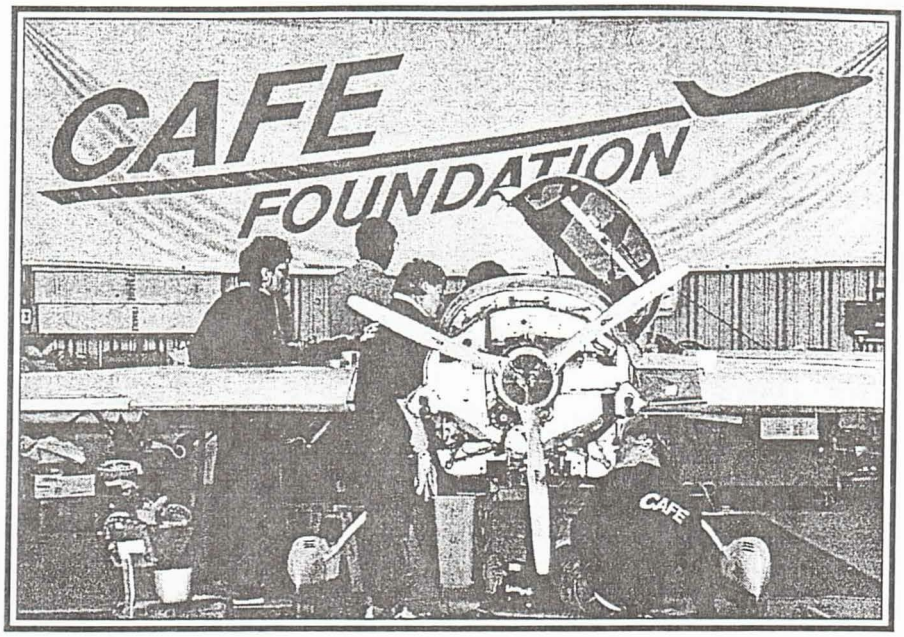

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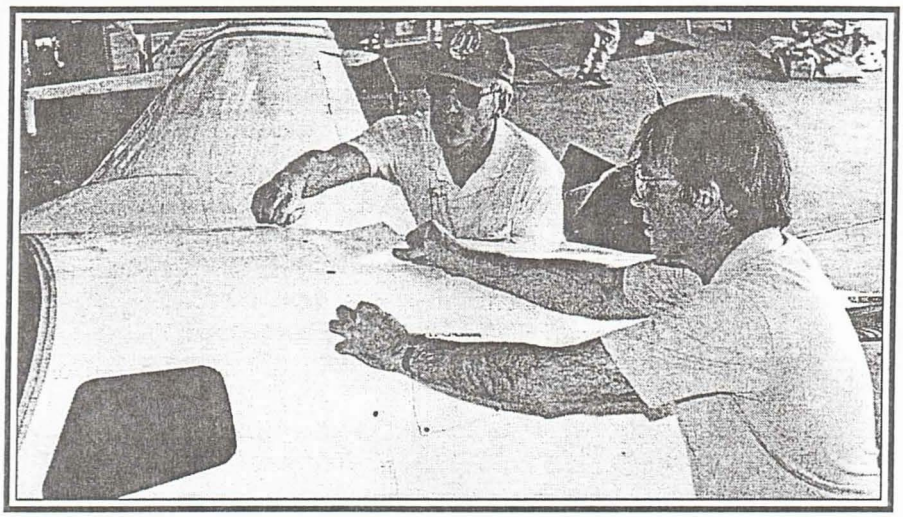

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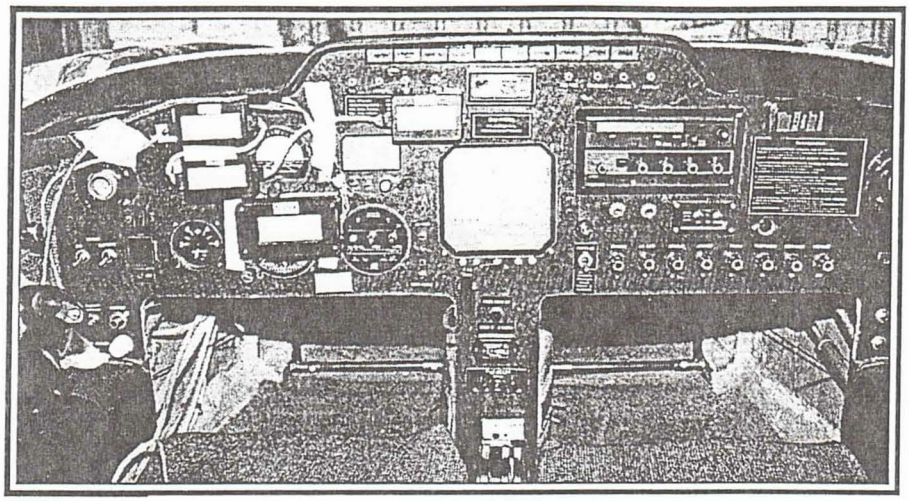
A laptop computer attached to the scales so that the CG of the plane could be instantly calculated whenever the plane was being weighed. After the initial weight and center of gravity were measured, the fuel truck came and topped off the tanks. After filling the tanks C.J. Stevens (the CAFE test pilot) and I went for a familiarization flight. Since C.J. has flown practically every thing with wings, and also owned a Vari-Eze for 10 years, I didn't expect it to take long for him to get used to my plane. I was correct. He seemed very comfortable with the plane after only a few minutes. We flew for a half hour or so, landed the plane, and rolled it back into the hanger.

