

Falco Builders Letter



Kim Mitchell christens the Falco with champagne.

Building N98KM

by Kim L. Mitchell

As president of a small electronics manufacturing company in Oklahoma, I have for many years enjoyed the luxury of a company airplane, available almost anytime it's been needed. But at the beginning of 1991, I started thinking about the need for an airplane when I retire. Retirement was in the distant future, but I like to plan ahead. Also, my job was becoming more and more stressful, since I was spending less time doing enjoyable work (engineering) and more time doing what was needed (management). It was time for a relaxing hobby. These two things led me to consider starting a homebuilt airplane project.

I looked at all of the kits available at the time. The Falco rose to the top of the list for a couple of reasons. Woodworking has always appealed to me, but there has been very little opportunity to do it over the years. I still remember having to give up shop class in high school in order to take chemistry and physics. Also, I wanted a fast airplane, and it seemed the Falco was the fastest wood airplane available. The Falco kit had the reputation of being relatively labor intensive but, what the heck, I had plenty of time till

retirement, and I felt I needed the distraction. Surely this thing would not need more than four or five years to complete.

Such a large commitment of time and money caused me to agonize over the decision for several months. The feelings of the spouse must be taken into consideration. My wife earned her private pilot license in 1975, but she had since lost interest in aviation. So she did not share my enthusiasm for the project. She understood the large amount of time the project would keep me away from home, and so was only mildly supportive. At least she did not exercise her veto power. I appreciate the fact that she has accepted the situation without complaint.

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On a trip to Florida in February of that year, we visited Ralph and Judy Braswell in Ocala and looked at his Falco project. The obvious quality of his work was intimidating. Could I do work this good? Was such precise workmanship necessary? I later learned that a lot of sanding can compensate for some kinds of imprecision. On the way home we stopped in Conway, Arkansas, where a local lawyer gave me a ride in a Falco which he said had been built by someone in Pennsylvania.

This experience demonstrated what a delight the Falco is to fly. Up to that time, I had only flown Cessnas and Pipers with their heavy controls and slow responses. Still not completely convinced, I visited Howard and Marty Benham in Wichita, Kansas, to see their project. Once again the beautiful construction was impressive. Howard answered enough of my questions to convince me to take the plunge.

So, where to build it? There was no good place at home. The garage was full of cars, and it would have been too small anyway. My company had a little-used garage that seemed ideal—heated and air-conditioned (very important in Oklahoma), high ceiling, and 12' x 12' door. Just a one-minute walk from my office. I could play with the project an hour before work, during lunch and coffee breaks, and an hour after quitting time. This, combined with weekends, would allow me to devote about 25 hours a week to the project without seriously disrupting family life. I could still take business calls and handle urgent problems when necessary.

As it turns out, I averaged about 10 hours a week logged time and probably one-fourth that much unlogged time. But that includes the one year I waited for Sequoia to make their first wing ribs, and the many months I was out of the country.

I bought a radial saw, grinder, belt sander, and battery powered drill. I borrowed a bandsaw, drill press, and jig saw. These, together with all the normal hand tools, turned out to be all that was needed. Actually, the only time the radial saw seemed more a necessity than convenience was

when making the angle cut on the end of the aft wing spar. The band saw was most useful, followed by the drill press. I tried to use hand tools whenever possible, instead of power tools. This took longer, of course, but minimized the possibility of catastrophic mistakes, and provided a more pleasant experience. The process of bending birch plywood was very pleasant. In my travels I have become a great fan of the Russian banya (steam bath), and the heat, steam, and smells of birch plywood bending reminded me of that.

I soon learned to heed the warning “Don’t try to visualize the whole airplane at once—that’s too intimidating and confusing. Concentrate on one task at a time, making sure it is done correctly, and have faith that everything will come together properly.” Good advice. But this approach caused the means to become the end. The construction process became so enjoyable and satisfying, impatient expectations of a finished product were forgotten.

It was interesting to see the reactions of people who visited the workshop. They were pretty consistent. During the first few years people were amazed by how little I had to show for so much effort. Just a few bits and pieces here and there in that big garage. Later on, after the fuselage was built onto the wing, they would look at the airplane, then look at the door, then say “How you gonna get this thing out of here?” I would say “Oh my God, why didn’t I think of that? Guess I’ll have to cut it in two.” Great fun.

I was on a work-study program in St. Petersburg, Russia when Howard Benham’s Falco was totaled. Upon returning home and finally hearing about it I first thought, what a tragic loss of time, effort, and money. But eventually I realized that if the same thing happens to me, I will have no regrets. The satisfaction of successfully completing such a monumental task justifies everything. In the meantime, it’s just now beginning to sink in that I have a beautiful, fast, and extremely capable cross-country and aerobatic flying machine.

I was fortunate to have a lot of good help. Alfred was always available to answer questions and find ways to bail me out of stupid mistakes. Two skilled machinists in my company, who have been totally enthusiastic about the project, helped solve many problems. No provision for a cabin air inlet valve in the plans? No problem. Just ask Alfred to fax a sketch of something that will work, give the sketch to Bill and Lonnie, and voila, in a couple of days a



finished part appears. Another employee, a pilot, instructor, shade-tree airplane mechanic, and deep thinker, provided much useful advice and helped with two-man jobs. Mike also provided moral support when things got tough. Don’t hesitate to seek out such help. It makes the project easier and more fun.

Speaking of getting help, when my plane received FAA certification I came to the embarrassing realization that here was an airplane I could not fly. I’m not exactly an ace pilot and have always had trouble transitioning from one airplane to another, especially one as different as the Falco. Jim Petty, a Falco builder in Oklahoma City, came to the rescue and gave me instruction in his outstanding bird, N627SE. I was a little demoralized by comparing his attention to detail to my lack thereof, until

he explained that he has had a few years to refine his airplane. Seeing Jim’s plane

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brought home the fact that the project is never really finished. Gear doors need to be built and installed, paint touched up, alternate air added, and on and on. I find this comforting, because I hated to see such enjoyable activity come to an end.

Finally, Howard Benham had enough confidence in my construction skill (or maybe in his flying skill) to make the first flight in N98KM. We started trying to do the first flight as soon as the plane was certified in late September. All through October, every time Howard had a day off, the weather was lousy. Then, for all of November, I was out of the country. I'm told the weather was perfect all the time I was gone. This was becoming frustrating.

Finally, on December 13, everything came together. Howard was off work, the weather

was good, and I was here. Howard and Marty left Wichita in their 180 at the crack of dawn (not all that early, this time of year). Howard had carefully inspected the Falco on a previous aborted attempt, so only a quick preflight was needed now. He took out the seat cushion and put on his parachute. The engine started easily, and Howard taxied out to do high-speed taxi tests.

