Falco Builders Letter



Al Aitken, Jack and Mike Wiebe after the first flight.

Weebee Air Force Doubles in Size

by Mike Wiebe

On Saturday May 18, 2002, after about eight years and somewhere near ten thousand hours of effort, Falco C-FMWW flew for the first time. Actually, we test-flew two Falcos that day, and this isn't the first "first flight" for Team Wiebe. So we've got to rewind the time machine a little bit to fill in the pieces.

The History: Pre-Falco

This is the sixth airplane my father has built and flown in almost forty years of flying, and the fourth one in which I have played an active part. I was involved in the first two aircraft, but more as a seven-yearold pain in the ass. Though if you ask him, he'll tell you I've been a pain in the ass for all six airplanes.

In the mid sixties, my father tackled the dream to fly. He quickly realized that he couldn't afford to own or even rent an airplane regularly, so he decided to build. Small airplane construction options in Canada were few at the time, but Dad bought into the clean lines of Claude Piel's Emeraude. The Emeraude is a low wing, two place, side-by-side, wood and fabric craft, and is the pre-cursor to the Cap 10—flown by the French Connection aerobatic team. The construction highlight is that the Emeraude wing is elliptical in shape, requiring the individual jigging and construction of every rib. The plans were drawn in metric and written in French, neither of which Dad had a clue how to interpret. Whether or not he knew it then, the perseverance required to complete that Emeraude was the first positive indicator on the 'insane masochist' checklist required to scratch-build a Falco.

A year after the Emeraude first flew, Dad and I flew it from our home in Hamilton

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Ontario (near Niagara Falls) to visit his family near Winnipeg—a distance of about 1,000 miles. This was 30 years ago, in a home-made airplane, around the rugged north shore of Lake Superior. Oh, the powerplant was an 85 hp Continental that Dad rebuilt, after buying it in the insurance sale of an Ercoupe that he had previously crashed.

But that's another story, best told by him after a couple of beers. Though reasonably uneventful, this trip earned him the second check mark on the 'insane masochist' list, and of course committed my name to the list as well. It also committed my mom, who despite suddenly realizing that both her men might perish together in an airplane has always kept a reasonable facsimile of a smile on her face when encouraging our dreams. Thanks Mom!

It didn't take long for Dad to dream of more speed, just about the time that Ken Rand was making a splash with his KR-2. This was the perfect homebuilder's airplane—cheap to build and operate, but fast and pretty good looking. Unfortunately he developed an allergy to the early epoxies used in such craft, which made me an active partner at age 12. Unfortunately during the building process, I grew from about four feet to six feet in height as well. Those of you who know what a KR-2 is, will know that it's no place for two six-foot guys. So Dad flew it, and built another airplane, a Cavalier, while I went away to university.

It was at university that I met Lee Anne. While most of my buddies were taking good care of their ladies on the weekends, I was travelling home to glue spars, install engines and test fly airplanes. Ultimately on a weekend visit to Mom and Dad's, Lee Anne went for a ride with Dad. Since she put up with me building airplanes through four years of school, and since she seemed to like the ride (she didn't throw up anyway), I put her firmly on the potential "insane wife of a masochistic airplane builder" list.

Fast forward two years. Lee Anne and I are newlyweds, when the phone rings. It's Dad. "Hey son, I got a line on a par-



tially built Emeraude project. Ya want half? Don't worry, the ribs are already built." A few hours later, after much genuflecting to ATC (A Temperamental Cohabitator), I officially owned half—of half—of an airplane. I had graduated to full-fledged partner in the Team Wiebe aircraft skunkworks! We made short work of that project, subsequently flying it lots of places, including down to the Florida Keys for some fishing.

Fishing! A big part of Dad's—and therefore my—life. Dad always wanted a floatplane, and with the evolution in kit aircraft, we finally got the chance. Plane number five was—or more correctly, still is—our Murphy Rebel on amphibious floats. Now this was a real compromise for Team Wiebe's senior partner and wood craftsman. The Rebel was a) aluminum, and b) (gasp!) a kit. However, the end justifies the means, and eighteen months later we were on the lake fishing. Insert any number of fish stories here.

The History: With Falco

So finally we come to the Falco, which may never have occurred except for one strange event. In the mid 80's while building the second Emeraude, we started to see pictures of the Sequoia Falco, and put a few up on the wall of the workshop. As probably the most active aircraft manufacturing facility in Canada at the time (just kidding, De-Havilland...), many people came through Dad's shop. All were impressed with the construction of an airplane as complex as an Emeraude, and equally impressed with the pictures of this thing called a Falco. The answer to their questions was always the same. "That's a Falco. It's probably the only wooden aircraft tougher to build than an Emeraude. Maybe someday, but not likely."