Several more CAFE volunteers had arrived while we were flying and immediately started working on the plane after we climbed out. Everyone had their assigned task. It was like watching a racing pit crew in action. The cowling was removed and numerous instruments were installed. A video camera and laptop computer were mounted in the cockpit for gathering data. The wing cuffs that I had built in preparation for this testing were attached to each wing, and the sensors were installed in them. At about 7:00 PM I went to the hotel exhausted, but the CAFE people continued to work on the airplane until around midnight.

When I arrived back at the hangar on Saturday morning, C.J. was already on the third test flight. Every time he landed, a flight parameter was changed. They changed either the

weight, the CG or both. The intent was to test as much of the flight envelope as possible. Having the scale hooked up to a computer made these changes very quick and efficient. C.J. continued flying all day and finished just after dark. On Sunday he flew 2 more times for his subjective flight analysis and was done around 10:00 AM. When the last flight was completed, the plane was swarmed by CAFE volunteers removing all of the instruments they had previously installed. By 2:00 PM the plane was back in it's original flying condition and ready to go. Whew! A lot was accomplished in only a couple of days!



Notice the additional CAFE sensors on Mark's panel

My experience with the CAFE foundation was very positive. I met some very nice people and learned a lot about my plane. I consider myself very fortunate to have had my plane tested by this very professional group of volunteers. I would highly recommend that if you are ever offered this same opportunity, don't pass it up!

Comparing LSE Inductive and Capacitor Electronic Ignition

Bob Holliston (WA) - After four years flying my Long-EZ Klaus' inductive ignition without a problem, I decided to update to the capacitor type. I did this for a promised performance gain and available options such as digital timing readout and manual over ride. Out of curiosity I did a little testing. I made a full power run at 9,000' density altitude, landed, changed plugs and harness and installed my 2nd magneto. This took about 1-1/2 hours and went back up. The take off seemed slightly more lethargic but the difference was small. However, back at 9,000' density altitude, the difference was eye opening, 10 mph! The next day I installed the new ignition and could discern a 2 mph increase over the inductive system, as Klaus said.

My average fuel burn on cross country flights between 14,500 and 17,500 is 5.6 gph with an O-290-D2 and standard Precision Airmotive MA-3 carburetor. This is at 205 mph and 2700 RPM. Talk about efficiency!

Wanted

Wanted: wheels, brakes, nose gear fork, conical engine mount and instruments for Long-EZ project. Bob Holliston 509-493-2961.

EZ Meets Sea Gull

Jim Price (MI) - I'm not particularly proud of my "letting this happen" but if we can't learn from one another we learn a at slower rate and sometimes a much more costly process. I've always known that the chance of this happening is much greater down low... but sometimes the fun factor makes it hard to resist. It is good to know how well these materials hold up to such abuse.

I thought I'd let you know of a VERY unusual "event" that happened to me. I flew into Westchester, NY and made the wonderful trip down the Hudson River from there early Sunday. While I was at 300 ft. going northeast up the southern end off Long Island I collected a seagull just offshore JFK. Ugh!.. I was looking inland at the airport and had just glanced back when whoosh... thunk... I just saw a blur and thought it had hit the canard. Thank God that it didn't. It hit the outboard right wing where the winglet joins the wing. The poor guy was quartered. There was lots of debris (mostly blood & some meat) on the outer winglet both above and below the wing and on the upper and lower winglet on the inside. It took the nav/strobe right off the winglet.

Thankfully, there was just a little cosmetic damage. I did the tap tap test, but fortunately found no delaminations. It might have helped that I was trying to keep things slow, 125 knots, to help avoid an "event" like this. I guess I need to do more bird watching and less rubbernecking. Thanks to Burt for designs and materials that hold up so well to my torture testing!

Going low is an easy way to get around this area of JFK but bird watching is a requirement. I normally prefer to stay high on trips to reduce the obstacle possibilities. Please don't tell me about the birds that fly at + 80,000' .... let's just leave it that the higher you go the fewer fowl that there are and that most are down very low. I wouldn't like to see what a bird like this could do to a canopy, propeller and even wonder what it would do to a canard. Best of luck in your avoidance of a situation like this.