Everything looked okay to me, but soon he was back at the hangar. Run-up had shown two fouled plugs, the result of too much ground idling of the engine. Thanks to the engine analyzer I had installed, these plugs were easily identified and quickly replaced. Soon Howard was off again. He took off as if it were an everyday occurrence.

I jumped in the chase plane, together with Marty and Lonnie, and taxied to the ac-

tive. Meanwhile, Howard was flying the pattern and overflying the runway. Everything must have been okay, because he departed the pattern to the practice area northeast of town. I took off in the chase plane and tried to catch him. This was not easy. He was climbing at 1000 fpm gear down and making pretty good forward speed, too. Encouraging.

Howard did a lot of different stalls. One of them must have been an accelerated stall and resulted in a 90 degree wing-over. I thought for a moment he had lost it, but everything was fine. An inconsiderate local politician, who happened to be on frequency, tried to carry on a conversation with Howard during this test flight, but Howard handled it well.

Finally coming in for landing, he flew well

past the runway on an extended downwind, and once again I thought something had gone wrong with the airplane. But it turned out he was just avoiding a flock of birds. Seeing that Falco fly, up close in a chase plane, was both thrilling and nerve-wracking. Howard remained very calm through the whole process, but I can't say the same about myself.

N98KM weighed in at 1277 pounds empty, with the CG at 66.87 inches. Adding the gear doors will change these numbers a little. Logged construction time is currently 3,500 hours and unlogged time (time for planning, shopping, discussing, etc.) is another 800 or so hours. Equipment includes Garmin GNC 250 GPS-Com, King KX-165 NAV-Com, King KT-76A transponder, PS Engineering PM2000 intercom, GEM-610 engine analyzer, Electronics International FP-5 fuel totalizer, Davtron 301 OAT, Precise Flight alternate vacuum system, and Century I autopilot. I plan to use the airplane IFR, but I will not do so unless the autopilot is working perfectly. I have become accustomed to Stormscopes in our company planes, and I will sorely miss this super useful device. I will also miss having an HSI, but maybe a GPS pseudo-HSI will help fill this gap.

What's the hardest part of the Falco to build? Someone mentioned in a builder's letter that the flap-ailerons were hardest, and I agree. After carefully assembling the ribs to the spar with precisely the right amount of warp, I then laid the assembly on a flat table to glue on the skin, thus losing part of the warp. I also varnished the inside surfaces with the trailing edge down, so that varnish migrated toward the trailing edge, aggravating the control surface balance problem. Another thing that was difficult for me was leveling and squaring the wing to the fuselage. I spent two weeks doing this. Another hard job was fitting the front fuel tank in the fuselage.

The most exciting event of the construction process was when my radial arm saw kicked back a small spruce stick, sending it flying across the workshop and completely through the vertical stabilizer (at the exact location of the com antenna, naturally). Maybe this experience explains my aversion to power tools. Fortunately, wooden structures are relatively easy to repair.

Difficulties are inevitable in such a project as the Falco. I think the key to successful completion is to address problems as they occur, before moving on to the next step. For me, the process and the result were both worth the effort.

A Flight Test of N98KM

by Howard Benham

The beginning of this test was really back in March of 1991. I received a call from Kim Mitchell introducing himself and asking if he could come to Wichita to look at our Falco. He and his wife Joyce showed up on the 29th of March, and they spent a couple of hours inspecting what Marty and I had completed and going over the blueprints. He told me that he thought he would buy the kit and start building as soon as his schedule would permit.

In June 1991, I spoke with him and invited him to our 4th of July fly-in at El Dorado, Kansas, to see Charles Gutzman's Falco. We both did the usual "Falco builders dance" of walk around, crawl under, and peer into to see how some of the construction steps had been accomplished.

After that I did not hear from Kim until August of 1998 when he called and asked if I would be willing to come to Ponca City, look over his creation and, if satisfied with the construction, do the initial flights after the FAA had signed off. I was surprised and somewhat hesitant as I had only done two other first flights, a Quickie in Iceland and my own Falco. Marty and I talked it over and decided to at least go down and look it over.

We flew the C180 down on the 5th of September. (Yes, I realize that it is probably heresy to mention a store-bought in the FBL, but it is a classic.) After one look at the beautiful job that Kim had done I was hooked again! We agreed to come back after the FAA did their thing at the end of September, do the initial flights and also check Kim out in the new bird. He had been flying a Piper Saratoga but was nervous about the Falco.

Then began a real circus of trying to fit my schedule at FlightSafety with Kim's schedule and the weather. On the 1st of November, Marty and I drove to Ponca City for four days to do a final inspection, first flights and Kim's checkout. For those of you who follow the national news, that was the same time that Mother Nature decided that it was time for a 100-year flood in the Kansas/Oklahoma area, so other than doing a very detailed inspection, Marty and I spent our time touring the Marland Mansion and other wondrous sights in beautiful downtown Ponca City.

We scheduled several other dates, but they were cancelled due to weather. But finally on the 13th of December everything finally came together. Marty and I took off

from our strip before sunrise and by 9AM, we were ready to take off in the Falco. I wanted a couple of high-speed taxi runs just to get the feel of a real airplane again. After a year of flying in the middle east and the flight training that I do at FlightSafety, I was more than current but not in something as nimble as the Falco.

During the initial run-up there was an excessive mag drop. The GEM engine analyzer was showing the #2 and #4 cylinders with fouled plugs on the #2 mag. Everything else appeared normal so I elected to do a couple of the taxi runs at high power and lean mixture to see if the problem would clear. The control checks and handling were fine, however another check of the mags showed no improvement, so back to the hangar.

By the time I taxied back, Kim had already located two new plugs and was standing by with a couple of his helpers to change out the offending plugs. As soon as the engine cooled enough to pull the plugs, they were changed, and we were ready to go again. During all of this I wouldn't say that Kim was nervous, but I don't think that the stem on his pipe will ever be the same. Back to the runway and everything was okay.

Then I had to wait for Kim to fire up the Brand X to fly chase. I was afraid to wait any longer for fear of fouling the plugs again so as soon as they started to taxi, I started my takeoff run. It was cool, about 10°C, and the acceleration was terrific. Before I was really ready, the speed was through 65 kts, and I was airborne.

As I lifted off, there was a pronounced roll to the left which I quickly corrected with right stick and rudder. The climb was rapid, 1500 fpm at 90 kts and smooth. All engine parameters were in the green. As the speed increased, the force built up on the stick and at 110 kts I was having to hold three to four pounds of pressure to hold wings-level. Other than the left roll tendency, everything else was normal.

As with all the Falcos that I have flown, two-fingers-and-a-thumb is all that is needed for smooth control. Kim, Marty and Bill finally joined up, and we leveled off at 5000. Kim is not used to formation flying, so he stayed well to the side and below to see if I was trailing anything that I shouldn't be.

