

# Falco Builders Letter



Peter Grist breaks ground in Dave Thomas's Falco.

## First Flight of G-CCOR

by David Thomas

It is five and a half years since I saw the airframe that was to become G-CCOR, stored in a barn north of Hull, and it was a year later that I bought the project. There have been many times in the past four years when I have wanted to give up. A low spot in construction a year and a half ago even led me to put the project up for sale—albeit for all of 24 hours. However, I am sitting here now, six weeks after the plane first flew, waiting for the Permit to Fly to arrive, and taking the opportunity to review the situation.

I am now experiencing the Falco phenomenon, and it seems that the plane is not just a plane. It's a work of art. People come to see it, walk around it several times, touch it and stroke it and simply admire it. I think possibly the best comment to date came from Darryl, an Auster owner, who after looking at it and touching it, declared it to be "SEX in CAPITALS!" Has it been worth it? You bet. Would I do it again? No—well maybe, given time.

Over the last seven months I have worked every night and weekend because I had a deadline to meet—harvest! G-CCOR

has been built and assembled on a friend's farm in a shed used to store the combine harvester all year, and the grain during harvesting. We simply had to fly out mid-July or face dismantling the plane.

Even on the day of the first flight the pressure was on. July 17 dawned hot and sunny, with the promise of more heat building up. We drove over to my friend Frank's farm at 8.00 am (just a 15 minute drive from home) from where the Falco would be making its first flight. The last few items on the snagging list remained to be completed that morning. At 10 am I was phoning Dave Almey, my inspector, to ask him to come

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over and complete the final inspection that afternoon. I then phoned Peter Grist, my able test pilot, who had been on standby for more than six weeks.

That afternoon saw Dave and Peter arrive, an inspection passed (phew!), and another half an hour whilst I cowered up. The initial engine and taxi runs had been completed the previous week (by me). The pre-flight proved that the radio had ceased to work, however, we had a hand-held radio. Peter was happy with the plane, and so it was time to taxi to the far end of the strip for the engine run-up.

A taxi back to the other end of the strip was necessary due to noise abatement conditions after the engine run-up, whilst I positioned myself half way along the strip, in the corn crop, to watch and take photos. Worry, worry—nothing was happening. Were the flaps down? Was the engine running? Then suddenly, with a 180 degree turn onto the strip, he's rolling. He's off. He's flying straight and level and hasn't rolled inverted. The engine's still running. Phew. I now have to walk back up the strip to collect the car and drive to Fenland airfield to see the landing! I am already emotionally drained. There's only me, my wife Sian, my inspector, Frank and his wife Carla to witness the take-off. There'd be a different reception for the landing, though.

As previously arranged with the Popular Flying Association (PFA), the first flight was to be from Jubilee Farm airstrip to Fenland airfield. Peter had agreed that unless things went badly he would fly around for about half an hour, completing the test flight schedule, to allow us time to travel to Fenland to witness the landing.

We scanned the skies anxiously from the winding Fen roads and arrived at Fenland airfield to find it staked out by photographers. Where had they come from? ATC was pointing out the whereabouts of G-CCOR, but I couldn't spot it—I need new glasses! Then there was an announcement on the tanooy—and here comes the yellow bird, rock steady on approach, and down—ON THE NUMBERS. Peter is



a member of the Precision Pilots Association. It appears that precision also applies to first flights. The landing brought forth a standing ovation from the crowd standing outside the clubhouse.

Peter tells me that the gear wouldn't go up (it's probably the pressure switch, so we fit a jump for now), we inspect the plane, and everything is OK apart from the pressure switch and the radio. Peter says, "I suppose

we could go again—jump in." I'm not sure I'm ready, and I'm glad that Peter is the pilot. Off we go. We're in the air after about 300 yards, we press the gear actuator fuse in and Peter flicks the switch Up. Up comes the gear and in no time we are at 3,000 feet in clear blue sky. 25/25 gives about 150 knots on this flight.

The left wing is heavy, and it needs a trim



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tab. Peter nudges me, and it's my turn to take the controls whilst Peter takes notes. 'Funny, G-CCOR feels just like G-PDGG, Peter's own Series 3 Falco'. I can't tell the difference between the fabric controls on my Falco and the metal ones on Peter's. Turns are a breeze and a small descent sees the airspeed climbing to an indicated 180 knots.

With undercarriage and stall tests completed, I find myself in the circuit, set up for my first landing in my Falco (and all from the right hand seat). We arrive over the threshold at about 70 knots, and we are down safely.

The stall tests show classic behaviour with significant airframe buffet from about 65 kts (flaps up) and in the one-g stall the airframe breaks level with a pitch down. If held just off the break she nods forward and back whilst a large rate of descent builds up. Use of the flaps reduces the stall to around 55 kts. I had measured the stall strips on Peter's Falco (which also displays this type of behaviour) and put mine in exactly the same place.

I ask Peter if he has time to undertake one more flight test, this time with a different flight test observer. Sian, my wife, has never flown a Falco and doesn't know what to expect. Most of her flying is on a Jodel D119 which we rebuilt nearly ten years ago and then Sian learnt to fly on. After a half-hour flight I'm pleased to report that the Falco passed muster. Sian likes it, but will need to get used to not pulling so much elevator in the turns! She comments flying the Falco is like ballet.

The end of the day comes with G-CCOR in her new hangar looking quite resplendent in yellow, and definitely a flying machine. As predicted so long ago, we now have both aeroplanes Romeo and Juliet in the same hangar, one behind the other. My friend Frank is however determined to prepare the grain shed at Jubilee Farm to receive G-CCOR after harvest, as he states the plane is so complicated there will be further work to do this winter. He is certainly partly right—there are still the front gear doors to fit, and maybe more on a snagging list, we wait to see.

The project could never have taken to the air without the help and support of great many PFA members and the engineering team, all of whom have helped move the project on.

They include Dave Almey, Dave Mason, Alan Gray, Richard Pidcock, Glenn Ward,



Koby Marom, Frank Ball, Edmund Comber, David Beale, and Francis Donaldson. If this seems a long list, it simply reflects the complexity of construction of the Falco plane and the excellence and friendship of the Fenland PFA Group.

Over the past few years I have been lucky enough to have had the opportunity to fly quite a number of different aeroplanes (including a CAP10) and I have always returned to fly the Jodel, pleased in our choice of plane. The Falco, however, has moved my enjoyment of flying to a completely different level. It's clearly so much more pleasurable to fly than our Jodel or the other types I have sampled. I am very pleased with our choice of Falco and happily acknowledge that it is all that my expectations demanded of it. Already the pain of building is evaporating (and we have only flown eight hours or so).

We have a snagging list of minor items and completions for the winter months so my Falco building will continue when the weather deteriorates. I guess a project is always that—I suppose it will be completed on day and then the DIY on the house will beckon. However, until that time comes it's still Falco, Falco, Falco!

### Flying the Falco One

We were having a little fly-about one evening this week, happily minding our own business. A little time for Sian to practice Falco flying, no one on the radio, when suddenly we hear "G-OCAD inbound from the Wash, to pass overhead the field." I had already called up descending dead-side for landing 08 Right Hand.

Then "G-OCAD is a Falco F8L aircraft".

Reply, "G-CCOR is a Falco F8L aircraft!"

Suddenly, landing didn't seem such a good idea, so a climb back up to 2,500 ft. G-OCAD calls us in sight and curves in from our starboard quarter, nav lights on. What a beautiful sight as she approaches steadily, and then we are in loose formation.

"White Falco you are a beautiful sight."

"Yellow Falco you too are a beautiful sight."

Well mutual admiration always does it for me! After a short spell together with the light fading, G-OCAD curves away gracefully towards Leicester, probably another 20 minutes away. We land with very happy smiles, and I swear Oscar is also grinning when we put him away in the hangar. □



## Falco Out of Africa

by Brian Nelson

November 1983. That's when Brenda Avery kindly agreed to meet me after hours, on the way to her bowling evening, to load me up with three large tubes of plans and two fairly heavy files containing metal parts drawings and a builder's manual. The next evening, at Washington Dulles, I spent 10 minutes pleading with airline staff to let me keep it all as cabin baggage because I was so afraid it would go astray during my return to South Africa via London. They relented, and I got my wish. Flying business class certainly helped.

By the time I got home, I was in a 'blue funk.' How on earth was I going to build such a complicated aeroplane when I didn't understand half the plans?

In an effort to become more familiar with homebuilding (you know—how to beg, borrow and steal!) I purchased the first part of a KR2 kit from the South Africa agent who was a personal friend and spent the next four years taking that aircraft to about 60%. Late in 1987, I was on a business trip to England and met the Falco agent (Brian Fox) who removed some of my fears and fired me up. So upon return to South Africa I sold the KR2 and started on Falco No. 820 in January 1988 after building a 10m by 6m workshop for the purpose.

Well, here we are in 2006 and ZU-BTT had its first flight on Wednesday 15 March.

In South Africa we are not allowed to test fly our own aircraft unless in possession of a test pilot rating and the specific type endorsed in one's log book so my long-standing friend, inspector and advisor—Brian Zeederberg—took responsibility for this. Brian is current World Tiger Moth (DH82A) aerobatic champion, was in the South African aerobatic team as both participant and coach for many years and is a highly experienced, competent test pilot with some 250 types on his license (but he is not one of those 'type collectors').

We arranged that, before his arrival at 15:00, I should spend Wednesday morning checking the aircraft to ensure that nothing had been overlooked. (You know, is there an engine in the front, etc.) The two of us had spent the previous Sunday going through the final inspection checklist, and I had been in the habit of inviting all and sundry to "feel free to criticise. I've got to fly in it eventually, and I would rather have hurt feelings than a quick passage to St. Peter's Gates."