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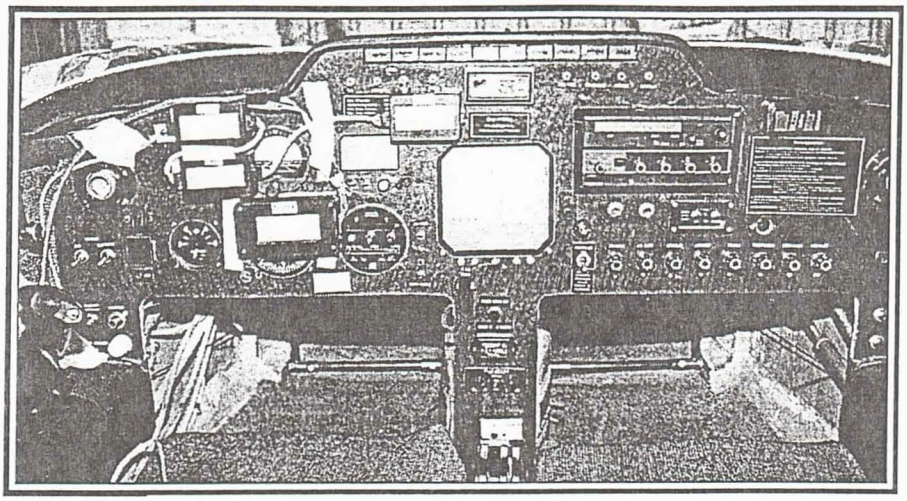

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Canard Community Forum

Nick Ugolini (SC) - I enjoy communications afforded by e-mail groups, but got tired dealing with multiple mail lists generating many daily duplicate e-mail messages for plane support.

I think Internet based Forums are superior to e-mail groups. I like the: format,ease of research,features, and freedom afforded this format. I wondered why no one started one for our aircraft so I decided to make the effort to do so. You can check it out at: *www.cozyaircraft.com/forum/*

I discussed the forum concept with Nat Puffer and he immediately saw the benefits for canard support. Co-Z Development is supplying the web space for the forum. My agreement with Nat is there will be absolutely no moderation or censorship of any kind.

The Canard Community Forum is an on-line forum with many advantages over e-mail groups. In many ways, forums represent the next generation for electronic group communication. A forum allows you to feel part of a community. You can add your own personal touch to your e-mails (avatars) and learn a little bit about the senders (in user profiles). You can rate discussion areas and vote on issues of interest. I wanted all canard aircraft represented such as Long-EZ, Vari-Eze, Velocity, Cozy, etc. Alternative Engine groups include Subaru and Rotary. There are areas to sell or buy stuff, an on line calendar of events, and will be other sections as the need arises.

There is ABSOLUTELY NO moderation or censorship. Arguments are unwelcome, but continuing discussions will not be suppressed, pre-edited or slanted.

Your email address is not visible to ANYONE except the administrator. It is not even visible to other members who you e-mail privately.

There is no spam or viruses. Since you're not receiving e-mails, you won't receive the associated problems.

Threads, subject areas, are listed. You can look at the title and ignore uninteresting threads.

Messages are archieved in an on-line database. EVERY SINGLE word of every post is indexed so if you want to find something you will.

Author profiles and ratings are available. Learn more about who is providing the information. Do other members think they generally post good information?

Click a button and only unread posts will show. You can also elect to receive all the posts as e-mails.

Learn about and post information on, upcoming events calendar. Check it out. Join up. I think you will like it!

State Representatives

Steve Beert 319-381-4702	Iowa	Buzz Talbot 630-759-1124	Illinois
"Sandy"Mondary 317-852-2890	Indiana	Terry Yake 913-451-8904	Kansas
Rex Rexin 248-349-8877	Michigan	Lynn Butters 314-837-2607	Missouri
Terry Lamp 740-454-2778	Ohio	Fred Warden 281-492-2078	Texas
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Lowell Dodson 918-245-7458	Oklahoma	Jack Fehling 561-744-1309	Florida
Alfred Coha 602-546-6646	Arizona	Dave & Ali Nelson 507-281-0469	Minnesota
Bob Sudderth 360-668-4900	Washington	Bob Iuliano 518-798-5915	New York
Perry Mick 503-472-6889	Oregon	Bill Swears 808-623-5792	Hawaii
Jerry Nibler 907-258-3086	Alaska	Gene Bohman 208-357-3244	Idaho
Ed Lovrien 406-251-0611	Montana	Gary Dwinal 207-353-8491	Maine
Tharon Judd 801-224-4428	Utah	Steve Volovsek 757-638-3463	Virginia

David Orr, New CA Representative

ED: I wish to welcome David Orr as California's new CSA State Representative. Norm Howell, has become too busy to continue and stepped down. David Orr is an extremely active canardian and also puts out the Squadron III electronic newsletter. He flies both a Defiant and a Long-EZ, which he built.