With the 'all clear' from Kim, I went through the usual first flight checks. The stalls were pretty much as advertised. A gentle buffet about 10 kts before the break during both the clean and flaps landing



stalls at idle power. The left wing dropped sharply at the break but it recovered immediately when I released back pressure. Then it was time for a little more excitement which the first power-on stall produces. With full power applied, the pitch angle approached 25 degrees nose-up before the speed started to bleed off.

The buffet started at about 50 kts and at about 45 kts I got a look at the earth from an entirely new point of view. The break was sharply to the left, and the nose sliced quickly through the horizon to a 40-degree nose down 70-degree left bank. I set power to idle, released the back pressure and everything returned to straight and level. The first one happened so quickly that I didn't have time to check what effect the rudder might have on the break. On the first one I was concentrating on keeping the ball in the middle. So it was back to full power, nose up, wings level and wait for the break.

This time as I felt the break start I kicked in full right rudder and held full back pressure on the stick. The break was still to the left but not so sharply and with the addition of some right aileron the break to the left is

stopped. After a few more combinations, it was time to quit having fun and return to the airport. The pattern is flown at 90 kts downwind, slowing to 80 on the base with 15 degrees flaps and 14" manifold pressure, flaps selected to down on the final and power adjusted to maintain 14" resulted in 70 over the numbers, power to idle in the flare with touchdown at about 60.

After the flight, our inspection showed everything was in good working order, and we planned another flight for the next day. However mother nature had other ideas and it was not until the 10th of January that we had a chance to do gear retraction and controllability checks. Kim has not installed any gear doors yet, and he says that will be a project for later. After join-up, we went through a series of retraction and extension cycles with out a hitch. After each extension, I checked the gear position with the manual extension handle but in each case the gear was fully extended. The only minor problem I noted was that the gear warning horn came on with the power set at about 20" manifold pressure which I feel is a little high. In order to get slowed down in the pattern, you have to either put up with the horn or shut it off

and set yourself up for a possible gear-up landing if you get distracted.

Satisfied with the retraction, it was time to do what the Falco does best, *go fast*. With the gear up, I set up 24/24 and settled back to let speed stabilize. In short order I got a call from Kim wanting to know where I was as he couldn't keep up and had lost sight of me. The speed stabilized at 160 KIAS at 5000 ft pressure altitude. The OAT is 10°C. For those of you without your whiz wheels handy, that calculates out to a true airspeed of 169.3 knots, 194.9 mph, or Mach .26 for the jet jockeys.

This seemed a bit fast, but I didn't have time to do any more checking as I have gotten so far ahead of Kim that he probably thought I was stealing his new baby, so I did a quick 180 and flew back to look for the Brand X and join up on his right wing for some air-to-air shots. Marty was doing the photos, and she told Kim to have me wave, at which point he said he didn't want to distract me.

The Falco is a real dream to fly in formation. With its rapid response to the throttle, it is a breeze to join up on another plane without any overshoot. Marty got her photos and then it was back to the airport to get Kim in the left seat for his first flight in his new bird while I recorded flight data (FAA please note it takes two people to fly and record data). During the next two flights, Kim repeated the stalls and handling checks plus some speed checks against the GPS. With two on board, our airspeed was 152 KIAS at 5000' pressure altitude with an OAT of 17°C This figures out to 165.9 kts true.

We then did a series of two-way runs to cancel out the wind and record an average ground speed of 162 kts. It will really be interesting to see what this one will do when gear doors are installed and the control rigging is adjusted to hands-off. All in all it was a real pleasure to fly, and I am very grateful to Kim for allowing me the honor and pleasure of flying this very well-constructed and beautiful aircraft. It almost makes me want to start building another Falco. Right now Marty and I are busy restoring our 1957 Cessna 180, but once that is done who knows.

I just got off the phone with Kim and as of today he tells me that he has about 10 hours now. He has installed a small wedge on the bottom of the left aileron which has corrected the left roll tendency. He really sounds like he is enjoying it so I guess that means that my Falco flying days are over for a while.

The Birth of N89WH

by Willard Hofler

I purchased plans from Sequoia in May 1982, and in July, I started construction of my Falco in an old barn that used to be a cow and horse stable in Sunbury, North Carolina.

I made all the wood parts myself and purchased all the metal parts, windshield and canopy from Sequoia. The engine is a Lycoming IO-320-B1A overhauled to new limits.

Through the years, I have enjoyed seeing the Falco take shape. Anything I did not understand, Alfred was always available and very helpful. Also, my wife, Naomi, has been very supportive in the project.

I moved the Falco from Sunbury to Elizabeth City Municipal Airport in December 1996. It took me about two years to get it back together and install radios. When finished, the empty weight was 1,170 lbs.

I know I must hold the record for the slowest builder, but I am very satisfied with the outcome.

I had some difficulty in finding a test pilot for the first flight, so after some taxi tests, I decided to do it myself. I got my private license in a Grumman Yankee, and I think this was to my advantage; although, I know it is better for someone with more experience to do the first flight.





On my first high-speed taxi test, at about 60 knots I lifted the nose, and the first thing I knew the Falco was about five feet in the air. I had about 7,200 feet of runway, so I had plenty of time to throttle back and land. The airplane handled so well that I decided not to wait any longer and do the first flight myself.

On November 22, 1998, the wind was very light, a pretty day, so I decided to fly. The flight lasted about 30 minutes. The airplane handled very well, and the only surprise was the amount of right rudder it takes when you open the throttle wide open.

Adrenaline flowing, I made a near-perfect landing, with a great thrill and feeling of accomplishment.



Skinning the Wing

by Gordon Cook

I scarfed all the pieces for the top leading edge skins (main spar to the leading edge, and from rib 1 to rib 14) together on the bench being careful to ensure the scarf joints would fall on a wing rib. Putting the scarf joint on a rib probably isn't necessary, but it will probably be more acceptable to the inspector. Doing the scarfing on the bench ensures a perfect joint. You can't feel the joint by running your hand over it.

I did the wing skins in this manner, the top fore and aft of the main spar, the same for the underside of the wing, the tops and undersides of the flap/ailerons and the 1mm fairing aft of the rear spar. If I hadn't yet done the fuselage, I would probably try this method to see if it would work as well there as it has on the wing.



The plywood was oversize by about 6" to 7" on the leading edge to accept a stiffener for the bending operation. I marked the rib and spar positions on the underside and the topside of the plywood, then I glued a piece of wood, 3/4" x 1-1/4" x 11 feet long, to the waste portion of the leading edge for stiffening.