At an EAA chapter meeting one day, a new face asked if anyone could provide him advice on building a metal aircraft. Dad was by now building the Rebel, and invited him to the shop. The stranger asked the same question about the Falco pictures on the wall, and got the standard answer. We learned the stranger's name. Don Adamo visited us a few times, looking for advice and admiring both the Rebel project and the flying Emeraude. Then one Saturday morning he drove in, towing a trailer on which rested the unmistakable bulkheads of a Falco fuselage, loosely held together with stringers.

As Dad and I stood there with our mouths open, Don explained. Soon after they became available, Don bought Falco plans from Sequoia and started construction. After a while, he realized that the construction of a Falco wasn't what he wanted

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Top: Jack Wiebe in the early stage of construction. Center: Sanding are Lee Anne, Mike, Lee Anne's sister D.J and her husband Glenn. Above: Jack rolls on the primer.

to do. Sometime in the middle, he and his wife divorced, and the Falco parts lay in a barn under his wife's control. Given the circumstances of the breakup, Don knew he'd never see any benefit from them. and essentially forgot they existed. He set out to build a simpler metal airplane. However, after meeting Dad, seeing his workmanship and seeing the pictures on the wall of the shop, Don called his exwife. He told her that he had a way to see the project put to good use, but without benefiting from it personally. She agreed to let him take it away. Don's kickstart contribution is the reason that we test flew two Falcos on May 18th.

Dad and I must have glazed over about this point, because Don snapped his fingers and said "Well, do ya want the damned thing or do I hafta set fire to it in your driveway!" It was in the shop in one minute flat.

It lay there for two years. Oh sure, we read eight years of newsletters, pulled out some staples and cleaned up a little varnish, but not much else. Despite Don's impetus, neither Dad nor I was sure that we really wanted to undertake the project. Given the value of the Canadian dollar and the inherent cheapness of us as homebuilt aircraft people, we knew that it'd have to be scratch-built. The time—and still the money—would be a drain.

I think the turning point was Lee Anne. My father does great construction work, but (God love him) he's a cheap S.O.B. when it comes to making the project look good. I think he constructed his first five airplanes without using a piece of avionics built after 1950. (Typical Falco construction conversation: "But Michael, it's a new part!" "Yes Dad, but it's a new war-surplus part. And I don't know if it's a war in which airplanes were even used.").

Having experienced a couple of Team Wiebe airplanes, Lee Anne simply put her foot down one day. She said that she was sick of all this discussion on building a Falco; and that if we had been building instead of discussing we'd be half done by now; and that if we were going to do it, we should at least not be so damned cheap on the interior and instrument panel! I could have kissed her. Except that I was too busy ordering avionics catalogues from Spruce, Wicks, Chief, etc. The project was a go! Oh yeah, and we did register and order fresh plans from Sequoia.

The Plane

So we jigged her up. Since we had fuselage parts, we jigged up the fuselage. Reality

check time. Don Adamo will always be the reason we undertook this project. But dammit Don—couldn't you have at least built it straight? We spent the first month trying to reconcile plans with reality. In the end it worked out, and in fairness to Don, the issue was not his workmanship. It was the typical frustration of trying to take over someone else's work part way through a project. Having said that, a scapegoat is always nice. Our airplane turned out left wing heavy—a situation that will forever be known as the Adamo roll.

With most of the fuselage skinned and the basic wing structure in place, we cut off the tail and put it aside. This gave us a short-enough section of fuselage that we could finish construction of the wing. We chose to build horizontally, mainly because it saved us having to raise the roof or lower the earth. In retrospect, if you have some experience with wood construction and jigging, I don't think it matters. However, building the wing vertically first, then adding the fuselage horizontally seems to provide the most likely chance of getting it straight.

By the way, much of the fuselage plywood was glued on dry without worrying about compound curves. Patience and good steady gluing pressure are key. I don't remember if this is in the plans, but one trick to help with this, or any glue joint, is to cut scrap strips of plywood an inch wide. Then drive brass brads or staples through the inch wide strip, through the ply skin, into the structure underneath. When it's all dry, work on removing the plywood strip and all the mechanical fasteners come with it. Waxed paper under the plywood strip ensures that glue seeping out of a joint doesn't stick the plywood strip down to the finished aircraft.

We chose West System epoxy because we were lazy. Two of the previous four wooden aircraft were built with Aerolite, the other two with epoxy. No magic reason on the Falco. We simply considered all the issues of mixing components, masking and varnishing surfaces, etc., and the epoxy just seemed easier. Without re-opening religious discussions, we did initially paint the rudder red and test it for temperature with a laser temperature measuring device on a hot sunny day. At 80 degrees ambient, the white surface measured 98 degrees. The red surface was a little over 140. We painted the plane white.