You may reach David at canardfinder@worldnet.att.net or 949-248-5725.

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Dennis Jacob Vari-Viggen Accident Update

n Smith (IN) - On July 11 the FAA test ran Dennis Jacobs' engine and found that it would bog down from running too rich at full throttle. They found that the leather seal on the accelerator pump was torn causing the engine to run rich. They have determined that to be the cause of the poor take off performance instead of carb ice. The loss of control is still up for speculation.

His widow, Deloria, has decided to donate the entire aircraft to Lincoln Land Community College in Springfield Ill.

ED: Dennis' daughter set up a website for those interested in knowing more of his interesting life. www.botani-soaps.com/dennis

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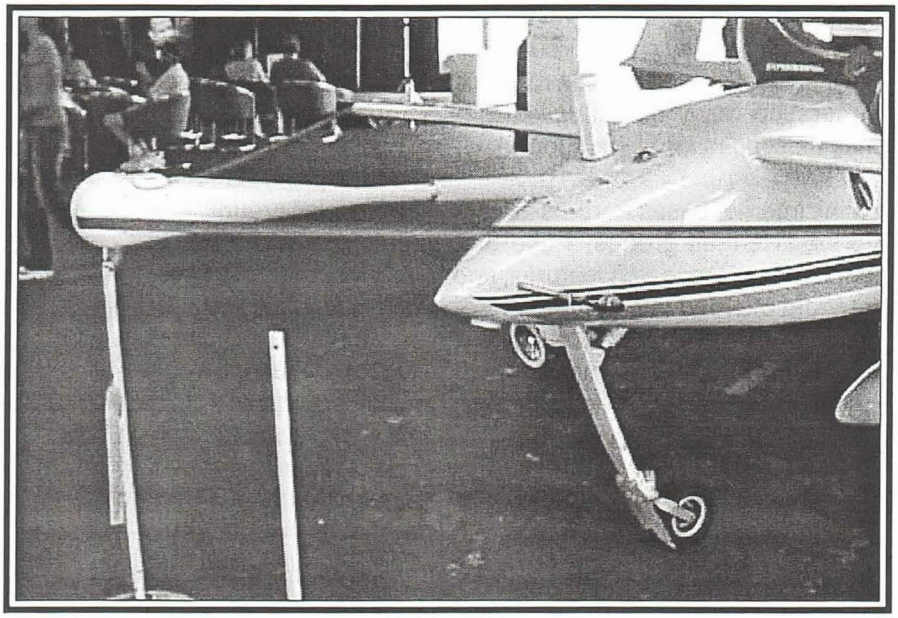
Exerpts from Cape Cod Times

Tim Crawford was a longtime NOAA ientist. The past four years, he was director of the Field Research Division of NOAA's Air Resources Laboratory at Idaho Falls, Idaho. His research contributed to knowledge of global warming and greenhouse effects, among other topics.

His aircraft, Long-EZ N3R, had been built and uniquely outfitted by Crawford for research. He had flown it for a decade without incident. Its main objective was to fly at low altitudes and collect atmospheric data. Crawford was on a solo mission Saturday, gathering information for a program funded by the U.S. Navy.

Tim built the Long-EZ specificallly for weather research



Stroke Causes Crash

Ed Dumas: (TN) - Tim Crawford died Saturday, August 3, 2002 off the coast of Martha's Vineyard, Massachusetts. He was flying the Long-EZ research aircraft in an experiment in support of the CBLAST-Low project (the Coupled Boundary-Layer Air-Sea Transfer) experiment which was designed to measure energy exchange between the atmosphere and ocean surface under very calm wind and water conditions. The death has been a terrible shock to everyone who knew Tim and his family.

There have been some significant developments, including recovery of the aircraft wreckage and Tim's body. An autopsy revealed Tim died of a massive stroke, which precipitated the crash. According to the coroner, the stroke would have occurred regardless of what Tim was doing and would have been fatal regardless of the situation. The coroner estimated Tim died before the plane impacted the water.

A memorial scholarship is being arranged through NOAA in Tim's name. If desired, donations may be made to:

Tim Crawford Scholarship Fund
c/o NOAA Field Research Division
1750 Foote Drive
Idaho Falls, ID 83402

Zehrbach - Poor Vendor Treatment

Bob Foster (PA) - I do not wish to pile stones on Zehrbach' s back but I had unsatisfactory dealings with him last ear after putting the workscope in riting and reviewing the document with Darus.

I am running an 0-320 Lycoming with pistons that were ceramic coated on the crowns and solid lubricant coated on the skirts as well as ceramic coated combustion chambers and ports. Darus did this work. I have no complaints about this work, however, he tried to misrepresent the pistons as 10:1 pistons and gouged me on the price for the pistons. Eventually Darus agreed they were 8.5:1 pistons and offered to coat 10:1 pistons if I purchased them and sent them to him. I declined and kept the 8.5:1 pistons.