The gluing operation is a two-man job since the pot life of the glue I use is about an hour. My son applied the glue to the ribs and spars (but not the leading edge piece) while I applied it to the plywood (but not where it comes in contact with the leading edge). We didn't spare the glue—I wanted no glue voids, and we accomplished that. However it means crawling under the wing after the gluing is complete to wipe off the excess glue. About 225 ml of glue was sufficient to do the job.

With the spar clamped to the main spar, I then began the stapling operation. This is where the rib and spar locations marked on



the top of the skin really pay off. During the stapling operation, I added a strong nylon cord under the staple to provide an easy method of removing the staples.

Note: Keep one hand between the staple being removed and your face. Most staples pop out one side only, but it only takes one to pop out on both sides to staple *you*. I got it just below the right eye, and it buried itself full depth, 5/16". No real damage, but an inch higher and I could have lost an eye. Ensure there is no thickness of glue at the leading edge of all the ribs.

I used a few deep-throat clamps made from 3/4" fir plywood and 5/16" pre-threaded rods and angle iron placed along the leading edge to bend the skin tight to the top of the leading edge.

When the glue had set and the clamps and staples were removed, I began soak-



ing the part of the skin that takes the radical bend. I used cloth shop towels soaked every few hours with boiling water to thoroughly soak the skin. I placed web clamps wrapped around the main spar and the leading edge of the skin and stiffener at each rib location, then tightened them every few hours during the day and evening until I had the desired bend.

The watch word here is *patience*. It took about four days of boiling water, steam iron and slowly increasing the tension on the web clamps and another three or four days to ensure the skin was dry before gluing it to the leading edge—2.5mm plywood does not take kindly to bending.

I flipped the wing over and slacked off the web clamps to glue the leading edge. This allows gravity to take the glue to the top of the leading edge strip and ooze out a little. When this happens, you know the glue has completely covered the leading edge. I then retightened the web clamps, waited 24 hours, removed them, cut the stiffening piece off, flipped the wing to a vertical position and feathered the skin to about 1/2 inch below the center line of the leading edge.

After inspection, I'll do the same for the leading edge skin on the underside of the wing. The next operation will then be the top side aft of the main spar.

If I hadn't already placed the 1mm fairing skin aft of the rear spar, I would have scarfed and glued the entire wing skin and placed it on the wing in one operation. But with the fairing skin in place, it was impossible to wrap the web clamp around the rear spar without damage to the fairing.

Construction Notes

Just an idea to pass on to other builders that really works for patterns for skins. Like other builders, I used posterboard for sizing and fitting before I cut out the plywood skins. But I found that if I cut it to the exact size, it wouldn't fit as closely as I wanted. My friend Ray Thompson suggested I use the same thing he was using for the sizing of the aluminum skins he was cutting for his Spitfire restoration. I did and they work like a charm! They are a little expensive but you can cut "right to the line". "They" are sheets of Lexan about 1/16" thick. You get no sagging or curling like posterboard. I don't know if this will help anyone but It works for us.

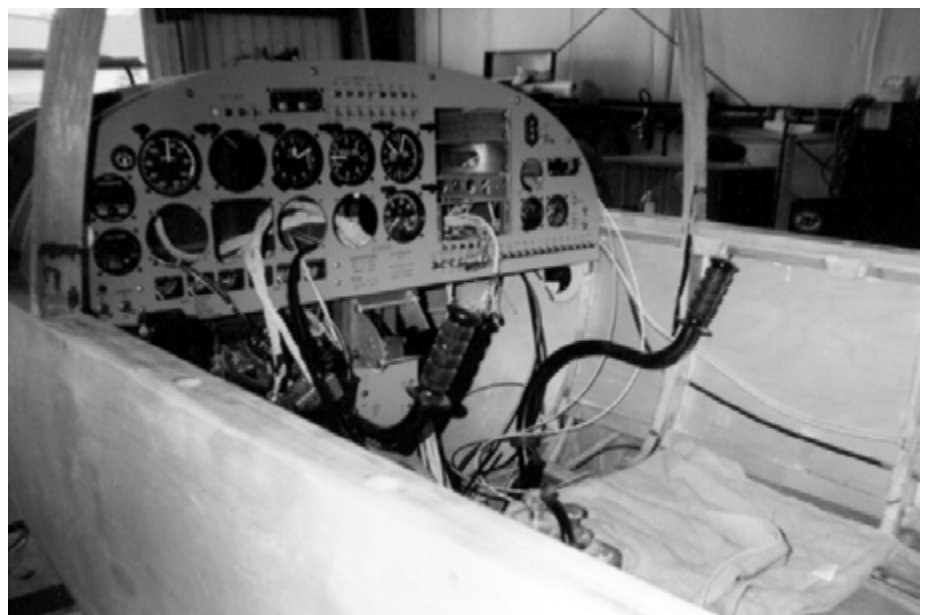
Bill Russell

In an effort to stabilize everything while I finish the longeron cut-outs (i.e. get all the angles right), I am in the process of affixing temporary 'virtual stringers' in the rough cut-outs for whichever section I'm working on. I happened to have some metal pieces laying around that are U-channel that fit easily in the rough cut-outs. I plan to use itty bitty wood screws to secure them to the fuselage frames. So, if I'm working on the left longeron near the waterline, I have the 'virtual stringers' secured in the top, bottom and right side. This keeps all the dimensions as they should be, and stiffens things up while I'm working.

Pierre Wildman

When fabricating my nav and com antennas, I consulted several articles published in *Kitplanes* magazine. The characteristics of the type of antenna I built are: (1.) 1/2 wave dipole (2.) Semi-rigid (internally mounted) one-piece antenna with everything from the coax up to the radiating element tip being in a straight line. (3.) Coax feed point does not interfere with the "25 inch right angle to the antenna elements" requirement. (4.) Can be mounted vertically (com) or horizontally (nav) (5.) Fully serviceable (can be removed and replaced) (6.) Cost less than \$5.00 per antenna

For Falco builders wanting to build their own antenna, I would direct them to *Kitplanes* issues Sept 94, Oct 94 and Nov 94. November's issue, page 74 figure 2, is the model I choose with a minimum of modifications. The radiating element is connected to the coax center wire with a small brass tube and soldered. The coax shielding wire is "sandwiched" to the outer tubing with a 1/4" long sleeve with fits inside the outer tube. The end of the outer tube is filled with epoxy to create a semi-rigid one-piece antenna. Make provisions for the antenna installation prior to skinning



Top and Center: Bill Russell found that the left-hand throttle modification interfered with the cabin air inlet on the left side, so he lowered it. Bill says "one nice feature of having to move the vent is that it will not interfere with the striping on the aircraft." Above: Bill's instrument panel is now installed.

and you will have an antenna better than what most manufacturers sell for \$100.00, or more, and is 100% serviceable.