Notwithstanding this, a final study seemed necessary to ensure my friend would not have to deal with some life-threatening situation. At about 14:30 Brian phoned to say he was running late—a message to be repeated twice more, each time with the assurance that he would be there, and that I should not get anxious. Strangely, I was not then, nor am I yet, emotional about the whole thing. I think I'm still so focussed on ensuring that everything is right that it may well require a few hours as PIC before the enormity of the achievement hits me.

16:00 saw Brian's arrival. He made me re-brief him on the cockpit switches, etc,

then instructed me to join him for high-speed taxi runs. Generally following Al Aitken's test cards, these were carried out without any real trouble, but we returned to my hangar to adjust oil pressure up and increase idle speed.

All of this took place at Syferfontein airport (southwest of Johannesburg) so those of you who have Google Earth can zoom in and see what we look like. I'm the guy on the right hand side waving! Syferfontein is owned by the Johannesburg Light Plane Club, the second oldest active flying club in the world. We are at 5393' and temperature on this Wednesday afternoon was 22°C (72°F).

I had decided to have the testing done at home base because, although we have only a 3600' by 33' runway and no formal fire service, the topography of the area is far more suitable for emergencies than at the two local commercial airports, Lanseria and Rand. In addition, the logistics of transporting the aircraft to either of those two places and the subsequent housing for reassembly and inspection dictated a home effort. The final favourable condition was a large group of friends at Syferfontein whom I knew could be called upon if help was needed.

After restarting, taxiing and pre-takoff checks were completed Brian applied full power, released brakes and executed a delayed lift-off at 70kt and about 1600' of runway. A gentle climb at 500'/min was followed by some gentle turns and control checks with T's and P's being called out to a friend manning a hand-held radio. Gear remained down, of course, and after about eight minutes Brian decided to land as the oil temp was reaching into the upper quarter on the green. Landing was at 72 kt, and the runway was vacated at 2400'.

The Falco's handling was excellent (which I hoped it would be with an empty weight of 539kg/1188lb) but the snags which required attention were high oil temp, variable idle, and max rpm in the air of 2350.

I spent the next two weeks reviewing possible causes and after some remedial action which included increasing the air flow to the oil cooler, resetting the Ellison throttle body and resetting the magneto timing, the second flight, still with gear down, took place on the 2nd of April. This time the flight was 20 minutes before the oil temp reached high into the green. Revs had increased to 2500, and Brian throttled back so as not to exceed the gear down 108 kt.

Brian is rather anxious that I fit another oil cooler, but Trevor Trautmann, my engine expert and the man who supervised my work on the engine rebuild, insists that with only about 1.4 hours on the clock (mostly at less than 1800 rpm) this engine has still a lot of running in to do. The cylinder head temps are fine so I plan to continue as we are, watching for Trevor's predicted drop and stabilisation of oil temp.

Trevor is a former motor racing driver who set some of the fastest times in South Africa in a rotary-powered car. He was instrumental in Mazda solving the sealing problems they had and some of his ideas are incorporated in current versions of the engine. Just as Brian is the expert in the air,



*Brian Zeederberg and Trevor Trautmann*

Trevor is my fountain of knowledge when it comes to engines—and cars in general.

The next flight is to be with gear retracted so I have started retraction tests (again!) to ensure that nothing has moved or gone out of alignment during the two flights and landings. By the way, earlier tests revealed that the nose gear could jamb on the screwjack. I installed two springs anchored to the tiller to centre the nose gear when it starts retracting and as a 'belt and braces' idea, screwed a wedge into the nose gear bay so that any off-centre condition would be deflected away from the screwjack. Fanie Hendriks had the same trouble and his (independent) solution was the same in principle.

When I look back on the whole building process, I have to confess to not really

knowing how I did it. Although South Africa led the world in some areas (heart transplants, banking systems, deep level mining), we only got television in 1976 (it was banned previously—even closed circuit video training facilities were few and far between) and many other systems ranging from telephones to government financial controls were antediluvian. Consequently, building a Falco with all the specified materials was next to impossible. We were not allowed to export money without an import permit and that was reserved almost exclusively for businesses. Many builders thus used to use any travel allowance surplus they might have to load suitcases with whatever could be carried.

Being a well qualified metallurgist helped me to assess substitute metallic materials and additionally I found that the local



*Barbara Nelson and Witness Ndlovu*

mining industry used large quantities of Douglas Fir which was stocked by large timber yards. This then was used in place of spruce, and I was extremely careful about dimensions because of the 17% weight penalty—also about 17% stronger. KR2 experience had revealed the availability of Araldite 2011—an excellent epoxy glue—so construction of the first elevator tip rib (“Barbara, come and see the Falco!”) was achieved quite quickly.

Progress was steady in spite of fairly frequent trips to France—I had become President of the Amateur-Built Aircraft Commission of the FAI—and local commitments (was also president of the EAA in South Africa) until 1992 when I was given the task of starting up a tyre-cord factory for the Haggie Group, my employer for 26 years. That task was carried out but

I then decided to retire at the age of 52 in 1997. The next five years were taken up revelling in my retirement, and I had no time for anything! This is reflected in my builder’s log which shows that in the six years from March 1997 to March 2003, approximately 100 hours were entered.

During this whole process I had been in close contact with Fanie Hendricks and Koen Plantinga (two other Falco builders) and had helped with materials substitution as well as with machining of landing gear parts (carried out by my uncle whose lathes and milling equipment were bigger than mine). To give an idea of the difficulties we faced: our oleos were made from solid 114mm diameter 7075 bar! We used six lengths of that diameter to make our six oleos. Our gear legs were made from ST52 honed hydraulic tube which, because of its

5mm wall thickness, had to be machined to thinner sizes. Most, if not all of Fanie’s brackets and hinges were milled by him from solid material!

After reading all the foregoing technical stuff, Barbara asked “what about the human element in all this?”

Of course, she is right. As a technical person, I wrote hundreds of technical reports during my career and, of necessity, they had to be dispassionate and objective. I find it extremely difficult to break out of that mould. Nevertheless a few anecdotes might be of interest, and I’ll try to be human!

George and Joy Barrett were kind enough to have me to their home on one of my trips, and I remember George informing me “It is impossible to form the leading edge of the plywood on the wing.” Now, while I work pretty hard, if there is any easier way of doing something, I’m all for it and building George’s leading edge forming jig was not part of the plan! (Fanie had done so, but it was too much like hard work.)

What did I do? I threw all the plywood sheets into the swimming pool for the week it took them to sink. Then you know they are wet. After stapling them in place on the wing, I stapled battens along the ply parallel to the leading edge and hung weights from the battens to cause the ply to take an initial bend around the leading edge. I then placed a one-inch perforated copper tube along the leading edge and connected it to a kettle with a garden hosepipe and boiled water in the kettle causing a substantial amount of steam to be projected onto the ply. In a matter of minutes the stuff bent like butter—does butter bend?—and I stapled the ply round the leading edge. After a week of drying and checking to ensure there was no delamination, the now beautifully formed ply was ready for gluing. I like a challenge!

Although I took 5000 hours to build this scratch-built Falco, Barbara asked how many cups of coffee and how many kilograms of biscuits she had to bring from the house to the workshop. Sadly this was not in my logbook. Barbara was also very concerned when she saw it assembled for the first time in the workshop. Forget all the accolades about Frati design, cruise speed, etc. She took one look at the ‘boot’ (trunk or luggage space) and declared “that’s not big enough. At my age there’s only enough space for my makeup!” So, of course, now I have to start the brain-washing about packing lightly and intelligently and ex-

plaining why she won't be able to take three changes of clothing per day when we fly away somewhere.

It seems that, especially over the last five years, Barbara's adult art pupils have begun to feel very sorry for me. She is always immaculately dressed and made up, and I was always seen wearing a blue overall. It might even be the same one in which I was photographed for the picture placed on the Seqair website about 15 years ago! They concluded that I was sacrificing everything for her and that I did not own any other clothing. Needless to say I milk that for all it's worth.

I'm not a publicity hound so it was Barbara who arranged for a reporter from our local community newspaper to come and take some pictures and ask some questions (like, seeing the dissembled Falco on the trailer ready to go to the airport "Will you be test flying it tomorrow?"). The whole event took 20 minutes so I had no expectations of article size or accuracy. Surprise! Accurate front page coverage which resulted in friends I had not seen in years calling to say hello. Bigger surprise! A friend called to say he had been eating some breakfast when suddenly he got indigestion—there I was, large as life in a *national* newspaper! Now I have to fend off the 'publicity seeker' comments.

Last year a friend, who has been building a Teenie Two, 'phoned to tell me that before I did any more spray painting I should check our Aviation Authority website because the regulations relating to registration letters had been changed and indeed the South African identification letters themselves had been changed

I had just spent a week masking off all my letters and this news came on top of a stated intent by our authority to require all aircraft to have mode-C transponders fitted. I had been one of the opponents of this and was still steamed up about it so a very short fuse resulted in me expressing somewhat negative feelings about governments, aviation authorities and generally moronic politicians. Then he started laughing. It was April 1. Hook line and sinker!

#### Our only photo of Brian Nelson



Test pilot Brian Zeederberg

Although he has never been in a position to become involved in the Falco construction, our gardener/househelp, Witness Ndlovu has always shown an interest and indeed he proudly took a copy of the newspaper article to his family in Zimbabwe when he went up there on holiday recently. He tends our half-acre garden very well, and I will take him in the Falco to see it from the air once I am permitted to fly it.

Although Barbara concentrated on her art in her studio while I was busy Falco-building, I was never alone, being constantly accompanied by Gypsey, our long haired Alsatian. She has the most beautiful eyes and is an utter lady. When too hot in summer the two of us would charge out of the workshop and plunge into the swimming pool before returning, much refreshed, to work.