I also paid him to disassemble the cylinders and inspect them for serviceability. They were disassembled and reassembled but I received no yellow tags for the reassembled cylinders.

In support of the technical side of Darus, the piston coatings have, as predicted by Darus, reduced the crankcase venting to near zero. There is no trace of venting after 15 hours of high power operation! It is too early in the fly off program to clearly say the coatings are helping to produce more power to the prop or are helping to keep the cylinder heads running cooler but I was forced to block 1/3 of the engine air inlet with the carb inlet yet the temps are within limits!

I'm not a litigation happy individual but will not go back.

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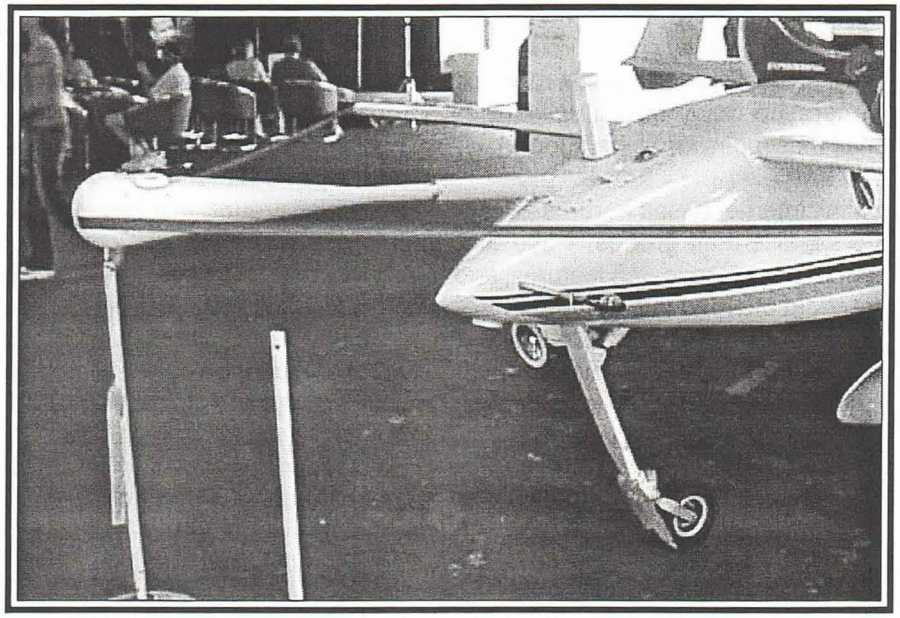

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Efficient Cross Country Flying

Who else, but Klaus Savier, could make an 8:30 AM forum interesting enough to keep me awake without coffee.

Klaus pointed out, "Fuel efficiency boils down to miles per gallon of fuel while time efficiency boils down to miles per hour. On a typical flight, the longer one remains flying (fewer fuel stops with wasted ground time) the sooner he will get to the destination." That sounds pretty obvious but frequently flying at a slower speed with lower power setting will actually take less time than using a faster speed but having to make a fuel stop.

Klaus cited several cases where he had reduced power/speed to prolong fuel supply and had actually arrived before other airplanes that flew at high speed and power settings: "Today's technology makes it pretty simple to do. Note your GPS destination ETA and adjust power setting/fuel flow on your fuel computer until you can arrive at the destination with your required reserve. It's that simple. I was reminded of the hour hold over Ripon entering OSH. I just throttled down to loiter speed, which burns as little as 1.2 GPH_s and let the auto pilot fly a 5 mile diam circle in smooth cool air while the rest of the traffic was battling it out at 1800'. I had PLENTY of time with no fuel concerns and was in a perfect position the minute the airport opened up. Meanwhile, others were headed for alternate airports to refuel and join the OSH parade again. I suspect some stayed at the alternate airports and never did fly into Whitman field."

Electronic ignition reduces fuel flow at the same power setting, gives smoother power and provides lower EGTs than conventional mags. I have heard that and saw it on my airplane but didn't know how it could be. I thought: more power means more heat and that equals higher CHT and EGT.

Klaus explained how the principle of refrigeration applies here. Roughly, the principle states temperature will drop as the gas gets less dense or is expanded. If we look at the power stroke of a piston engine we see the piston moving downward and the combustion chamber volume increasing. This increasing volume lowers density and drops the temperature. In a conventionally timed magneto ignition the fuel burn occurs so far after top dead center that the burn is taking place as the piston moves down and expanding the combustion chamber volume. The normal expansion cooling (refrigeration) is not as effective because the late ignition timing has "built a fire in your refrigerator". That doesn't seem very efficient and it isn't either.