Finishing the airplane took some time, and even then we didn't get it quite right. We didn't "chase" the humidity



The red tail is the only Ferrari red part the airplane ever saw. It was scrapped after measuring the skin temperature on a hot day.



Top and Center: Some of the usual suspects help with a rollover. Above: Under assembly at the hangar for the first flight.

in terms of filling low spots, which was a good thing. But we did use two different density fillers-one for 'big' jobs and one for pinholes and scratches. Sanding to a smooth finish across two different densities of filler is a pain in the butt, and there are a couple spots where it shows. The solution is simple—use one fill method (or at least make the final finish all one method). One neat thing we did do is use a roll-on prepaint water-based "primer". This simple method allowed us to fill and sand right to the final paint stage in our low tech shop. For paint, we chose Dupont Imron 6000, which is actually a new polyurethane base/clear system, not the traditional onecoat polyurethane that everyone thinks of when they think Imron. It's a great paint, giving tremendous depth to the finish. But like any base/clear system, it exaggerates the effect of any surface imperfections.

We chose the standard canopy because we're both six feet tall. In the end, we bought the canopy glass bubble, the cowling, and the nose gear casting. Oh yeah, the gas tanks and main gear shocks are real Falco, but came third-hand from an estate sale. Everything else was scratch built.

The panel includes a gaggle of Electronics International engine monitoring instruments, interconnected to various systems. For example, we have their 'black box' wired to collect four cylinders of EGT & CHT, RPM, MP, fuel pressure, oil temp and pressure, etc., continuously. I download it to my laptop for analysis. We also have a voice warning system that tells us if any engine parameter, fuel level or timer triggers an alarm, the limits of which we have preset. This system is hooked into the landing gear, so that if we don't put the gear down when we're supposed to, a beep and a gentle voice overrides into the headset with the message "check landing gear". This is in addition to the normal visual warnings. If you're going to have bells and whistles, active systems monitoring is the reason to have it.

The panel is good VFR with a UPS Technologies comm, Garmin digital transponder and Garmin 295 color GPS. Having the panel removable is a very important part of the Falco design, and we needed to preserve it even with our scratch-built philosophy. We included a Navaid single axis autopilot (a hand-me-down from Jim Petty's Falco) and the Porcine Associates connector to mate it to the GPS.

Here's an interesting mod that turned out to be simple and effective. A local homebuilder had tested special order 12VDC narrow beam kitchen halogen bulbs for longevity and weather resistance with good results. So we mounted two of them in place of the single bulb in the cowling. With the addition of a \$35 police car headlight flasher, we now have two bulbs that will shine steadily, 'wig wag' flash for recognition, or any combination in between.

The engine is a 180 hp IO-360-B1E, built by Bart Lalonde at Aerosport Power in British Columbia, Canada. Aerosport Power is the uncertified portion of a certified engine shop, and Bart builds a lot of engines for RV drivers. I would strongly encourage Falco builders to check him out. We specified an engine with all new parts, except for a first-run case and an overhauled fuel injection servo and spider. He was very cost effective.

We chose to use one electronic ignition and one magneto. Since we used an impulse mag, we can start on either system. However, so far our experience suggests that the hotter spark of the Jeff Rose electronic ignition eliminates most of the hassles associated with starting an injected engine—hot or cold. RPM drop running only on the magneto is about 100, while the electronic only shows a drop of ten to twenty RPM. As long as the electronic is running, the mag might as well not be there.

The First Flight

Dad and I, and then in another year Lee Anne and I, have both attended the world famous Urbanna Oysterfest. In the process, we met Al & Nancy Aitken. From that point, there was never any question as to who would test fly the airplane. Nancy was our choice, but since she wasn't current, we settled for Al. Last summer, I contacted Al and made the official request. What is truly amazing is that a man who I didn't know that well at the time, would find a four-day weekend in the middle of one of the most hectic professional periods of his life (and two weeks after the birth of his first grandchild!), to come to Canada with his wife and fly our airplane.

After watching him operate, I know why. There's no need to reiterate his credentials for any Falco builder, other than to say he takes the job of test flying seriously. For example, after numerous low speed ground runs, the control tower lightened the conversation by asking if he thought it might actually fly. Al's response: "So far, it's ground handling is what I would expect from the type". My assessment of Al's approach is simple. He eliminates future risk



Top: Jack trying to look busy for a photo. Center: Ready to fly. Above: The Weebee Air Force stands ready to defend.

with every interim step. In the end, he made his job easy. And that's the problem. Someone like Al—who knows what they're doing—makes it look so easy that us normal idiots think we can do it, too. Then we skip a step, something goes horribly wrong, and we wish like hell that we were somewhere else. My strongest advice to Falco—or for that matter, any—aircraft builder is to get someone with Al's attitude to test-fly your airplane. You as the builder might have 'the right stuff', but I doubt it. Why find out the hard way?