David Carroll

Just a small point that you may or may not be aware of, the revision to GG23 to make it match P/N 764 doesn't really work. It says that the radius of the material surrounding the hole can be 12mm instead of 10mm (as the Sequoia parts are), but this means that P/N 718 then fouls against the top edge of P/N 764 which means that you can't really get any down elevator movement of the joystick. Easy to fix this, of course. I just sanded the top down to measure 10mm radius and all is now okay, but if you update the drawings, then I would ignore this revision.

I'm interested if this is a common problem. I installed the poly-flow tube for the pitot line a few days back. I was very careful although I must say I thought it would be quite strong. When I came back a few days later it was broken. It seemed to break at a rib hole, namely Sta. 4. Is it common for this tubing to be brittle? I checked the holes, and they weren't sharp or too small. I need to replace it now so I'll get some new tubing, but I want something I can rely upon. I don't want the worry of having to rip a hole in the skin to replace it.

(Then a few days later George sent another note.) Further to my note on the break in the pitot line, I had left the broken line in the wing to see if anything else happened. I had left sags in the line between the ribs to ensure that it was not a lengthways 'pull' that broke the line. Today I noticed that the line has now broken in a different place, namely rib Sta. 2, but it broke either side of the rib leaving a small piece the width of the rib (about 4mm) still in the hole. I'm assuming that the hole must be very slightly too tight (although it doesn't seem it) and this may cause the problem. I'm toying with the idea of using a different type of tubing for the line to avoid heartache.

George Richards

This is a new one on me, and I've never heard of such a thing. Poly-flow tubing is made of polyethylene plastic, and it's normally very durable. I can't imagine what would cause this to happen. The whole thing is beyond me.

George also asked about the purpose of using a different type of bolt (AN173) for the flap hinges and torque tube pivot points. These are close-tolerance bolts, and we adopted them after we had the incident of flap flutter with the Falco in England.



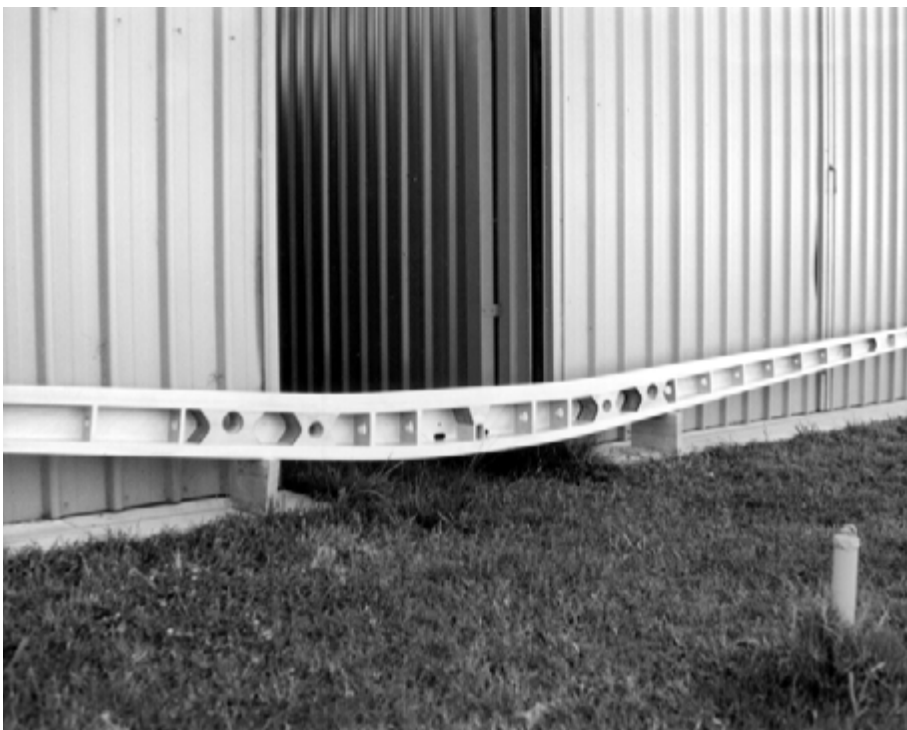
Neil Aitkenhead's main wing spar laminations being glued on the jig table.

Graeme Lean asks if we have any preferences or suggestions for the type of autopilot for the Falco. He is considering either an S-Tec or Century IIB.

The only autopilot we have ever considered for the Falco is the Century 1, which is really a wing-leveler. The reason

is that it is very compact and consists of an enhanced turn-and-bank gyro and a single servo that goes in the wing. And finally, it is an all-electric device that flies the Falco beautifully.

All the other options take up more space in the panel and may or may not fit. Because



the Century I works so well, I haven't spent any time working on other installations, and I'm opposed to installations such as the Century II because it depends on both vacuum and electric. Autopilots are great conveniences for cross-country flights, but they are also important safety devices, particularly in the event of a vacuum pump failure. If that happened in IFR conditions, the Century I will work just fine, while the Century II will be of no help at all—right when you need it the most.

The brass tubes used in the nylon tubing

at the high pressure fitting is too small in diameter. It is .125 O.D. while the nylon tube is .150 ID. When I position the insert in the tube and then tilt the tube to install the fitting the insert moves out of position. Is there a better type of material to use?

Second, what is the proper way to install bolts with cotter pins? Should the nut tighten up on the shank of the bolt and then insert the cotter pin? The aileron hinges must be free to move so you can't tighten the nut against the bearings.

Al Dubiak

I think this is something I have to do more research on. The idea is to have a metal insert that will allow the nut to tighten down on the nylon. Why don't you check to see if there's a larger size of tube available at your nearest model airplane shop?

On the hinge bolts, just tighten the nut till it touches and then put in the cotter pin. If the bolt is a little too long, then add washers. Some people advise turning the nut back out 1/2 a turn to allow for free movement. Hmmm. Maybe there's a really good description in one of the maintenance books. It's been a long time since I've read one of them.

You are my unique contact in Sequoia, and I need your assistance. I am the owner of the Chilean Falco. Well, I want to repair the paint of the wing and my questions are: How to remove the old paint? What are the specification of the paint?

Patricio Guevara

I don't know what sort of paint was used on that airplane. Typically there is a fabric layer on top of the plywood or fiberglass. In either case, you usually have to sand the paint down to the fabric. Don't try to use a paint remover. You might get an experienced painter to look at the airplane and tell you what he recommends.

Alfred Scott

I was checking with a Lycoming Tech Rep about the AD for the early crankshafts with thin propeller flanges which resulted in the Lancair fatality when the flange and propeller separated from the aircraft.

I believe the accident occurred in 1987 and the AD is dated 1965—I don't quite understand the AD numbering scheme, but the information he gave me is as follows: The AD applies to all IO-320-B1A engines with serial numbers below 681. The serial number has the form L-xxxx-55A. If the xxxx is 682 or higher, the engine left the factory with the thicker flange.