A similar event happens if you run one mag and one electronic ignition but turn off the mag as recently proposed by a high profile builder. The electronic ignition will fire with the proper advance but the flame front in the combustion chamber can not travel to all parts of the charge in the limited time before the downward moving piston expands the volume rapidly. The result is more "fire in the refrigerator". One of Klaus's statements put it all in perspective, "A single ignition source actually damages your engine because the slower burning raises EGT 100-200 degrees".

Higher compression ratios will increase efficiency, too. The diesel is noted for its superior efficiency because of its very high compression ratios. Klaus suggested, "If you have a low compression ration engine like the O-235-C's 6.5 to 1 consider upgrading to the 8.5 to 1 pistons". I did and have more power for the same fuel burn.

Klaus explained how one can measure their actual compression ration. "Compression ratio is the total volume above the piston when it is at its lowest point, BDC, compared to the volume above it when it is at TDC. This volume in the combustion chamber with the piston at TDC is called compressed vol., cv. The volume above the piston at BDC is a combination of the compressed volume and the swept volume, sv. Swept volume is the displacement of the cylinder. Thus: CR = sv+ cv:cv. I take the engine's displacement, 0-200 :4 to get cylinder displacement or sv and only measure the cv. You may measure your engine's cv by the following procedure: fill a burette with 10 wt motor oil. That oil is thick enough to not run around the ring end gap yet thin enough to be handled easily. Position the piston on TDC with the top spark plug removed. Rock the crankshaft to be SURE you are on TDC. Add oil to the cylinder until it appears in the top spark plug hole at a particular thread of your choosing. Record the volume of oil used which is the cv. Remember to let the oil volume in the burette stand for 3-5 minutes before reading so all oil runs down off the glass sides."

Different cylinders may have slightly different size combustion chambers. That is why some engine performance builders "cc their engines". The engine smoothness will be enhanced if all combustion chambers are exactly the same. Of course anything that effects cylinder combustion can affect perceived smoothness. With respect to smoothness, Klaus indicated it takes a significant ignition timing change to get a noticeable change in power or perceived smoothness.

The speed-efficiency guru indicated ceramic coatings of engine parts is wrong for our type engines as the ceramic material holds heat on the surface and may cause pre-ignition. You end up having to retard timing to prevent pre-ignition and lose power by doing that.

Klaus' final comment was vindication for some and fighting words for others. "Water cooled engines burn more fuel than air cooled."

Efficient Cross Country Flying

Who else, but Klaus Savier, could make an 8:30 AM forum interesting enough to keep me awake without coffee.

Klaus pointed out, "Fuel efficiency boils down to miles per gallon of fuel while time efficiency boils down to miles per hour. On a typical flight, the longer one remains flying (fewer fuel stops with wasted ground time) the sooner he will get to the destination." That sounds pretty obvious but frequently flying at a slower speed with lower power setting will actually take less time than using a faster speed but having to make a fuel stop.

Klaus cited several cases where he had reduced power/speed to prolong fuel supply and had actually arrived before other airplanes that flew at high speed and power settings: "Today's technology makes it pretty simple to do. Note your GPS destination ETA and adjust power setting/fuel flow on your fuel computer until you can arrive at the destination with your required reserve. It's that simple. I was reminded of the hour hold over Ripon entering OSH. I just throttled down to loiter speed, which burns as little as 1.2 GPH_s and let the auto pilot fly a 5 mile diam circle in smooth cool air while the rest of the traffic was battling it out at 1800'. I had PLENTY of time with no fuel concerns and was in a perfect position the minute the airport opened up. Meanwhile, others were headed for alternate airports to refuel and join the OSH parade again. I suspect some stayed at the alternate airports and never did fly into Whitman field."

Electronic ignition reduces fuel flow at the same power setting, gives smoother power and provides lower EGTs than conventional mags. I have heard that and saw it on my airplane but didn't know how it could be. I thought: more power means more heat and that equals higher CHT and EGT.

Klaus explained how the principle of refrigeration applies here. Roughly, the principle states temperature will drop as the gas gets less dense or is expanded. If we look at the power stroke of a piston engine we see the piston moving downward and the combustion chamber volume increasing. This increasing volume lowers density and drops the temperature. In a conventionally timed magneto ignition the fuel burn occurs so far after top dead center that the burn is taking place as the piston moves down and expanding the combustion chamber volume. The normal expansion cooling (refrigeration) is not as effective because the late ignition timing has "built a fire in your refrigerator". That doesn't seem very efficient and it isn't either.

A similar event happens if you run one mag and one electronic ignition but turn off the mag as recently proposed by a high profile builder. The electronic ignition will fire with the proper advance but the flame front in the combustion chamber can not travel to all parts of the charge in the limited time before the downward moving piston expands the volume rapidly. The result is more "fire in the refrigerator". One of Klaus's statements put it all in perspective, "A single ignition source actually damages your engine because the slower burning raises EGT 100-200 degrees".