There are so many things one might write about in relation to such a big project, and it is difficult to be interesting to all readers. Consequently I should like to advise that any reader with specific questions is more than welcome to e-mail me (brian@falcoman.co.za) and I'll do my best to describe building procedures or whatever else is of concern.

I now look forward to continuing the test programme after which I will be getting an instructor to give me a conversion to allow solo flight. I have to accumulate 25 airframe hours after which our CAA will issue an Authority to Fly, which document is renewable annually.

#### Late 'Breaking' News

April 22: The third flight and first with gear up took place yesterday so Brian Zeederberg took me up for the first time in the fourth flight, also late yesterday afternoon. All was

fine until landing, when the nose gear collapsed. I don't know yet what went wrong.

April 22: The gear collapsed because the tubing in the upper drag strut, through which the bolt goes to form the hinge with the lower strut, had only been tacked in place and never fully welded. I did not spot this. The welder emigrated to Australia three years ago so no recourse.

It seems I have been very fortunate: Brian recognised the problem very quickly, yelled at me to climb into the luggage bay, stopped the engine and got the prop horizontal. The makers have confirmed that the prop tip damage can be repaired, and they are busy with that. The upper drag strut brackets at the firewall got bent slightly but the firewall is not damaged, and I have repaired one bracket so far. I am busy with the upper strut, straightening the slightly bent tubing and machining a new hinge point from solid material. This will be welded into the 'u' shape on the strut left after cutting off the damaged piece.

The radio frequency selector switch was destroyed by my feet pushing against the panel to stop myself going through the windshield but I was able to get a new one on Monday and I have installed that.

The nose gear fork was bent into a shallow 's' but I have straightened that successfully and am busy removing the paint to carry out crack detection tests.

Fortunately the Ellison was untouched although the air intake box was distorted but repairable. I think the most difficult task ahead is repairing the wingtip. I will probably have to make a partial rib and scarf in a piece of sheet to the underside. □



## Advanced Hot

### Fat Sparks

How I Installed a CDI in my Falco

by Jonas Dovydenas

Several years ago my Falco was approaching 1300 hours on the tach. A mechanic I trust told me this is about the time that magnetos begin to fail. Since Slick magnetos cannot be rebuilt, they have to be replaced with new ones. I remember being horrified when I saw what was inside that deceptively sturdy looking black case—little plastic gears going round and round and ancient automotive points madly opening and closing, sending feeble 12 volt pulses through the primary winding, hoping to get the secondary to kick it up to 17,000 volts, if everything worked as it should...

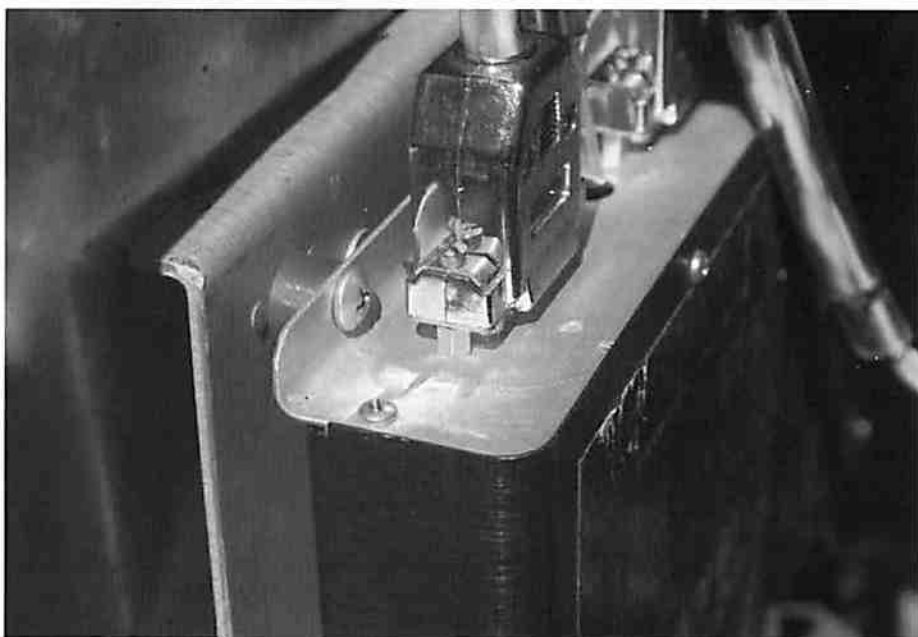
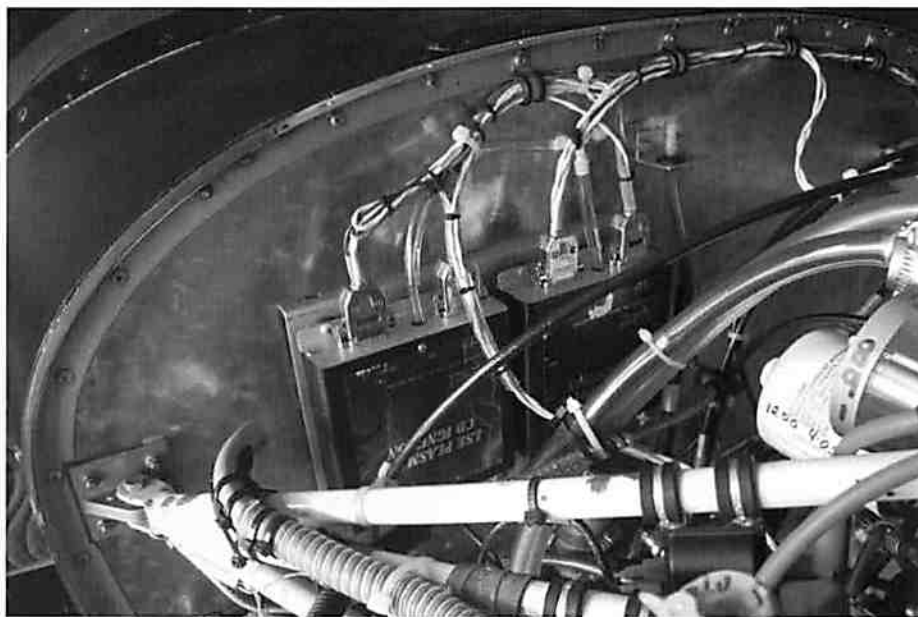
That made me think. All you ever read in aviation articles is never to bet on the reliability of a magneto, yet I don't know anyone who has had a magneto failure that resulted in an emergency. One fails, the other gets you down at the next airport. So why go to the trouble of installing an electronic ignition? There are many good reasons, all you have to do to find your own favorites is Google 'aircraft ignition'. That was in the beginning for me.

In the end it was out of pure spite. Two new Slicks, worth about \$50 each if there was any economic justice in the world (which any Howard Dean supporter worth his spit will tell you there ain't) will set you back almost as much as a solid state capacitive discharge ignition system that includes everything you need to bring you into a world that car ignition systems have inhabited for the last 30 years. I don't recall the last time someone complained to me that the car stopped running because the ignition didn't work. And cars don't have dual systems like planes do.

I don't know about you, but every time I get in my Falco I see the big letters EXPERIMENTAL on the side, and I think What can I do today that the FAA doesn't approve of? Well, car ignitions in airplanes was the answer to that question one day about two years ago.

The product I decided on is the Lightspeed Engineering Plasma CDI ignition system. Lightspeed claims that replacing just one magneto will give you almost all the benefits, but because I felt so strongly about magnetos, I could not just junk one without junking my principles. Both had to go.

In a Falco there is not much room, or access, for anything until you get past frame



6. While my Falco had more than enough spare wires in the harness, the Lightspeed CDI unit came with its own wires. These would have to be incorporated into the wire bundle running from the engine to past frame 6. Too much trouble for me. A firewall installation looked a lot easier. But it was not recommended. Keep the boxes away from engine heat, said the installation instructions. I called Klaus Savier, the man who developed the product and sells it, to ask him if he could be more specific about the degree of heat to be avoided. He said his system was on the firewall without any problems, that all the components were stock mil-spec items, that cooler would be, of course, better, but don't worry, be happy, use the firewall if you have room and some cooling air. Or words to that effect.

The problem with mounting the two boxes on the firewall was that it wasn't as simple

as putting the Sawsall to my spar when I installed the swing wing. I could just drill some holes in the firewall, which would have been easy enough if I wanted to use wood screws, but I did not. (One reason, among others, is that once you had wood screws showing, their slots all have to line up or you got points off at Oshkosh, by gosh.) I decided to bolt a plate, a doubler, on the firewall in the area on the right side intended for the inverted oil tank, and mount the units to that.

Unless your Falco is still under construction, to get to the back of the firewall you have to remove the instrument panel and the fuel tank. This is not difficult, but a little tedious, compared to, say, flying to Maine on a sunny day for a lobster lunch, and doing a couple of rolls along the way for the crowd of earth crawlers on the top of Mt. Monadnock.

After I took out the fuel tank I found a construction error. The hex heads of the motor mount fasteners were not safety wired, nor did I use one of those locking channels. For some reason the occasional slight tightening of the nut on the firewall side did not turn the bolt as well. So I never knew that I had made a possibly serious mistake until the tank came out.

An alternative if you are in the early stages of construction is to put both boxes behind frame 6. The equipment is not heavy, including the 5 or 7 AH battery, but it does lighten the nose when the heavy magnetos are replaced by light aluminum sensors. (I have never had a problem with aft CG. The more the better, is how I look at it. Once I had about 75 lbs. of luggage, two cases of wine, if you want to know, a full tank and my wife on a warm day on a short strip and, guess what, the Falco munched and wiggled its tail like a lazy guppy before deciding to climb. That was all.)