Once the test flying and checkout work was done, we went flying in the Rebel. I was able to give Al a very unique Canadian experience—landing a floatplane on a Canadian lake in a snow squall. Not normal May weather, even for Canada. But part of the experience anyway. It was nice to have Nancy with him for the weekend, and it's almost a shame that we had to interrupt the visiting to fly airplanes. It was a great weekend, and for the price of a couple of drinks, I'll reveal some previously hidden talents of quiet Al Aitken, test pilot extraordinaire!

The Performance

Here the review falls a little short. Neither Dad nor I have any experience in a constant speed retractable aircraft in this speed range, so much of the testing time has been spent staring at the GPS with disbelief. So far 22/2400 seems to cruise it about 170 mph IAS down low. Full tilt boogie at 5,500 feet yields 180 mph IAS for about 195 TAS. This at 24" and 2560 rpm, without any airspeed calibration. I don't think we've got a particularly fast example of the breed, so these numbers seem high, especially since there's no gear doors yet. Temps are good, though oil only reaches 180 degrees. I'd like it warmer, but we'll worry about that after the nose gear doors get added.

As many have said previously, the real value of the Falco is in its control feel. This thing carves an arc through the sky like no airplane I've flown. Just think movement of the fingers and the airplane responds. As Al said, move your wrist for 'big' maneuvers, and don't even think about using your elbow or shoulder! The Falco has tremendously well balanced control harmony on the stick, though I would prefer a little more rudder sensitivity. That's probably at least partially because of my own size-eleven landing gear. I'll fly it barefoot sometime and report back. We incorporated a MAC electric pitch trim system, and I do use it. The difference between high-speed cruise and configured for landing requires a fair amount of trim. I can feel that now after 20 hours. However, a Cessna driver would have a hard time picking up on the need for trim. It's only after getting used to the light controls of a Falco that trim even enters your mind.

Empty weight is 1,242 pounds. C of G is right in the zone at 65.2" back from the prop flange. What this means is that there are some C.G. situations where you can't fly with a full front tank and an empty rear tank. This is solved with simple fuel management. Stall speed is 71 mph clean and 65 dirty. There's a very structured method of getting an airplane approved for aerobatics in Canada, and so far I've resisted the urge to break the rules. However, stalls and spins are part of our training curriculum (I don't think they are in the U.S.?), so I wanted to at least experience a stall and recovery. The gentle pre-stall buffet occurred as expected, followed by the nose porpoise. Then we were pointed down—like *really* down—and going over on our back. I was a little busy at the time, but I think that sound in my headset was Al laughing. A couple dozen more attempts solo since then has made the stall a non-event, but remind yourself of what to expect and how to deal with it, before you try stalling a Falco for the first time.

Big lazy wingovers don't count as aerobatics, at least to me. So between those, and testing the glue joints to plus 3.5 and minus one G, I'm getting enough giggles to make the price of avgas worth every penny. As I write this in early June, only the weather is preventing us from adding the final four hours of flying required to get the 25-hour clean bill of health. Until that's complete, we're restricted to a 25 mile radius from home with no landings allowed anywhere else. I gotta admit—I'm getting sick of flying in circles. After the test period, we can get Dad checked out, and go places. First on the list are friends on the East Coast. Next up is OSH, and of course, the Oysterfest this fall. Not sure if we'll make the West Coast this year (not enough vacation time), but we'll pee on all four corners of the continent soon enough with this machine.

In the meantime, we've got to finish the interior, fix a couple of paint chips, and get the gear doors and strobe lights operating. Oh yeah, and lighten up that left wing just a little. It's nothing you'd ever notice in a Cessna, but it's obvious in a Falco. What the hell—we need something to fix on those rainy days.

In closing, there are a few people to thank. I know we'll miss some, but here goes. To the local crowd of assorted builders-Les, Ed and others-who attended many a rollover party during our inefficient building process. To Greg, Stan, George, Trevor and especially William-who provided equipment and expertise for some of the more difficult jobs. To the Falco pilots: Dr. Ben Burgoyne, who by giving me a ride, convinced me to scrap the idea of a Glasair or RV: Steve Wilkinson, who did the same thing for Dad; Jim Petty, Joel Shankle and Dave (and Tamara!) Nason, who answered questions endlessly and let us take countless pictures; Steve Bachnak, who flew up for the weekend a year ago to give rides and keep the enthusiasm high. To Don and the unknown ex-Mrs. Adamo, who provided the kick in the butt that allowed us to get started.