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Interrupted Pre-Flight Leads to Disaster

Robert Grady (CT) - I totaled my Vari-Eze, N728RJ due to fuel exhaustion. With 16 gallons on board for the planned one hour flight and 30 hours in the aircraft I felt confident. I planned to determine fuel flow for different altitudes. I had experienced some lead fouling with the 100LL I was using and planned to add TCP to the fuel.

During pre flight, I checked the right tank and remembered the TCP I was going to add. I added it but forgot to tighten the Dzus fitting on the cap. I completed the preflight and took off. My airplane has a clock with big numbers in front of me on the panel and fuel sight gages that are hard to see while flying. I use the clock to determine fuel quantity remaining. I had seen a fuel gage at Sun' n Fun I planned to install but - - -. You can guess what happened next.

The first trouble indicator was a cough during descent. I climbed and headed toward the airport - - just in case. Four minutes later at 8,000' I heard what no pilot wants to hear - silence. I did what I was supposed to do, "Fly the airplane". I looked for a landing place and thought I might make the airport ten miles ahead. I almost made it but realized I might hit houses in my glide path so I headed for some trees near the airport. The next minutes were hectic but I managed to free the canopy latch, however the safety latch did its job and I could not get the canopy completely open. As the plane descended through the trees it turned upside down and wedged between some trees and a rock about four inches off the ground. I could not get out of the cockpit and spent the next 23 hours trapped in the plane.

I had been in contact with someone on the local frequency on the ramp but had not declared an emergency so FSS just called the FBO and asked if there was an experimental on the ramp. There was, but it was not me! There was no further action. It was not until later that night when a friend went to check his airplane that he noticed my plane was not back and my car was still parked behind my tie-down. He was concerned and called other friends to see if they knew my whereabouts. The next morning they had gathered to initiate a search. The first plane off spotted the wreckage and I was rescued about half an hour later, dehydrated, but otherwise none the worse for wear.

I learned some things that I hope will help others in similar situations. First, the Vari-Eze is a great flyer and the construction strength is tremendous. There was no damage to the cockpit and the harness held me intact. Second, at the hint of any trouble, **Communicate!** Third, if you rely on sight gages only, consider upgrading to something showing fuel quantity on the panel. A clock is not enough because apparently the cap was just loose enough for the fuel to be siphoned out in after 42 minute, including what was in the header tank. I don't understand this but the logs mentioned the tendency for the header to drain the mains after sitting for a long time. I did not notice that while I had the plane, but there must have been a flaw in the fuel selector valve.

Others suggestions include: Even on short hops, tell someone what you intend to do. I crashed only a quarter mile from the runway but nobody knew I was there. Carry backup communication. Usually I carry a handheld but I was only going in the area that day so I didn't think I needed it. **DO NOT VARY YOUR PRE-FLIGHT ROUTINE!!**

Lastly, because the airplane is so strong and the canopy almost unbreakable, make sure you carry one of those all purpose tools that fold up with you. Mine was in the car.

I was lucky. I survived. The lesson I learned was not to take things for granted. From here on out, I will be especially alert if my pre-flight is interrupted or changed. I shall remember my Boy Scout motto, "Be Prepared".

Unfortunately, my bird is totaled but I am still around to fly again.

Now is the Chance to: Fly Australia

Allan Aaron (Australia) - I invite any of you canard enthusiasts to join me and my family on a 2 week "fly yourself holiday" around Australia, tentatively set for next May.

I'll arrange airplane rental and coordinate distribution of maps, briefing, regulatory material, background travel information, and investigate license conversion requirements with our FAA equivalent, etc. I'll organize accommodation to suit budgets and preferences of travelers, organize tours and activities: deep sea fishing, diving, sightseeing, 4x4 trekking, art galleries, opal mining etc.

Flying Australia is pretty easy, with much less congested airspace than in the USA. My wife, Shereen, will probably fly commercially to a couple of the choicest spots with my 6 year old while my 11 year old son will fly with me. Some of you with less enthusiastic fliers as spouses or with young kids may wish to do the same.

A typical 4 seater rents for about US $70 per hour with fuel. The plan is to share flying costs (by hours as PIC or bums in seats??). Food is relatively cheap here - though portions are not nearly as big as you yanks are used to! I don't know what flights to Sydney cost but I can get a Sydney to LA flight for as little as US $600, or more typically, say US $1000.

If you think this sounds fun, please reply. (allana@interconnect.com.au) or FAX (61 2 93372118). I'll return a more detailed plan and information relative to destinations and sights.

Please note .... **this is not a commercial venture!** We'd be delighted to have some of you with a common interest join us for what we hope will be a great holiday! Each time I go to the USA many folks say they want to come down and visit Australia ... well here is your chance to do it and see more in 2 weeks than most others will see in 2 months.... and not pay tourist rates to do it!