Jim Quinn

David Carroll asked about the High Nustrini canopy modification and the cockpit coaming strips between frames 4 and 7. The plans show one 20x40 spruce and in the drawing, it looks like two are stacked on top of each other.

Answer, there is only one coaming strip, mounted on top of the fuselage frames and glued to plywood skins on the outside and inside. And at the location of the screws that hold the canopy tracks in place, there are solid blocks of spruce.

Goings On at Sequoia Aircraft

Since Instruments & Flight Research stopped making instruments, we've been without a source for the airspeed indicator and the manifold/fuel pressure gauges. These are standard instruments, but they have our custom dial-face markings. We've been working on getting these made by one of the leading instrument companies, and it's been a far slower process than I would like to see.

However, we now have the instruments on order, and they should be available in about four months. At that time, we will probably add these to one of the kits.

In our last issue, we announced the Falco sweatshirts. These have been very well received, and we are nearly sold out. There are still a few available, but when they are gone, that will be it for now.

This experience has caused me to take a fresh look at the subject of producing a series of garments for the Falco. I have been extremely reluctant about getting into this sort of thing simply because I have had no faith at all in my ability to understand what people would want. Some years ago, Bill O'Brien produced a series of jackets, shirts, patches and hats for the Falco. He assured me he knew what he was doing, and I watched as he spent his money on the garments. They sold, for a while, and I was always thankful it was his money and not mine in this venture.

And over the years, I've watched at Oshkosh as companies offer tee-shirts, hats, jackets, etc. The thing that really hit home to me was that the most popular garments were all things I never would have predicted would sell at all. So I have developed a serious case of mental snakebite when it comes to garments. It also scared me that you had to make such an investment in garments since the minimum order usually numbered in the hundreds.

But with modern embroidery machines hooked up to personal computers, you can now experiment with designs and deal in smaller runs of shirts, hats or whatever. So our overall plan is to offer a series of Falco related garments, starting in the spring with tee-shirts, golf shirts and caps. And in the fall, we will come out with a new choice of sweatshirt or some other cold-weather garment. You will probably see this appear first on our website, and we may experiment with a few designs first to see what people like.



In each case, we plan to produce a limited number of the designs and have them available for a period of five to six months only. The embroidery designs for golf shirts and hats will be fairly conservative, but we will probably switch shirt and cap designs each year so there will always be something new. The designs for silkscreened tee-shirts will be much more wild and colorful, and we will have new designs each spring.

To be quite candid about this, my reason is that I never want to have a permanent collection of any particular garment and thus I want to create a get-them-while-they're-hot condition with garments.

A lot of people ask me how the search for a successor is coming. Actually, there's almost nothing to report. For one thing, I've always thought that this process would take at least five years to find the right person and in the meantime you would find yourself spending a lot of time talking to people who don't begin to have the skills or resources needed for something like this. For a while there, I was getting one dreamer a day and only a few of them are serious candidates. Because you can spend so much time talking to people like this, I've put them all on hold until I have the time to get a package together for them to look at.

I'm also not in a hurry. I've spent a lot of time thinking about how I could dramatically increase sales. Over the years, we've tried advertising in any number of publications including the *Wall Street Journal*, *Road & Track*, *Hemming's Motor News*, *Sail* and all of the aviation magazines.

However, this past summer I spent a weekend on a mountain (I always do my best long-term thinking on top of a mountain), and I came up with a plan to really give the Falco sales a boost. It's all based on using the Internet, with improvements to our website and the Skunkworks.

And it is working beyond my wildest dreams. Sales here are up dramatically, and it is across the board—in plans and kits. The increase is unreal—about 400% on a short term basis—and it's causing us some headaches keeping up with orders. But after all these years, it really feels good to have a situation like that.

So with all this activity, I continue to have difficulty keeping up with my plans for the Skunkworks, improvements to the plans and manuals, etc. But I'm making progress in all areas, so please be patient because I'm having to carefully allocate my time to the most important priorities.

Sawdust

• Blue Skies. In life, Bill Knight was colorful, if anything. He was an actor (in Oliver Stone's *Wall Street* and *Born on the Fourth of July*), writer, wannabe Falco builder, SF.260 owner ("Marchetti Madness" March 1994 Falco Builders Letter) and eccentric in general. We're sorry to report that Bill died late last year in an RV-6, in Maryland on his way back from Florida.

But by virtue that he had a bottle of Viagra in the plane, the NTSB is considering this as a possible cause of the accident—some theory that perhaps it made him see blue—and it's been all of the aviation press as a result. Nobody wants to die, in an airplane or in bed, but if you gotta go, you might as well go out colorful, and with all this nonsense about Viagra, well, Bill would have loved it, if only for the humor.

• And speaking of Viagra and the bedroom-related infirmities of age, a jovial Falco builder from Texas with a 180 hp Falco (who asks for anonymity) said "it's like trying to put an oyster in a parking meter."

• Media watch. Falco builders in England can watch the pages of *Pilot* magazine there for a rerun of the piece on driving through the streets of Milan with Stelio Frati.

• Here today, disbonded tomorrow. When polyurthane glues first appeared, they sounded too good to be true, and indeed they are, and they have not proved to have long-term durability. Indeed, Ben Owen at the EAA reports that the researchers at the Forest Products Laboratories call the glues 'honeymoon glues' because they're true to you for a while.

Susan's Corner

Whew! It's nice to stop and come up for air to write my piece for the Builder Letter. We have been absolutely hand-over-fist shipping orders out of here for the past several months, and we've about depleted our inventory in one fell swoop! I'm having to order more parts by the hundreds! I have ended up with a few more parts backordered than what I'm comfortable with, so please be patient with me while I go through the process of restocking our inventory.

And it's no longer just a case of sending out the purchase orders. In most cases, Alfred is doing new, more accurate drawings for



Christen Eagle (Jim Shannon) and Falcos at the Great Oyster Fly-In.

the parts that need to be made. Also, so many of the things we're running out of are made up of several "other pieces", that also need to be ordered. Once all the "pieces parts" are assembled in one place, then we can send them out with the new drawings and have them made. So it isn't an easy process, but it's one that we're trying to perfect as we go along. And as I'm sure you can imagine, every step along the way that gets improved, makes it all that much easier down the road when the parts need to be made again.

We have another person working out in the warehouse, almost full time, temporarily, to help us keep up with the orders and parts that need to be made, and that's helped to keep my head above water. So again, please be patient with us... we're working our little hands and fingers to the bone to keep up with you guys!