And to Al and Nancy Aitken, who helped us finish an important chapter in style. To the spouses—Lee Anne and Mary—who (perhaps unwittingly) bankrolled the event, gave up quality time with us, and put up with an untimely aviation conversation at every event from weddings to funerals in the last 35 years. To all of you I say, watch out for our wake turbulence as we blow by at one third the speed of sound, and bring an airsickness bag when you go for a ride! And since *I'm* the partner stuck writing the article, one other thank you. To Dad, who got me interested in this damned obsession of flying in the first place, and who has-despite the frustration and arguments along the way—been the primary mover to make our Falco dream come true. But let's enjoy this one for a while before we decide on number seven, okay?

Mystique of the Small-Plane Pilot

by Stephan Wilkinson

This article is from a monthly column for Popular Science magazine

Until Al-Qaedas answered learn-to-fly ads and went shopping for cropdusters, most Americans assumed that private flying was a hobby pursued by rich people in "Piper Cubs." But media scrutiny brought the aviation experts out of the woodwork. Like the lady who wrote to *The New York Times* after a 15-year-old slam-dunked a Cessna into some Tampa plate glass to suggest that all U. S. flight schools be closed and people forget about learning to fly unless they joined the Air Force.

Unfortunately, a competent, talented and intelligent group of enthusiasts is being maligned by this rush to judgment. General aviation, which is what they call flying that's neither military nor airline, is largely inhabited by people who have labored mightily certainly in comparison to what it takes to be licensed as an operator of an SUV, 18-wheeler or nuclear powerplant—to develop skills that generally go unappreciated.

Lightplane pilots routinely multi-task in ways that even a three-handed cellphone/ Palm/GPS driver couldn't handle, and they *can't* pull over to copy a new clearance from air-traffic control.

For instrument pilots, superb situational awareness becomes second nature, for if everything turns to excrement—which can happen—they're like blind men in a strange house who are suddenly told to go find the kitchen.

GA pilots operate totally on their own, without the emotional support generated by other small, cohesive groups such as infantry rifle squads, tennis doubles teams, racecar pit crews... or airline flight crews.

They are very good at compartmentalizing affairs, shutting out external concerns in order to deal with their immediate problems, whether it's a headwind burning up fuel or unforecast weather blocking the only escape route.

The good ones don't tunnel-vision in times of crisis but actively assess and reassess their decisions—continually gathering information, refining solutions, working out alternatives.

Flying an automatic Airbus on a regular route has its challenges, but it could be



argued that they pale in comparison to single-piloting through bad weather to an unfamilar airport in a turbocharged light twin. Aboard the latter, you're dealing with a cockpit forest of throttle, mixture, prop, turbo and cowl-flap controls, dangerous single-engine handling qualities and an analog autopilot, compared to the airliner's two power levers, two pilots and near-totally automated, computerized operation.

(Two things that come as a surprise the first time you fly a big airplane: they're way more stable on the approach to a landing than is a little one, and their size is really only apparent to a pilot on the ground, taxiing through close quarters. In the air, you're aware only of the cockpit, and a 747's is actually quite small.)

What is it about the person who can not only stick-and-rudder a Mooney 201 or a Cessna 310 with grease-it-on delicacy but can pound through lousy weather at altitudes that the airlines wouldn't touch, who can navigate with a tablecloth-size sectional, deal with icing using 1930s technology and dart around thunderstorms with K-Mart radar? And do it all without a first officer to put the gear down?

Good question, particularly since nobody has ever answered it.

Oh, those of us who fly little airplanes *think* we've answered it, and for decades we've traded personal insights into who's an airborne loser and who's the ace of the base. Consider our envious opinions of certain professionals. General-aviation pilots laugh that lawyers make lousy pilots because they don't realize that they're arguing not with a jury but with God. And doctors make lousy pilots because they think they *are* God.

Whatever parlor psychology we bring to play, these are obviously busy, preoccupied professionals who can afford both Mercedes-Benzes and the Benzes of airplanes. Which is one reason why the classic Beech Bonanza used to be known as "The Vee-Tail Doctor-Killer." MDs bought them when they should have been honing their talents on a safer, cheaper Skyhawk, the reasoning went, and soon found themselves in way over their heads.

In fact, the FAA has done an informal study that suggests that there are two kinds of pilots: those who believe that fate is the hunter—that chance can kill them—and those who feel they are strongly in control of their destiny. The control freaks, and doctors and lawyers would most likely be in this group, seem to be at *less* risk of having an accident. Hmmm.

The general-aviation human-factors research that has been done deals largely with the man/machine interface—how best to communicate information to the pilot; what knobs, levers, analogue gauges and digital displays are most effective; how to help the human bean keep the machine right side up.