The CDI ignition uses motorcycle spark plugs. If you go to the nearest Harley dealer you can go hog wild and spend as much as \$15 each for platinum wire plugs, if you don't like the ordinary ones for about \$3 each. And I'm not cheap, I just don't like to spend money.

The system is connected to a source of engine vacuum and responds to manifold pressure and RPM, in other words, to engine power. At idle the plugs fire at 42 degrees before TDC. On take-off, the advance is around 28 degrees. In cruise, at 22" of manifold pressure and 2350 RPM the plugs fire at 32 degrees BTDC. Varying the ignition advance according to the manifold pressure makes the engine more efficient.

There are other factors in favor of increased engine performance. The magneto puts out a voltage in proportion to RPM. Thus, to start the engine, one magneto has to have its armature snapped forward to put out sufficient voltage. This is accomplished by springs and levers—another stone age gizmo. Or the "shower of sparks" from a different, equally primitive device.

Electronic ignition, on the other hand, supplies 36,000 volts to a huge spark gap (.037") no matter what the rpm. Moreover, both units use a default setting of zero degrees TDC when the engine is not making vacuum in the intake manifold. Thus, my engine starts in less than one revolution. A bigger spark plug gap, a fatter spark makes for a more positive ignition of the fuel mixture. During a run-up there is no drop in



*Jonas's panel and CDI installation.*

RPM as each side is turned off and on. In cruise, there is a slight increase in engine vibration and a decrease in speed.

The fat spark and advanced firing make possible running the engine on the lean side of peak. This way of operating is not recommended by Lycoming, but it works; the engine runs smoothly (up to a point where the first cylinder begins to missfire) and all the temperatures drop significantly. For me, with my IO-360, there is a slight speed penalty to operating lean of peak, but a big gain in how much expensive burned avgas goes out the exhaust pipes.

Lightspeed does not recommend using an existing Bendix starter/ignition switch. You may recall that the ignition switch disconnects the P-lead from the magneto. The CDI unit is the other way around—a connection must be made, not broken. Despite frowning on it, Lightspeed tells

you how to re-wire the Bendix switch so it works with its unit. I consider that to be a big plus for anyone with a standard Sequoia panel. I didn't see a nice way to replace the Bendix switch with two toggle switches and a push button somewhere else on the panel. Taking the Bendix switch out would also leave a big hole, though I suppose it could be left in place and only used as a starter switch.

But there is an elegant solution to installing the ignition read-out panel and emergency battery switch. The marker beacon bright/dim switch (S26) is in my panel but not used. It is a transfer switch. Next to it is an orange light, also not used but intended for the marker beacon, which I don't have. Next to S26 there is enough room to install the small readout panel that displays the ignition advance of each unit in degrees, manifold pressure, and RPM. It's an accessory worth buying since it is one of the best



*Luciano Nustrini and George Richards provide filler material for this article.*

features of the system. With it, you can read spark advance of each unit within one degree of resolution, and the information is available in flight. It's a very cool setup.

In the "down" position of the switch, the current flows from the main electrical system, through the Bendix switch to the left ignition unit. When the switch is flipped up, current flows from a small five AH battery and powers the right side unit, the orange light next to the switch, and the Davtron. I did this because the Davtron temperature indicator unit also displays voltage and draws very little current. With the electrical system shut off, I have over one hour and thirty minutes before the battery crashes. I can tell you from having done it—the Falco flies almost as smoothly as with both sides firing. I have flown this way and after an hour the battery the voltage had gone down to 11.2 v. According to Lightspeed Engineering, their system will

work from four to 32 volts. According to the specs of the battery, after it discharges slowly down to 10.5 volts it will drop to four volts almost immediately. This battery is connected to the main electrical system through a diode, thus allowing it to accept a charge from the main system, but blocking a discharge back into the main system when all power is shut off.

Lightspeed Engineering provides a choice of ways to generate the primary ignition signals: mounting a magnet on the engine to sense a small piece of metal bolted to the flywheel or installing the so-called Hall Effect sensor in place of the magneto. These are small aluminum cylinders that go in place of the mags and are held by the existing mag clamps. This made sense to me and that is what is in my Falco. These units have a little green light on the back which lights up when the timing is correctly adjusted.

These units come without a drive gear, so you have to take the drive gear off the magneto. The magneto with the impulse coupling mechanism has a different gear that can't be used. A gear from Lycoming will set you back—you wouldn't believe it if I told you. But a junkyard in Arizona had a gear with a little surface corrosion on several of the teeth for \$35, which is just as outrageous since the surface discoloration made that gear unairworthy. The rotating magnet in the Hall effect sensor has very little mass, unlike the junk grinding away inside a magneto, so I decided I was comfortable in assuming the gear from the junkyard would last longer than I would. And, of course, the gear on the other unit was like new—an acceptable plan B as far as I was concerned.

**Conclusion.** The engine starts more easily, there is a slight increase in power during takeoff (a steeper climb), the engine runs a little more smoothly, the cylinder temperatures are lower. I have enough data to quantify a comparison from a number of test flights, but frankly, I don't have much enthusiasm (never did) for organizing the data into a presentable narrative, but the system works as advertised. Lightspeed Engineering has a good website ([www.lightspeedengineering.com](http://www.lightspeedengineering.com)) as do some of the other vendors. It's worth reading all the information before committing to a new way of thinking about your Falco's ignition.

The quality of the components is good, the installation instructions are okay but nowhere close to what you we are used to from Sequoia. There were occasions of minor confusion on my part but when I called Klaus Savier, the man who makes and sells Plasma CDI. He did not always seem very interested in deconfusing me. Perhaps dim instruction manuals generate dumb questions. □

#### **Jonas Dovydenas**



## My Falco Story

by Neil Aitkenhead

Following a number of years of boating and yachting my interest in flying started with training in C152's at Ardmore, Auckland, New Zealand in the early 80's. After achieving my unrestricted PPL, I used to hire C172's for local flights around the North Island of New Zealand. At that time having business interests at various locations in NZ I decided to buy my own aircraft. Having trained in Cessnas the natural progression was to a larger Cessna aircraft deciding on a CT210N that was sourced in, and ferried out, from Texas.

In '89 I migrated permanently to the Gold Coast in Queensland, Australia, and I joined the Southport Flying Club which, for Australia, is a unique private club for aircraft owners situated in the midst of an environmental park on the Gold Coast. The Club currently has approximately 100 aircraft hangared at the licensed airfield comprising of single-engined fixed-wing and helicopters.

In earlier years the aircraft were mainly conventional Cessnas, Pipers and Beechcraft but in more recent years there has become a greater variety including sport, amateur built, aerobatic and vintage fixed wing plus a number of piston and turbine helicopters. Among the membership and staff there is a wealth of aviation experience both recreational and professional which is great moral support for a long term project. We flew the C210 over the Tasman Sea to Australia, and I continued to fly it in Oz for a year or so, including a two-week safari with the club around the top half of Oz, but as I did not have the businesses over here to justify the big thirsty high-maintenance machine. It had to go.

I continued a limited amount of flying with hired or borrowed aircraft but after a few "planeless" years I wanted to get back into my own aircraft again. Some of our club members suggested I just buy a little economic aircraft like a C150 or similar just to keep up my flying, but I knew if I did that I would soon be bored out of my brain with it. So I decided to look at the option of building something more my style, even though I knew it would be a long-term project. This was in the mid 90's and at that time the few performance kit planes around were mainly composites which did not appeal to me. One of our club members had been to Oshkosh and brought back a coloured brochure on something called a 'Falco'. At first I did not take much notice of it but another very experienced pilot



Neil and Drew break ground on the first flight, while Judy Done and Gwyn react.

member and friend, Doug Bruhn, said "if you want to build a 'real' aero plane, that's the one for me." He was familiar with the Zucolli Falco and suggested I go to Toowoomba and meet with Guido and see for myself. The wooden construction appealed having worked in wood for most of my life, boats, yachts, furniture, etc. plus the timeless lines and performance figures were to my expectations.

I introduced myself to Guido and arranged to drive up to Toowoomba to have a close look at a Falco. Guido and the family were very hospitable and unexpectedly Guido offered to take me for a fly with myself in the left hand seat. We went out for half an hour. He demonstrated the stalls, and we then we did a couple of circuits. I was sold even though the general consensus was "a fantastic aircraft, but don't do it. It takes too long to build, too complex and too expensive." I knew it would be a long term project so it would take more than these comments to put me off.

At this time the flying club was building more hangars at the field so I secured one of the 40'x 30' units and started setting it up as a Falco workshop. Band saw, drill press, sander/lanisher, work tables, benches and various hand tools.

The plans were ordered from Sequoia and Falco S/N 1291 was started with the tail kits in April 1997. Actually the tail could boast to be the most traveled in the world, the kits dispatched from Sequoia by air freight went astray and finally turned up in Australia some weeks later after having been to Hong Kong and London! However apart from some minor damage with all the additional handling I was able to make a start.

After reading all the pros and cons of the various options I decided to use the West System epoxy throughout which I can say I have not regretted. It is very versatile and user-friendly as an adhesive, varnish, filler, glass cloth laminate etc.

Being still fully employed and with businesses to run, my time on the project had to be limited to an hour or two after work and hopefully a full day on Saturdays. I must say I have a very supportive wife Gwyn. Without this support and encouragement a project to the extent of a Falco would not be recommended. Many a visitor over the years have said I must have extraordinary patience to continue such a long term project. I don't see it that way. I enjoy the work and treated each stage as an individual project.



*Success! Neil and Drew Done after the first flight.*

I found the drawings and construction manual to be very thorough, accurate and complete. As this side of the world is generally metric, I had no difficulty with the drawings and measurements. The stabiliser, elevator, fin and rudder took the best part of the first year to complete.