I have to remind myself that it was me, a couple of years ago, that had to beg Alfred to connect me to the Internet. I remember telling him "I think we should have a web site". "Bah humbug", said he. "The Internet is nothing but a waste of time". Well, he's now done such a good job of our website that I need a clone of myself to keep pace with the increase in business!

That's really all the business news I have for this time. Spring is right around the corner for us (I hope) and I'm looking forward to getting the "spring tee-shirts" in. The sweatshirts were such a hit that I expect a nice, all cotton tee-shirt will be equally well received.

All you new builders out there that are going full speed ahead on your Falco projects, don't forget to drop us a note once in a while and let us know how you're doing. And those of you that are closing in fast on your first flight, keep us posted also...we wouldn't want to miss that exciting event.

Until next time, keep up the good work guys.—Susan Stinnett

Calendar of Events

West Coast Falco Fly-In. September 16-18, 1999 at Durango, Colorado. Contact: Fred Doppelt (970) 884-0843, email: fredd@animas.net or at 298 Mushroom Lane, Bayfield, CO 81122

Oshkosh 2000. Plan now to attend the 45th Birthday Party for the Falco. All Falco owners are ordered to attend. Expect a massive turnout—Stelio Frati says he will be there.

Mailbox

I have some news for you. Last weekend my old Falco was destroyed in very strange circumstances.

I went running on Saturday afternoon to the park close to the airport and then, after seeing all the nice small planes going up and down, I decided to go flying myself. The Falco was parked right outside the hangar you have seen, keys in the cockpit, and cockpit open. Since I can fly it whenever I want, I walked up to my FBO to pick up my earphone.

There I met a friend and started talking, for no more than five to ten minutes. Suddenly we heard an incredible noise of metal, engine at full power and then silence. We ran out, and there was the Falco quite destroyed, a Cessna 172 totally destroyed by the Falco propeller, and a PA 28 with the wing damaged.

A guy with no experience at all started the engine at full power and ran the aircraft for 50 meters against the other one, then disappeared. I'll send you the picture of the aircraft involved. The Falco thanks to the wood airframe is repairable and probably we'll take care of it in Cantu. Basically the engine is gone, the propeller, of course, and the wing is damaged as well the fuselage and the canopy. The actual owner has decided to repair it as an experimental.

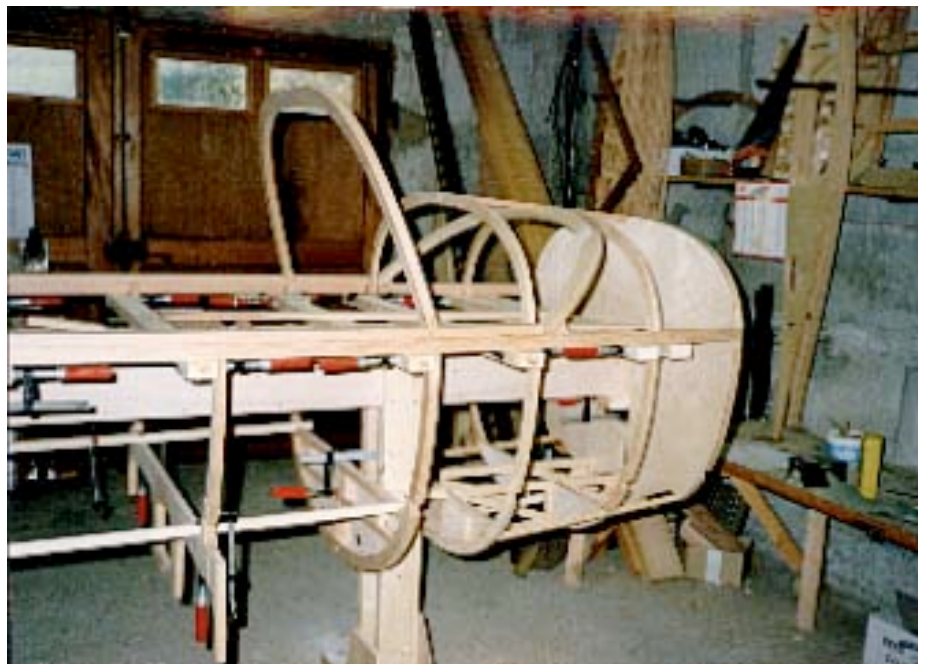
At the moment, my Falco is going to be painted during the Christmas holidays.

*Andrea Tremolada
Milan, Italy*

After purchasing the plans several years ago, I have since purchased a spruce wood kit from Western Aircraft Supply, and I have molds nearly done for fabricating the fuselage frames. Progress is slow due to many other demands for my time. One thing is for certain and that is I chose the right plane for my project in choosing the Falco. Nothing else compares in design or associated nostalgia.

*Gary Vrbas
Wilmington, California*

My wife and I were weekendening in Dumfries and Galloway last year, and my wife wanted a run in the car, i.e. she wanted me to chauffeur. Surprise, surprise, we finished up at an old wartime airfield, Wigtown, which I heard was still usable and which I had wanted to check out. I got to talking to some people who were parked there. The conversation turned to airplanes, and the talkative one came out with the fact that his companion had been one of the



Above: Leon Boizot's Falco takes shape in France. These photos were actually taken in December 1997.

navigators for the pathfinder squadrons, eventually a fairly senior officer and much decorated.

The talkative one, maybe 40 years old, was a compulsive gatherer of information on all wartime airforce operations. I mentioned that my step brother, 13 years older than myself, was a rear gunner in the Polish Air Force, flying Wellingtons and had been killed on his third sortie, at the age of 19, in 1941. What squadron? I didn't know. What was his name? Andrzej. Is your name anglicized? No.

Within two weeks I got a letter from him with a copy of details of Polish Squadron

301, (Pomeranian), to which it appeared that my brother had belonged, precise details of the particular raid, on Bremen, date Wed 18/Thurs 19, June 1941, from their home base in Swinderby, a few miles south of Lincoln. One hundred aircraft set out, low cloud over the target, three Wellingtons and three Whitleys were lost.

Andrzej's aircraft was a Wellington Mk 1C, Serial No. R1365, Squadron Code GR, which had taken off at 22.24 hrs. They were attacked on their return over Holland by Oberfw Paul Gildner of 4 Staffel, Nightfighter Squadron No. 1, based at..., etc. and he shot them down at 02.34 on 19 June into the North Sea over



Top: Graeme Lean working on a “bit of tail.” Above: Marilyn “checks that the competition measures up.” Australians!

Terschelling. (I had always understood that the aircraft had blown up.) Details of the German were given. He shot down another Polish Wellington of 300 (Massovian) Squadron.

My brother’s crew and their duties were listed.

He also enclosed a photograph of Gildner.

I was very disturbed. From a few words in a conversation, a story I had occasionally and casually told, I was faced with the reality of how my brother, a beautiful young boy of 19, had been killed, and a photo of the man who had killed him.