Mapping out the physical, psychological and demographic profile of the ideal private pilot wouldn't be of much practical use in any case. To wonder what makes an excellent Piper driver is as pointless as wondering what makes a great Ford Taurus driver. There is no mechanism for selecting or excluding either drivers or GA pilots based on skill sets, demographics or personality profiles.

Nor should there be. In the U. S., anybody with a reasonable pulse and the means and the interest can learn to fly and nobody much cares whether they're SuperPilot. We like it that way.

A Tail of Two Tires

by Bob Brantley

When it became time to purchase the wheels and brakes for my Falco, I decided to go with the Matco (Rosenhan) ones. The thinner wheels would allow me to have less of the tire out in the airstream and since I had planned to make a full set of wheel doors, the main doors would be less bulbous and less unsightly. The recommended tire for the Matco rim is an industrial type tire, a squarish sawtooth one, made by Chen Chin or Carlisle. These are size 5.30/4.5 x 6. If you recall, Steve Wilkinson used the Carlisle tire but trimmed off of some of the edge tread making the tire rounder.

I ordered a pair of these tires and the proper tubes from Desser Tire in California. In a few days they arrived and were the best looking tires I had ever seen if I had been building my very own homebuilt *forklift*. No, these would not do for such a fine airplane as the Falco. What I wanted was a true Aircraft Tire!

In the course of building my Falco I had the pleasure to meet James Tseliki, the fellow from England who had purchased Bjoern Eriksen's Falco. James happens to be a cousin of a friend of mine in Santa Barbara. Small world, isn't it? James said that he has been using a wheelbarrow tire for some time without incident. A wheelbarrow tire you say, interesting concept. After some checking I found that Chen Chin also made small, round profile, tires that might fit the bill. In their lineup they have a size 13-400 x 6. That's a 13" diameter by 4" wide for a six-inch wheel. The tires have a four-ply rating and are Load B rated, which is 670 pounds each. Let's see, 1,340 lbs. on the mains leaves only 600 lbs., or so, for the nose wheel to carry. Not bad, and these look like aircraft tires.

I decided to use this tire. I found that a local go-cart engineering firm was a distributor for the tire. Although they would not sell me the tires directly, they did put me in contact with a retailer in Utah that would. Price per tire was only \$12.75 each! One thing I should mention is that James flies from his own grass strip at home and using this tire on asphalt or cement runways might be risky even though lames didn't think it should make a difference. To date I have not had any problems using this tire even with some very hard hitting, cross wind related, landings. The tires do wear down rather fast, and I find that they need to be changed every 75 hours

or so unless you have the luxury of a grass field. Oh, yes, there is one other drawback. That's when you tell fellow pilots that you are using garden-variety wheelbarrow tires on your hundred thousand-dollar beauty.

Please note that I do not recommend that you use, nor do I endorse that you use these tires, and if you choose to use them you do so at your own risk.

I had always thought that someone out there must make a true aircraft tire in the proper size for the Falco. I put in a call to Desser again after seeing on their website a tire in the size 13 1/2 x 4.25-6/6. This is a 13.5" diameter tire with a width of 4.25" for a 6" rim. I was informed by them that this tire was made in England by Dunlop, but because of the large quantity needed for them to do a production run that they hadn't had that tire for several years. This was also an expensive tire, somewhere in the \$250.00 each range.

I started searching for English Dunlop Tires on the Internet without any luck until I noticed that the Brits spell tire "Tyre". Well sure enough, Dunlop Tyre has a website, and you can search by tire size. Low and behold, that particular tire is made for the Royal Air Force for use on their Lynx trainers. It is a true aircraft tire with a 6-ply rating and has a speed rating of 160 MPH. I didn't worry too much about the load rating on this tire. OK, where do we buy English tires over here? Under their distributor listing I found that the only US distributor is Wilkerson Tire Co. located in Crewe, Virginia. I called them and got in touch with Iim Wilkerson, the owner. Jim agreed to call Dunlop in England the next day to get the particulars. Well, Jim is a man of his word, and I received a call back with some interesting news. Yes, the tire is still



Near custom-built tyres for the Falco. Who says this is compulsive behavior?

available from Dunlop, but they will only do a production run in quantities of 30 tires or more. Cost per tire is in the range of \$230/250 with a production lead-time of fourteen to sixteen weeks.

I put this to rest for the time being not wanting to place, nor able to afford, an order for 30 tires. Jim had said that he would be if touch in anything came up. About a week later lim called again with the news that the RAF had just placed an order for the minimum thirty tires and Dunlop said we could add a pair, for me, to their order. The only stipulation was that I needed to have an import agreement on file with Dunlop which stated that the tires would not be re-exported, sold for export, and that the goods would not be used for any purpose connected with chemical, biological or nuclear weapons or missiles capable of delivering such weapons. Really! Because these tires are only made for military applications, I needed to have such a document on file with them.