Considering costs and shipping difficulties I decided to make my own wing spars. I bought the wing ribs and hardware kits from Sequoia and after researching costs and quality I decided to have the spruce graded and sized to my requirements by Perfectus Airscrew in Melbourne, Australia. A small business run by a gentleman that has been there for decades initially manufacturing wooden propellers. Having worked with timber most of my life I was very impressed with the quality and grading of the Sitka spruce from Perfectus. I was also able to procure locally the GLI European birch aircraft plywood that is manufactured in Finland.

Laminating the wing spars was a project in itself. I set up a dead-level eight-metre table and, after lofting the spar shape onto the table, I screwed square blocks at every station to clamp the upper and lower spar laminates. By this time I had amassed a total of 55 clamps for the job and that's not too many. I recall having to double up in places and bolting through the table to achieve a satisfactory and even clamping pressure over the eight metre length.

Most of my Falco was built to the older Amateur Built category which required a number of inspections along the way be-

fore closure of any part that could not be inspected after completion such as before closure of the spars, wing, etc. Over the years the Experimental category has effectively superseded the Amateur Built and so my Falco along with most sport aircraft recently built here are operating under the Experimental category.

The most intricate and exacting part of the project I found was the construction of the aileron/flap units being built with the washout and taper to match the wing. However if you follow the instructions and work to exact dimensions—and importantly have a good solid dead level set up table—it does all come together. By early 2000 I had the wing jugged up and ready to skin. The sanding of the wing ribs and spars to a fair surface before skinning is laborious and tricky job, using sanding boards of various sizes sanding across narrow delicate ribs and a wide spar cap.

In 2000 Gwyn and I made the pilgrimage to Oshkosh where we met Alfred, Susan and a number of North American Falcoholics who made us very welcome. We thoroughly enjoyed the experience both from a Falco point of view and recreational aviation in general. We incorporated a two-week driving holiday into our visit traveling back to the West Coast and home from San Francisco.

Over the years the project was interrupted by various other mundane tasks of building shop fittings and other cabinet work along with maintenance for our two ice-cream parlours that we owned over the period.



*Gwyn and Neil Aitkenhead*

By 2001 I had laminated the fuselage frames and had the fuselage assembled with the wing and tail. Since I was building the aircraft at an airfield, I opted not to have the bolted joint in the fuselage at frame No. 8. Once all the upper and side surfaces of the fuselage were skinned, with several helping hands from the club the airframe was carried out of the hangar into the Queensland sun for the first time, and it did its first 'loop' and then returned to the hangar inverted. While upside-down I skinned all the undersurfaces and had it up high enough so I could walk around with head room in the cockpit area which made fitting a number of items easier. Before returning the airframe right way up I took the opportunity to prepare the entire underside right through to finished paintwork.

I have used DuPont's Imron 6000 paint system. Since it will be operating generally in warm to hot conditions I decided against a 'Ferrari' red or similar dark colour that sucks in the heat but at the same time not wanting just plain white we chose a Silver Pearl White, so it has the DuPont epoxy primer, then the Silver White base, the Pearl and a clear top coat. The stripe system just recently added is two tones of a Mica Burgundy/Red.

Neither Gwyn or I are particularly tall so I opted for the raised Nustrini canopy which gives 38mm greater head room than the normal Nustrini, which is particularly low. I moulded the extended canopy skirt to match. I have countersunk all the screws and faired off all the metal strips securing the windscreen and canopy.

Taking the lead of others before me I have reduced the engine cowling air in-

lets by approx 50mm with apparently no effect on cooling.

Right from the beginning I had been considering which engine to fit. I was very interested in the diesel developments which I was watching over the years with interest. The only one that looked to be a strong possibility was the Nasa-Continental two-stroke engine. I saw the prototype at Oshkosh in 2000 mounted in the front of a twin engined C337. It sounded very promising, weight, size, 180-200 hp, but the development ended up shelved, I believe, with a number of technical problems.

I decided the Superior XP IO-360 was the best of both worlds being an improved copy of the well proven Lycoming IO-360 plus I have chosen to go with Dual Lightspeed electronic ignition and the larger Performance Airflow fuel and injection system. Because the electronic ignition relies on battery power, I decided to have a completely dual electrical system, two Odyssey batteries, mounted behind frame No. 6, two alternators and no vacuum system—all electric instrumentation. I fitted the standard Hartzell constant speed two-blade prop. What was the battery box I have made into a full-width locker for additional light weight luggage, covers or tie down gear.

The instrument panel I moulded out of fibreglass with the radio rack extended out approximately 25mm and angled towards the pilot about 15 degrees which meant I could eliminate the recess in the forward fuel tank. Only intended as VFR my instrument panel consists of the two Dynon displays, the EFIS containing all the flight instrumentation and the EMS having all

the engine and fuel instruments. As backups I have fitted a conventional AS and altimeter and vertical card compass. Avionics are two Australian-made X-Com760 VHF with built-in intercoms, a Garmin Mode C transponder and a Skymap IIIC GPS. I have also fitted an entertainment radio/CD player which feeds music through the intercom... very relaxing. On the far right hand side of the panel I had room left for a glove box—somewhere for Gwyn to keep her 'sunnies' and lipstick!

By March this year, after final checks and inspections the C of A was issued and Falco VH-NVA was ready to fly. Initial engine runs and taxi tests went fine, instruments and radios all OK. Following the golden rule that the owner builder should not do the initial test flights, I contacted Drew Done who has now been flying his Falco for five years. Drew generously agreed he would do the test flights, and we arranged for Drew and Judy to fly up from Southern Australia for a few days. After weather delays VH-DJD, a fine example of a red Falco, arrived at our club airfield on the 29<sup>th</sup> of March.

Early next morning the weather was still unkind to us with low cloud and rain showers which was unusual for us at the sunny gold coast. However we proceeded with preparations for the first flight with last minute additions of temporary stall strips, draining of excess fuel to about half and removal of gear leg doors so we didn't have to worry about gear door speed limits on the initial flight. It was agreed that I would go on the initial flights in the right hand seat as flight engineer so Drew could concentrate on the flying, particularly being that my instrument presentation is very different from the traditional Falco panel.

By early afternoon the weather had lifted, and we were ready to go—apart from a last-minute headset failure. So a few more high-speed taxi tests and a full power ground run up, and we were ready to go flying. At 2:00 pm VH-NVA rapidly accelerated and lifted off 01 Mason Field, Southport for the first time. The engine numbers and temperatures were all good, and we climbed above the field to the limit of the uncontrolled airspace of 3500 feet. The only flight problem that quickly showed up was it was a bit right-wing heavy. We left the gear down and checked out the initial stall which was as per the book at around 52 knots gear and flaps extended. Keen to fix the heavy wing we kept the first flight short and returned for a copy book landing and the welcoming committee of Gwyn, Judy and a number of our club members.

Temporary trim tabs were taped to the aileron and after a further thorough check out we were off for flight number two. We checked out the gear operation this time along with clean stalls, again much as the book says at approx 60 knots. A further small adjustment to the aileron trim tab and our third and final flight for the day. All in all we both agreed the initial test flights went without any major hitch and were very successful. Needless to say a little celebration at the club bar was in order.

Drew and I intended to do some serious flying the next day with myself in the left-hand seat but the unseasonal weather would not go away. We had heavy rain with cloud down to the deck all day. The following day, Saturday, was out as well as I had a long term arrangement for the stripes to be painted on plus Drew and Judy needed to be on their way home. Although legally current I had not done a lot of flying for some time so we arranged for Gary Spicer, a very experienced check pilot and club member, to fly with me in the right hand seat until I felt comfortable handling the Falco.

Over the next week we did a number of short flights and circuits together while checking and calibrating instruments. No problems other than a faulty circuit breaker and a bit of fine-tuning of the trim tabs. I have now been flying on my own since Easter and as of the beginning of May have clocked up 15 hours. Under the conditions of the Experimental C of A there is a 40-hour test period to be conducted within a 50 NM radius of our base airfield and outside controlled air space before the full C of A is issued. Until then no passengers except a licensed pilot and only if required to assist with the test program. Hopefully I will be able to fly the hours off over the next two months as this time of the year we generally have plenty of clear blue skies.

I am pleased with the initial performance figures, acceleration and climb is excellent at around 1000 fpm at 120 KIAS and 1500 fpm at approximately 100 KIAS. This is not at MTOW but pilot only, half fuel and at 2500/25. Trimmed out level at low altitudes TAS is around 170 Kts and at 8000 feet TAS is about 180 Kts. Empty equipped weight is 1215 lbs. (551 kg.)

So, after a nine-year gestation period Falco S/N 1291 VH-NVA, the 83rd Sequoia Falco is flying. My special thanks goes to my wife Gwyn for the support and putting up with the many hours that I have spent in my second home: The Hangar. Also my appreciation for the information and advice from fellow Falcoholics over the years



*Neil's first takeoff in the newly painted Falco.*

and in particular Drew Done's assistance with the initial test flights. Thank you to

Alfred and Susan for their support and service over the nine years. □

## Book Review:

### Man and Machine

by Stephan Wilkinson

The Lyons Press, ISBN 1-59228-812-X

\$16.95 Paperback, 196 pages

If you've been in mourning ever since Steve Wilkinson sold his Falco, then your latest grief therapy session awaits you at your favorite bookseller. *Man and Machine* is a collection of articles, about 'the ways men entertain themselves when no one is telling them what to do.'

Steve takes you into his sphere as an ambulance driver and the high speed world of vintage jets, race cars and speedboats. You'll find the Falco all through the book though the article about a hawk is about Steve's personal raptor, capable of 247 mph in a dive and incapable of compassion for its prey.