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Cabin Noise

Recently, many builders have made glowing statements about the quietness of 3 blade props. I have sometimes wondered if they were really that quiet or was the owner justifying the considerable expenditure.

David Knox (SC) is in the process of writing an article comparing the sound level of a 3 blade and 2 blade prop on the same Long-EZ airframe at the same power - airspeed combination. If anyone else has a 2 blade and 3 blade prop for their aircraft and would be interested in running a sound level comparison also, please advise me and I will set you up with a Db meter to run the appropriate tests

A research of literature shows the relationship of different airframe parts' resonant frequency to the prop's fundamental frequency is important. While this is most important to conventional tractor aluminum airplanes it still has application to our birds.

One can determine the prop's resonant frequency by multiplying RPM by the number of prop blades and divide that by 60. A 3 blade prop at 2700 RPM has a fundamental resonance at 135 Hz while a 2 blade's is only 90 Hz. Change engine and or prop RPM and the noise will change greatly. "Bring the prop's fundamental frequency below the resonance point of the fuselage and you'll cut the sound level dramatically.

The following paragraph was taken form a recent AOPA Pilot article.

"Engine vibration from combustion events, internal imbalances, and exhaust pulses - join the party in the lower frequencies as well. It's interesting to note that a four cylinder engine with a two blade prop and a six cylinder engine mated with a three blade prop place their natural vibration characteristics smack in the middle of the prop fundamental frequencies. From an acoustical point of view it's almost as though the common combinations are also the worst low frequency noise makers."

In the 70's Cessna did a lot of noise research and determined the lower frequency noise, around 63 Hz, came mainly from structural members. Low frequency is by far the loudest in aircraft and, unfortunately, the hardest to filter out. Higher frequencies, around 2000 Hz, (2 KHz), are influenced mainly by wind noise and can be masked effectively with lightweight headsets or ear plugs."

The AOPA Pilot article noted a considerable noise reduction by going to thicker windows (up to 1/2" - UGH - heavy canopy!) but that the later model Bonanza with a sloped windshield is best of all. Window inserts, like storm windows on your home, are effective too but not as good as just increasing window thickness. Inserts should be 4" away from the outer window for most effect. That makes for a pretty thick canopy. You'd better have a really skinny head. It seems a curved window is generally quieter than a flat pane for the same thickness and area.

The flight tests were on a tractor type airplane and may not be completely applicable to our more rigid composite material pusher configuration. The main point seems to be, smoother air flow makes less noise and that is much more important than trying to eliminate it after it is made.

Earlier flight tests, reported in this newsletter, show significant noise reduction by improving smooth air flow into the prop field. Keep air flow attached and your airplane will be more efficient and quieter. SHHHH.

It seems 3 blade prop operators will agree that a pusher with a 3 blade prop is quieter than one with a 2 blade. At first thought that seems to conflict with the fundamental resonance frequency rule in the second paragraph. The rule suggests a 3 blade should have 1/3rd higher fundamental resonant frequency and therefore make more cockpit noise. This may be true for tractor configured fabric or metal construction. Our composite pushers have more rigid fuselage sides and are out of the prop slip stream so the prop's resonant frequency may be only a very minor player in cabin noise.

It seems noise generated by the prop, when passing through relatively slow disturbed air and then hitting fast smooth air, might be a bigger contributor to cabin noise.

Assuming similar blade design, RPM, airspeed, cowl shape, etc. a 2 blade prop will generate 4 of these noise impulses (bangs) per revolution on a standard cowl. Since each blade of the 2 blade prop hits the disturbed air at about the same time it may appear there are only 2 monster bangs per revolution. A 3 blade prop will generate 6 impulses per revolution. The "bang" frequency is 3 times higher and thus easier to mask with headset/ear plugs. Additionally, an engine generating 100 hp is loading 50 hp on each blade of a normal prop. The 3 blade carries only 33-1/3hp per blade. The 3 blade will probably appear noticeably quieter as the "bangs" are softer due to lower hp per blade and the frequency is higher which is more easily masked.

Prop noise is also highly dependent on tip speed. We've all heard objectionable prop noise of the air show biplanes with larger prop diameters at near supersonic tip speed. Frequently, 3 blade props are smaller in diameter than 2 blade as there is 1/3 more blade area to absorb the power. Therefore, great prop length is not so necessary. The 2 blade, with a larger diameter, will have a higher tip speed, thus generating more noise than a smaller diameter 3 blade at the same engine RPM.

It now seems clear to me. My next prop will be a large air screw. I will have an incredible number of blade elements so my power per blade will be very low and the wing/prop "bang" frequency will be extremely high - maybe even above human hearing range. What a good idea - a quiet cabin and all those irritating little Schnauzer dogs barking in distress. Caution: Don't over rotate on takeoff. You'll drag your air screw in the dirt!