I agreed to the terms and ordered a pair. Jim said that he expected delivery sometime in the spring of 2002. This was at the end of November. I received a call from Jim Wilkerson on March 8th saying that the container had arrived with my tires on board. He would be able to ship them out the very next day. Final price would be \$230.00 each, and he would pay the shipping charges. The tires have since arrived and are gorgeous. They look just like the Goodyear or Michelin tires used on production aircraft, only smaller.

I know it's hard to justify paying \$230.00 per tire when a \$13.00 one will work, but only if you don't mind changing tires a lot more often and maybe sacrificing a little safety because of the lower load rating. The Dunlop tires sure looks good on the Falco! I will reserve my judgement until after I see how well the Dunlop tires wear. We now at least have a choice.

If you would like more information about the Dunlops, feel free to call Jim Wilkerson at (434) 645-9641. Who knows? If enough of us are interested, it may become a stocked tire. The Dunlop stock number is DR4123. The Chen Chin ribbed tire is from Azusa Engineering, stock #7005 and is available from Msquared Racing in Utah, (801) 972-4631. Both tires use the same 90° bent valve stem tube.

A very extensive aircraft tire care manual can be found at: http://www.dunlopaircraft-tyres.com/tyrecare/dm1172/dm1172.pdf

Construction Notes

Tim Painter asks, "As I started so long ago, I have fabric-covered control surfaces. The ailerons and flaps come out at 14 oz, two oz. under, and the rudder at 26 oz, including the tail light. However, the elevator is way over-balanced. I have removed 6 oz from the mass balance to achieve minimum weight (33 oz). This includes the trim tab and operating cable coiled to cancel any bias. Have I missed something or is English lead heavier than American?"

I suspect it's just a matter of fabric covering and that type of construction being much lighter.—*Scoti*

Cipriano Kritzinger asks, "I have a minor problem with my landing gear. Upon retraction the right hand tyre touches rib 1 and my wheel well doors do not fully close because (the stick out about 2-3 mm). When the airplane was upside down everything was working well. Now I'm thinking about taking the 5.00x5 tires since they are somewhat smaller aren't they. Do they fit on my Rosenhan wheels?"

I have a few comments. First, when the airplane is upside down, the springs on the ends of the screwjacks compress, and you can be tricked into thinking the landing gear will go 'up' that far, when it will not. When the airplane is in the normal, in-flight position, the screwjacks are in tension and the landing gear will be a few millimeters 'out' of the wing.

Are you absolutely sure that the shock absorber struts are *fully* extended? Some of our first struts were made with a plating method that caused the plating to build up on the piston at the largest point of diameter, and this could cause a minor interference with the recess in the aluminum. When the struts were fully inflated, the piston pushed its way in there and then it extended fully.

You can see the tire sizes on the wheel well door drawings. The wheels and tires are not interchangeable.—*Scoti*

George Richards asks, "The alternator analyser thingy. How does it function? It has a green section marked good and a red one, bad. There is also a thin red band at the start of the green, bad too I assume. Does this just mean there is something wrong with the alternator or is there a specific fault it is signaling?"

George is working with Giovanni Nustrini, who now owns the Falco that Syd Jensen



Top: Angus Buchannan's airplane takes shape in England. Above: Bill Roerig barely has room in his garage for his Falco.

built. This has an alternator analyzer installed. The alternator analyzer was a great idea, but it never caught on. It measured ripple-current. The theory is that alternators don't fail suddenly as is commonly thought. They have three field coils with the associated semiconductor devices. When one of the three drops out because of the failure of a semiconductor device, then the other two start to work harder to keep the voltage where it should be, the thing heats up and then the entire thing fails. With an alternator analyzer, you can see that you are in trouble, so you can reduce the electrical load.

The device is no longer made. It was once offered at a reasonable price but then the

price when up to \$300.00 or so on special order only, and nobody bought it any more. Somewhere deep in my files, I have a schematic for a home-brew version. It was published in *Sport Aviation.—Scoti*

Richard Clements got quite a scare. In March, he went for a 30-minute flight, then pulled up to the fueling station and found the fuel tank caps hard to get off, and when he finally got the cap off, he heard a 'whoosh' of air pulling into the tank. On investigation, he found that snow/slush from the taxiway had kicked up to the tank vents on the bottom of the wing and had frozen both tubes shut. Richard estimates that the tubes had about a quarter-inch of ice on them.





Doug Henson is skinning the wing in California. In the upper photo, the lower right skin is glued and stapled. Above: The top right skin is glued and clamped.