For me, the most poignant part of the book is the tribute to "the three grandest editors" Steve has worked for: Scott Mowbray of *Popular Science*, George C. Larson of *Air & Space Smithsonian* and the late James Gilbert of *Pilot* magazine in England. It was James Gilbert who introduced the western world to Stelio Frati and his airplanes, and thus begat the Falco kits, Steve's Falco, his articles, and all of you reading this book report.

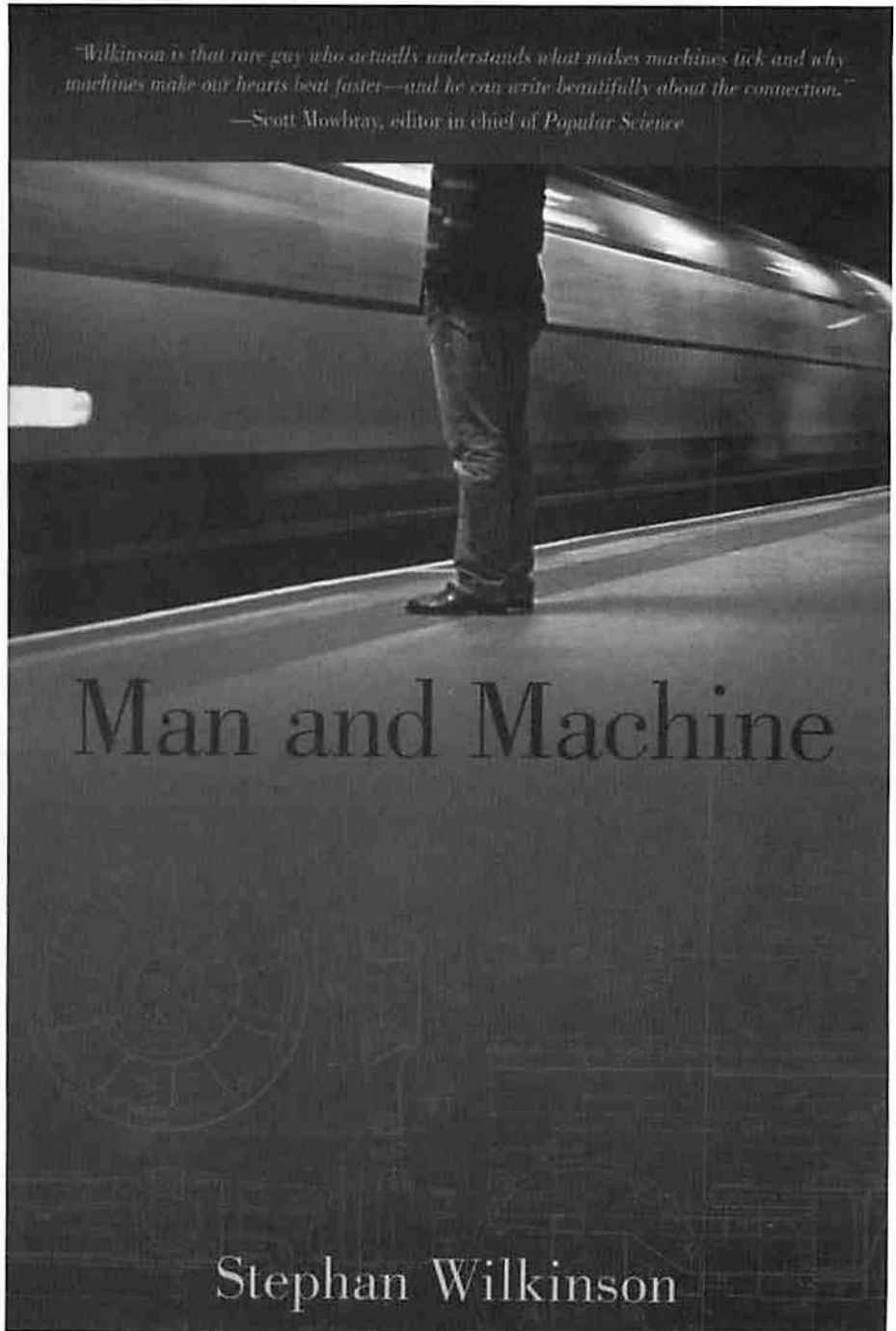
Who else but Steve would chase down the guy in California who is a world's expert on the DB-601 engine that powered the Me-109 and then into the working of the engine and why it was a year or so ahead of the American and British engines at the time of the Battle of Britain. Or into the factory that makes Steinway Model D concert grand pianos in New York City. Or to a contest by car audio systems to produce the loudest noise for a burst of two or three seconds—something called "dB Drag Racing."

For me, the most appealing thing about Steve's writing is his willingness to go on his own, off the beaten track of conventional thinking and standard wisdom, into the world of eccentrics and their obsessions. Perhaps that's what brought him to the Falco, and which draws all of us to his writing.

So don't get over it, get with it and dive into *Man and Machine*, and hope that in another couple of years we will all have another adventure into the grease pits, desert garages, and machine shops that draw Steve into their world.—*Alfred Scott*

*"Wilkinson is that rare guy who actually understands what makes machines tick and why machines make our hearts beat faster—and he can write beautifully about the connection."*

—Scott Mowbray, editor in chief of *Popular Science*



*They sit on a spur of test track outside General Electric's locomotive factory in Erie, Pennsylvania, panting and grumbling like two old lions half asleep. The ominous, muttering rumble is the idle of 8,800 horsepower—24 cylinders with pistons big as buckets, turbochargers the size of washing machines, two V12 engines driving alternators five feet in diameter. For here are two units of the most advanced diesel-electric locomotives in the world: a pair of GE Evolutions.*

Stephan Wilkinson  
From "Do the Locomotion" in *Man and Machine*





Top: Giovanni Fulcheri is nearly finished. Center: So is Gordon Cook. Above: Attention flea market shoppers! Jonas Dovydenas spotted this Russian landing gear component in Afghanistan. Perfect for a Falco.

## Susan's Corner

As you may have noticed, we've gotten a little behind on getting our Falco Builder Letters out each quarter. I'm in hopes that we can now get back on schedule. I think the last one sent out was just about a year ago!

We've had a lot of new builders in the past year and many of them are very quickly

getting into the building process. We've also had a number of first flights, the details of which are on the website.

We have just gotten in a whole new batch of the oleo shock absorber struts, and for those of you that have been waiting for them, we will send out all the backordered ones before this goes in the mail.

There were also a lot of other miscellaneous parts from various kits that we were getting low on and David has spent a good part of the last year ordering and getting in the parts we needed and has also spent a lot of time on the electrical kit, getting in some missing wires and in general getting the whole electrical kit in tip top shape.

Bob and Janet Brantley flew into Richmond for a couple of days a few months back and stayed at our house with Michael and me. We had a wonderful visit, but as usual, when you're having fun, the time seems to go by much too fast.

You sure couldn't miss Bob's Falco coming in, as it's painted a bright yellow and looks absolutely lovely. Bob was nice enough to take Michael up for a spin one afternoon and actually allowed him a little stick time. The last thing Michael flew was a Cessna, and he was quick to note how smooth, sweet and easy the Falco handled as compared to what he had been used to flying. I think Michael had a grin on his face for three days straight! We sure did enjoy the Brantley's visit and while the guys were up flying, Janet and I had time to go visit the local Flea Depot, which is one of my favorite places to shop.

If you haven't checked out our website recently, you really should go take a peek. We have a whole new batch of T-shirts, sweatshirts, coffee cups, pens, coffee travel tumblers and hats. The T-shirts are two different colors and two different designs. The colors are red and blue and the designs are "Life Is Too Short" (like the original ones) and the others are the "50<sup>th</sup> Anniversary".

The sweatshirts are all new colors (six or seven different ones I think). We used one design but those are in different colors as well. The sizes run a little big, so please keep that in mind when ordering them.

I guess that's all for now. Alfred will be on vacation next week so we want to get this to the printer so we can get them in the mail next week. I hope everyone has a great summer and as always, keep us posted on your building progress.

Susan Fleming

## Calendar of Events

West Coast Falco Fly-In. Sept. 21-24, 2006 at Bend Municipal Airport, Bend, Oregon. Contact: Dave and Kate McMurray (541) 383-2337 fax (541) 383-0195 email falco155bk@bendcable.com

## Construction Notes

Bill and Charlie Nutt reported that after they installed the instrument panel, everything checked out except for the landing gear retraction system. "We spent the better part of a day and a half double and triple checking everything and for the life of us could not understand why the gear would extend, but not retract. In desperation, I checked the Skunkworks..." where they noticed a report by Ian Ferguson that his system would retract with 10 volts on the bus, but not with 12 volts. Ian changed the 22,000 ohm resistor to 7,600 ohms which allows a current of about three milliamps and that the system works with 11 volts on the bus.