The talkative one asked for a photograph of my brother. I could not bring myself to send him one.

*Charles Wagner
Glasgow, Scotland*

I’m seeing light at the end of the tunnel. I don’t think it’s a train, either.

*William Roerig
Kaukauna, Wisconsin*

We’re back from our whirlwind ‘Vuginia’ vacation, having done further stops in Williamsburg, Blue Ridge Parkway, etc. A good balance of airplanes for me, history for Lee Anne and fresh air for both of us. Even Lee Anne admitted that the crowd

of plane people at Urbanna represents about the nicest balance between aviation enthusiasts and ‘real people’ that I’ve ever forced upon her. She’s already talking about next year! Another convert—this one from a combination of sexy airplane and nice people. Alfred, our thanks to you and Meredith for your gracious hospitality once again. And, of course, to you too Susan, the unsung hero of the back room, without whom the Oyster festivities and the Sequoia Skunkworks would likely be much more chaotic.

*Mike Weibe
Ancaster, Ontario
Canada*

Howard and I always enjoy the FBL, but the September 1998 issue was of special interest to me. I loved the ‘Fрати Finale’ article. Having met Stelio Frati at during the 40th anniversary get-together at Oshkosh in 1995 and being a cat lover myself, I got a big kick out of reading about ‘Napo’ and seeing the pictures of Frati with the cat. The comparison of your running with the bulls in Pomplona with riding through the streets of Milan with Frati at the wheel was priceless!

I put him on our Christmas card list after Oshkosh ‘95 and have received a card from him every year since. One of the few parts of our treasured Falco, N11HM, that we kept after the accident was our battery compartment door with Frati’s signature. He signed it for us at Oshkosh, and we will treasure it forever.

The other article of special interest was where you discussed the development of your WildTools CAD program and the Sequoia website. I have been a computer aficionado since long before it was considered “normal”, and I am pleased that you are taking advantage of the promotional aspects of the Internet. I have visited the Sequoia website several times in the past couple of months, and it is an enjoyable experience each time.

After we lost our Falco, one of the things we missed was feeling part of the “Falco-builder-family”. I think every builder has a circle of fellow builders that can be relied on for support and information during the building process.

The input received from these special friends is invaluable. Steve Wilkinson, George Barrett, John Devoe, and Cecil Rives were among the special friends we made during our six years spent building our Falco. Because of this bond, I particularly enjoy visiting the Falco Hangar. It

was great getting caught up on what our circle of builders have been doing and meeting new ones as well.

You asked for input about the builders who are no longer alive or no longer own their airplane. I agree that they should get the recognition for their creation. Perhaps one section of the Falco Hangar could be about each of these original builders as well as a part about the present owners. This brings me to another concern close to Howard and me.

What about the builders who have lost their planes either through accidents or natural events? I know you don't like to dwell on these mishaps, but shouldn't these people be recognized as well? Howard and I still consider ourselves Falco builders. After all, we did start, complete, and fly our Falco even if only for a short time. I guess in our situation, we maybe shouldn't be in the Falco Hangar. Maybe there could be a special page for these situations and those of original builders.

One solution would be a listing somewhere in the website of all completed Falcos and their builders/owners. Then along with the ones now in other hands or no longer in existence, include a brief notation of what happened, the progression of owners (if more than one after the original), etc. It would be kind of fun to see a chronological/numerical listing of all completed Falcos and the completion dates. Do you keep those kind of records? That might be rather extensive to compile that kind of list. Maybe I am the only one who would be interested?

Thanks for the great FBL. We always look forward to it. The website is super. Keep up the good work.

Marty Benham
Augusta
Kansas

I've been tending to the website as I have time. My first priority is to move Falco builders from the Falco Articles section into the Falco Hangar, and I still have a lot of this to do. I am very bothered about how to handle situations where the builder no longer owns the airplane, where the airplane has been destroyed, where the builder has died, ... and I don't yet have a solution worked out. I'm still looking for suggestions.—Alfred Scott

Thank you for sending my plans and construction manual to my Florida layover hotel. It all worked beautifully, and I am now thoroughly enjoying pouring over my early Christmas present.



Dwight Lapeare first flew his Falco in April 1997. Now with a Lycoming O-320-A1A and constant-speed prop, Dwight says it gets him out of a 2200' grass strip with a full load. "A dream to fly" he says. We've asked Dwight to give us a full report in a future builder letter.

Richard Marks, one of your 'long-term' builders, has very generously let me borrow back numbers of the FBL, and it has been fascinating reading through them. As someone who has spent a lifetime sitting with my back to the public, Alfred's article (March '90) "Introverts" certainly struck a chord with me. My wife confirmed that it could have been a description of me by a very close friend! It has had the effect of already making me feel a part of the Frati Fraternity.

Have you ever produced a graph of V-stall/takeoff weight? I hope I don't appear as an arrogant professional butting in, but I have been struck by the fact that even after accidents such as Stuart Gane's, I read nothing suggesting that at higher weights a higher climbout speed (an additional 15% approximately) is necessary to maintain a healthy stall margin. I admit that my exposure to light aircraft flying over the last few years has been low, and I think this is what prompted the question as I am used to huge changes in speed with weight on the 747-400!

John Maxwell
Ascot, Berkshire
England

We've never actually produced such a chart, but the most appealing idea (to me, at least) is a type of takeoff performance calculator that was once sold through the AOPA and produced by an aeronautical engineer. It's around here somewhere, and I may be able to locate it. It was an approximation of aircraft performance type (Cessna 172, Bonanza,

etc) combined with runway surface (asphalt, grass, wet grass, etc.) and it operated like a slide rule. I don't know if it's still available, but the device seemed perfect for this, and all you had to do was make a mark for your Falco on the calculator.—Alfred Scott

This is a test! Having been retired for little over a year now, I have decided to join the 20th century by hooking up to the Internet.

My Falco has today become the first to be registered in South Africa. Fanie Hendriks is fed up with me because I am still a year away from flying while he is ready to carry out engine runs, and I pipped him to the post with paperwork!

Barbara and I are going down to Standerton next Wednesday to see Fanie and his wife Diana. This is something to anticipate because I assure you his Falco has to be one of the best in existence. (No insult to the McMurrays whose Falco I drooled over in 1995.)

In principle, I do not have a lot to do, but retirement seems to have caused a marked increase in activity and, as so many have remarked before me, "I don't know how I had time to go to work." The aircraft is fully constructed and covered, electricals installed, and I am busy doing the brakes. The panel is completely installed, and the major jobs left to do are engine/cowling installation and finishing. As soon as I figure out how to do it, I will send some photographs over this electronic wizard.

Brian Nelson
Randsburg, South Africa