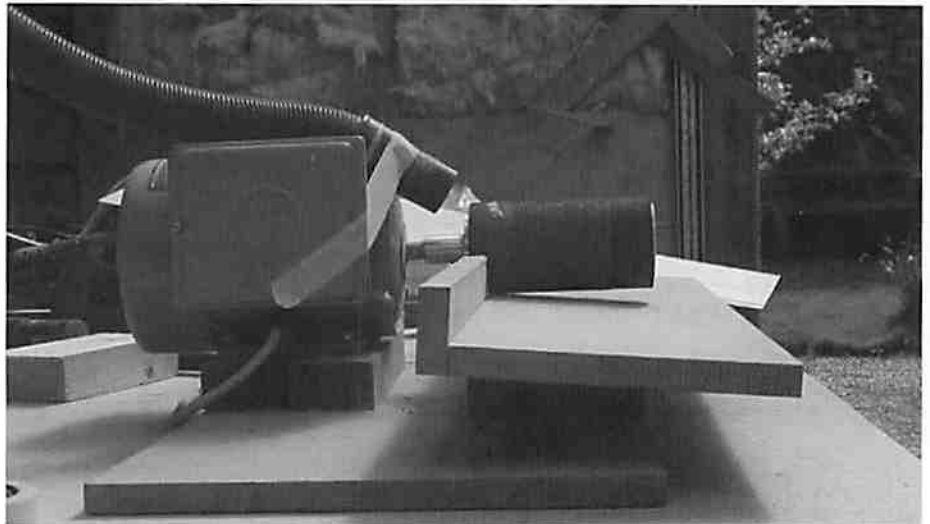
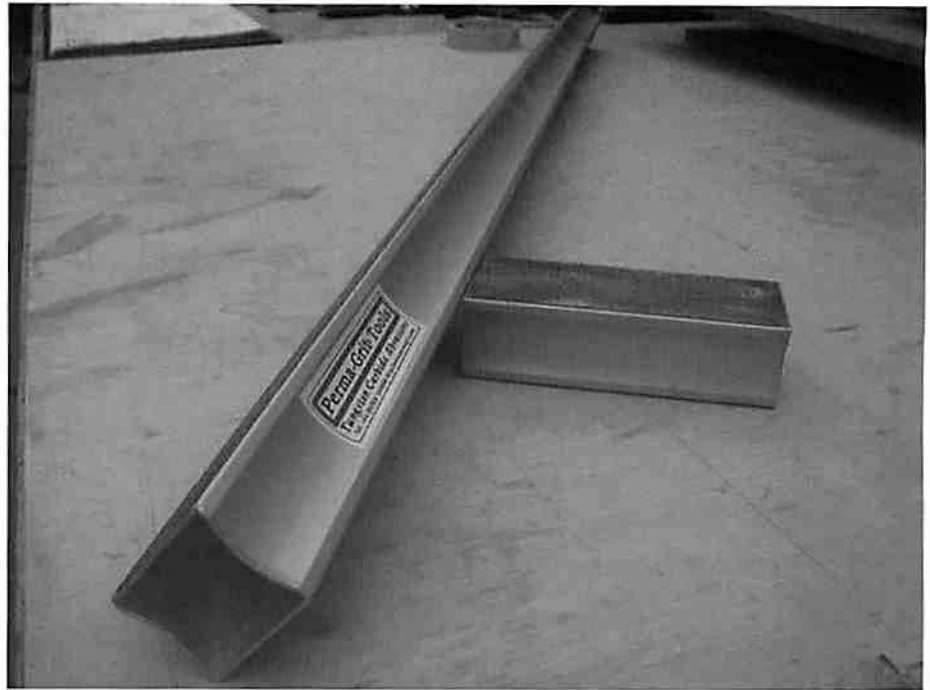
After trading notes with Bill, he reports: "We ended up swapping the resistor to a lower value and also swapped the transistor for another one and now it works fine. I'm not sure if it was the resistor or the transistor that fixed the problem, but now it works. Glyn Russell also had the same problem and didn't get the retraction system to work until he hooked up a battery charger to get more voltage."

It's a long and complicated explanation as to why the retraction system is designed this way, but it all is related to the pitot pressure switch, which is rated for a very low current load. That's the reason for both the transistor and resistor, and in the initial design work, we found that the system worked well down to a very low voltage on the bus, but over time, we've had a couple of Falco builders who have had to install a resistor with a different ohm value to get it to work. It is probably due to some variation in the manufacture of the transistor.

Bill reports that they are going to trailer their Falco to the airport shortly to get it painted and upholstered. They are still planning to get it in the air sometime this fall if all goes well.

From Charlie Witherell: "I wanted to pass along my recent experience in obtaining Aerolite. I haven't seen many comments in the newsletters on its obtainability lately, although I assume it is still a problem for Falco builders. I located a ships supplier (chandlery) in England that will sell and ship it. I have obtained 6 Kg from them for a bit over 40 pounds (British). I ordered it, less hardener (formic acid), as that is available locally through a laboratory supplier I use.

"Without the hardener, they can ship it via air with two-day turnaround, although the ship-



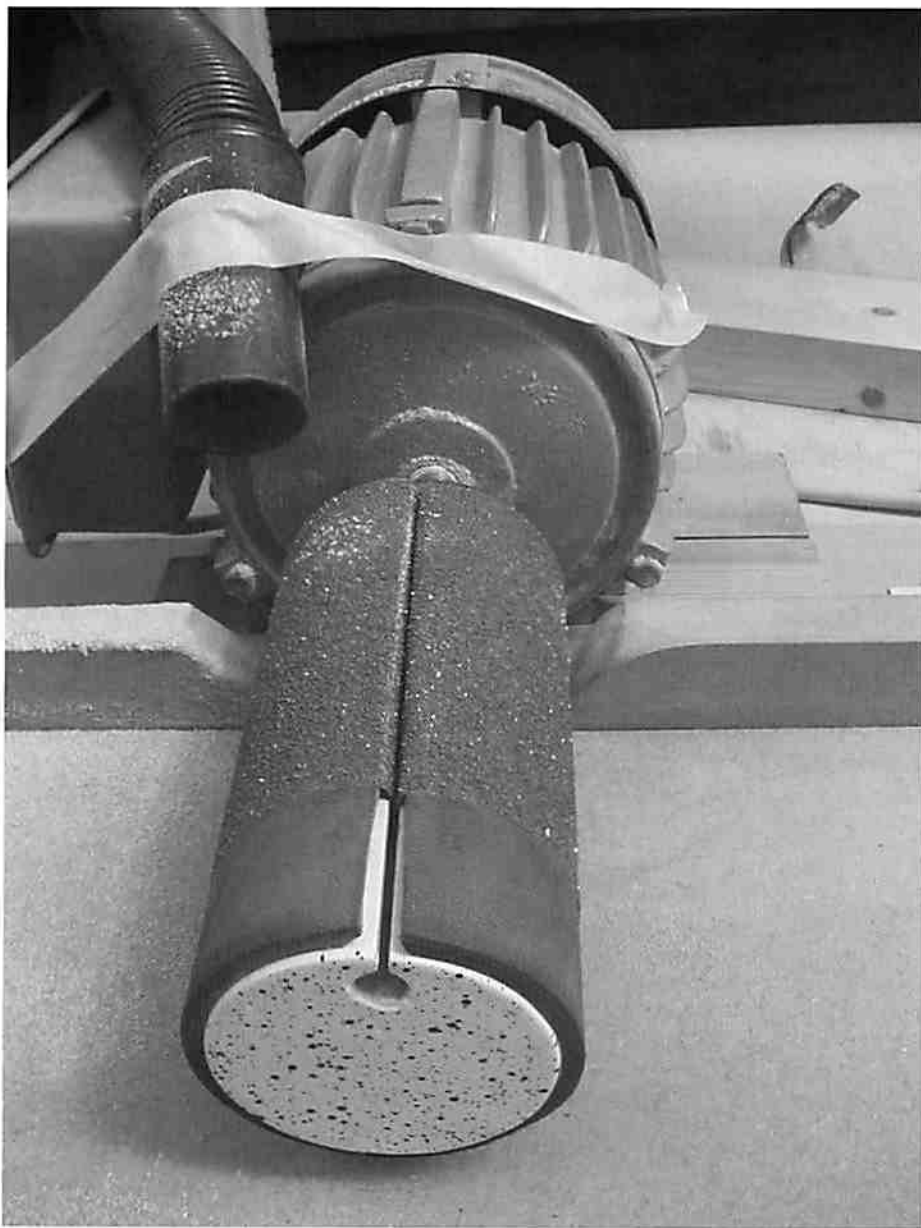
ping cost exceeded the cost of the Aerolite. Their e-mail address, for anyone interested is [chandlery@marinestore.co.uk](mailto:chandlery@marinestore.co.uk). As always, best not to mention it is for an airplane."

Gord Cook reported a problem with his nose gear steering arm being off center with the nose gear directly below it. Gord cut the three tubes supporting the bracket, added sleeves to the tubes to take care of the metal lost in the saw kerfs, and rewelded it. This required Gord to remove the engine and prop and to postpone the final inspection. So instead of getting the first flights this fall, he will have to wait until next spring.

I was very sorry to hear about this problem. We try our best to insure that everything we do is high quality, and we are good but not perfect. The engine mount is a difficult thing to get perfect, and it's a little tricky to install so that things work out perfectly.

Because it's a welded structure, there are inevitable tendencies to spring one way or another. In the last year, someone pointed out to me that the four mounting locations at the firewall were not all in one plane, so if you put it on a flat table, one of the ends was off the table by some amount. I could not believe it, because all of the engine mounts are made in a very precise and very sturdy jig, and they are stress-relieved in the jig as well.

It didn't take long for me to discover that the 'error' in the manufacture was not an error at all but rather the springiness of the engine mount. If you spread the four ends so that they were at the locations shown in the drawings, then everything was located correctly. At this point, it's too late to do anything to help Gord, but I would bet big dollars to doughnuts that this is the source of the problem, and that this alignment problem could have been avoided entirely.



We can't really know this for sure, but I'm guessing that he compensated for the slight distortion of the engine mount when he mounted it on the firewall frame, and that this is the root cause of the problem.

From Angus Buchannan: "I don't know whether you or the building fraternity have discovered Permagrit—if not it is worthy of a mention. I think the tools are sold quite heavily to composite builders. I have used the hand tools for a few years. They've never worn out! The material is for sanding, and a tungsten carbide grit is brazed into a metal base.

"The long sanding channel is fantastic. I had one made three feet long.

"The latest excitement is my scarfing machine. Sandpaper on a bobbin keeps wearing out as the same area is always in contact with the plywood. As it wears, the

scarf becomes less precise. I've adapted a flexible sheet of Permagrit so that it is wound round the bobbin. Now I have the Rolls Royce machine that repeats perfect scarfs over and over. Please pass on to the world—[www.permagrit.com](http://www.permagrit.com)"

From Gord Cook: "I don't know if others have encountered this problem or not, but I found it rather strange that some anodized aluminum fittings are non-conductors.

"When I first turned on the master switch after the panel was installed the oil pressure gauge was 'pinned' on 100 lb. I thought this rather odd but tucked it into my mental list of things to do and check when the engine is flashed up for the first time. When that time came the reading didn't change, it was still pinned on 100 lb. After checking the wiring by removing the wire on the transducer and putting a resistance ground on it I found I could change the reading

on the gauge by varying the amount of resistance I dialed in on the pot—gauge and wiring okay. I checked the braided oil pressure line for ground, and it was found okay, however there was no ground at the oil pressure input to the transducer. The blue anodized aluminum fittings between the transducer and oil pressure line were wide open, infinite resistance even on the 2M scale. The solution was to replace them with steel fittings.

"After finding the above mentioned problem another one came to light. I was running up the engine with all the lights, bells and whistles on, and the gauge was showing no oil pressure. I was sure there was sufficient oil pressure since the engine sounded good. So, it's back to the drawing board with my homemade test gear. With the oil line disconnected I put 60 lb. of air pressure, via my homemade pre-lube device, on the transducer and read nothing at the gauge. This was after getting the proper readings when dealing with the first problem. With all the breakers off except for the one powering the gauge I found all was well. I then started turning on the breakers one at a time and when I operated the panel lighting breaker the oil pressure fell to zero. There was interference between the one of the lamp leads and the gauge. This meant tackling the dreaded job of pulling the panel, which I did and turned the air blue while doing so.

"When I first installed the engine instrument cluster on the panel I noticed a ground stud on the case but chose not to ground it because there was zero resistance between the case and the stud and since the case is grounded there was no need for a ground wire. Or, at least I thought there was no resistance. When reading very low resistances one should always take care in 'zeroing' the meter and when reading it should ensure the sight line is aligned with the eye, needle and the mirror behind the needle to get an accurate reading. I must have been careless because my new digital meter read 1/2 ohm between the case and the stud. I put a ground wire on the stud and now have correct oil pressure readings. All that work for a missing ground wire. Moral of the story: if there's a ground stud—put a ground wire on it!

"When I was installing switchboards for the local telephone company we used to find if there were lot of problems during the testing phase the equipment would perform flawlessly when put into service, however, if it tested cleanly there would be nothing but problems later. I hope this also applies to airplanes!" □

# The Falco Turns 50





## Mailbox

Somebody told me, a long time ago, that one of my stories had been translated and put in a Falco site in the US, but I did not paid much attention at the time, being probably sandwiched between agendas. Then, by a stroke of luck, here I am, landing on your electronic runway, and I find my story there. And I love that, really. And more than that, I find that you've paid homage to James [Gilbert], who was like my older brother in the business of writing about things and people who fly, and I love that too.

I went through your site, and I love it. It even makes me wonder about building a Falco myself, but alas, anytime I am handed a basic screwdriver, I end up with a bad cut and blood all over the place. I am just barely able to assemble plastic 1/48th scale kits, and even that can become quite difficult.

With my son (Air France Triple 7 F/O, who started flying for the airline at 20) and my wife (and his mother, then), we own and operate the one and only Lockheed 12 this side of the Atlantic, a J-2 Cub and my son's PT 17. It's all very nice, but Falcos... My son did his first roll and loop in Switzerland when he was 14 from the right seat of Georges-André Zehr machine, which was lacquered in Ferrari rosso. Sadly, Zehr sold it, and the thing was crashed in France later.

Reading along your site brought back that old red magic and the taste of what real flying is about. I have flown, as a pilot-journalist, around 250 different types. I am not an expert pilot, being a journalist and thus barely sampling an aircraft instead of really flying it. But at least I can compare. And as I wrote in that story a long time ago, there are a very few machines belonging to the list of out-of-this-world flying wonders, and I mentioned the Falco and the Spitfire. Since then, I have flown a Spitfire, a Mk IX. And the only thing I can say, is that the Falco and the Spitfire belong to the same category, the Spit being a bit more dampened in its reactions compared to the Falco's incredible vivacity. But otherwise, the pleasure is of the same magnitude.

I am glad that Sequoia is still preserving the Falco family. This is one of the classic designs of all times, and I say Bravo.

Apart from writing, I have created a "romantic aviation" site at [www.pegasus.tv](http://www.pegasus.tv), which is the boutique where we sell our



*Luigi Aldini's Falco is now flying.*

high quality aviation documentaries. I write and produce them, with the help of our small team of professional movie specialists/pilots. Pay a visit there.

*Bernard Chabbert  
France*

Just had to tell you that the electrical kit arrived in perfect condition and, as Alfred said—it will blow your mind, and it did and does! A most fantastic package. It is difficult to comprehend how anyone could create such a well-organized and intricate system—even within a lifetime, let alone in a year as Alfred said he did.

Truly the product of a genius, and I am sure that I am not the first to make this observa-

tion. I appreciate how well it is packaged and identified and look forward to installing it (still a long way to go for that, but it is a pure joy and inspiration just to go through the box of components and wiring diagrams and manual).

And we do appreciate those great mugs and the updated copy of the construction manual and revision list. All first class in every way!

*Charlie Witherell  
Salinas, California*

N644F is now the property of Gary D. Noble, Captain, U.S.N., Commander of the Navy contingent at the Command and Staff School at Fort Leavenworth KS.



Top and Center: Oshkosh Grand Champion Doug Henson in formation with Reserve Grand Champion Dan Dorr. Above: George Richards in his new paint scheme.

June 2006

I finally had a visitor who was more than either (1) a tire kicker or (2) one wanting to "steal" a Falco! Thanks for the ad space.

While at 83 I have yet to have use any Medicare benefits (I take no pills or shots, employ no physicians) the words of an RAF Air Marshall of long ago came to mind about a year ago: "Aviation in itself is not inherently dangerous but like the sea, is terribly unforgiving of any carelessness, incapacity or neglect." The one in the middle came to mind when I decided to hang up the headset. There is a time for all things.

My Falco experience really had its beginning some sixty-two years ago, when, like departed friends (of fond memory) Karl Hansen and Tony Bingelis, I graduated from a U.S. Army Air Corps Advanced Flying School (along with 100,000 other pilots that year) in 1944. In the many thousands of hours in the air since then, fortunately but few under enemy fire, two phases of that experience will remain always with me as most cherished; the halcyon days of my Aviation Cadet flying and those with my Falco.

While I may not have always agreed with this guy Alfred Scott on some issues, I owe you (and Dr. Frati) a debt for having made that last flying adventure possible, and at a relatively advanced age (I suspect I was the oldest to have made a first flight in his Falco).

Important: I never ever sought help in the course of building that wind machine, the Wooden Wonder, from Sequoia when I did not get a prompt and courteous response; support of builders (and quality of product) has always been much in evidence at Sequoia Aircraft. Thank you for that as well. I suspect I shall continue to follow what goes on in the world of Falcos until I Cross Over the River.

John Devoe  
Stratham, New Hampshire

Here in Reiti we're completing the flight tests of our Falco, and everything is going on very well. We're enjoying every second of the Falco and it is well balanced and seems to be a fast aircraft. We tried some aerobatics with Jack Zanazzo (Italian air force test pilot, former Freccie Tricolori leader, and test pilot for many of Frati's projects) and he finds I-ALDI a great aircraft. We're very happy.

Luigi and Davide Aldini  
Rome, Italy

Finally I've modified the air intake for the engine and the speed has increased by about six to seven kts. Replacing the old big mouth air inlet, we installed a NACA type air inlet copied from a Cessna 182RG. The next step is to improve the gaps (aileron and rudder gap hinges).

*Daniel Millas  
Santiago, Chile*

We have just completed the annual inspection of G-OCAD and nothing untoward was found, indeed the inspector for the PFA thought that the aircraft was one year old and not the ten which she actually is.

We have a new Falco just down the road now, G-CCOR and we have already flown in formation, by chance when we were passing her home airfield. We also have a few under construction in the UK, so I'm told, so maybe we can have our own Falco UK air force in the not too distant future.

*Ivan Court  
Leicestershire, England*

Here some pics of I-BARO with the new Garmin 430 installed and the new cowling with the reduced air inlets.

I'm proceeding in the flight test program, and I've found out that I-BARO has a pretty good efficiency. I'm doing about 20.6 miles per gallon at 154 knots! I think it's not bad and the data is confirmed also by the Shadin fuel flow (connected to the GPS) but the wind effect is cancelled out.

I have solved the problem that was keeping the main gear doors open in flight and now I still have to find a way to keep the front gear doors closed. I've tried different solutions but every time they were opening!

Temperatures with the new air inlets stays in the green arc in general they have gone up by 25 degrees, but I still have to see in July when the OAT will be 15 degrees higher how I'll manage the climb.

Speed is OK although I'm not satisfied (no Falchista is ever), and I'm thinking how can I increase it.

I really like the Aldini Falco and honestly I feel that the Aldini the nicest Falco I've ever seen. I know I said this about Fulchieri but I had not seen yet Aldini, plus he did some small changes to the cowling that are really quite stylish.

*Andrea Tremolada  
Milan, Italy*



*Andrea Tremolada has a new cowling, a Garmin 430 and he is still struggling to get his main gear doors to close completely.*