Our drawings show a small hole drilled on the aft side of the tubes, the standard technique used on general aviation aircraft, and Richard said he didn't have these holes drilled on his Falco. He didn't think they would have helped, and he could be right.

As it happened, only a few days later, Bill Nutt sent us a note. "The fuel vents appear to be directly inline with the left/right main landing gear. As such, they appear to be susceptible to clogging by debris kicked up by the landing gear on takeoff/landing, especially on grass strips. Has this been a problem with anyone to date? We noticed Dave Nason relocated his vents outboard submerged in small NACA inlets. It seems to me that location is not critical, but what is important is orientation to provide a slight positive pressure on the tanks (i.e. no vacuum). Any comments you might have would be appreciated."

I talked to Richard about the possibility of adding or moving the vents outboard. At this point, I don't have a 'new solution', but I agree that location is not critical and that a slight positive pressure is essential. Other than this report by Richard, I have not heard of any other Falco experiencing the problem.

Marcel Morrien asks, "Is it necessary to earth aileron and flap hinges, and if yes, is it sufficient to earth by connecting only the hinge bolts inside the wing, assuming there will be electrical connection between the different parts of the hinges."

This is really not required any more since the only reason for doing it was that a build-up of static electricity would interfere with the reception of an ADF. Now everyone uses GPS.

Also, "In the flap correction package are two precision bolts AN173-20, to be used to connect the control tube to the P/N 765 support. Even after buying a new 3/16" reamer, they won't fit. Is this normal? I could reduce the diameter in a lathe."

I don't know what to tell you on this one. The bolts are supposed to go in a hole produced by a standard reamer. I would try to increase the inside of the hole diameter slightly, rather than change the bolts.

And, "The aft wing spar has to be fitted to the fuselage. In the drawing, you give two different angles, 34:250 and 35:250. Is one the cut in the vertical plane and the other cut in the horizontal plane?"

The slopes are measured relative to the forward and aft face of the spar, and the spar is slightly tapered. This is the reason for the difference.

And one last question: "Is there a drawing presenting a view inside the wheel well, a cross cut? I'm trying to figure out where the upper laminate will go."

I don't have a specific drawing, but they are fitted to the upper wing skin in the end. So you glue them to the airplane and then sand them to the shape of the upper wing surface.

From Mike Aherne. "I am considering making most of the simple aluminum fittings. I have easier access to 7075 T0 material. Can I substitute this and following machining, heat treat to T3?"

It's okay to substitute any alloy that's stronger than the specified alloy. We use 7075 for many of our parts. However, I don't know a thing about heat-treating 7075 since we buy it only in the heat-treated condition. This is something your heattreater can explain to you.

Mike also asks, "The tailplane main spar the section on the drawing appears to indicate a 12.5 thick timber over a 10mm pieces in both top and bottom booms. The main view does not show this 'split'. Do I have to laminate two pieces for each boom? The material that I have from Western Aircraft is over 12.5mm thick by 40mm plus, it seems a shame to run it through a saw just to stick it back together again!"

The main stabilizer spars have the spar caps made in laminations so that the wood can more easily be bent into the very slight bend at the center. It doesn't make any difference if you use 12.5 or 10mm laminations. We use two 12.5mm laminations, and taper the outside one.

Dave Nason has installed a ceramic coating on his exhaust system. The coating is sprayed and baked on both the inside and outside of the exhaust system pipes, and it insulates the system so that the engine compartment is cooler and the exhaust air is hotter. Dave says the exhaust gasses are burning cleaner and that he gained about 2 mph at the top speed—now 2.33 mph at full throttle and low altitude. The process costs about \$110-120 and was installed by Performance Coating.

While installing the main landing gear side load fittings on the main wing spar, Dave Burchette noticed that the center hole of the block in the spar did not line up with the large hole in the side load fittings. Many others have noticed and commented on the same thing. In fact, both are just lightening holes, and they are not intended to be directly aligned with each other.

From Pierre Wildman. "I'm at the point of installing the canopy gunwales. I want to do the 'raised Nustrini' installation others have done. I see the references to the pieces that go between frames 4 and 7, and I see how they go in. My question is for the pieces that go between frames 3 and 4. Are they raised 38mm also? Or are they supposed to fit directly on the longeron as the original drawings indicate?

Between frames 3 and 4, nothing changes. There's a drawing of this in the Skunkworks.

From London, England, Alan Powell asks "I am confused as to how the skins on the underside of the wing—below the cockpit floor are fitted. It appears that there are packing pieces glued to the bottom of the main spar. Is this correct? If so, what drawings are they shown on? Is it carried forward and scarfed to the forward part of the fuselage? Furthermore, the fore and aft blocking for the sides of the wheel wells forms part of this supporting structure. Again, I am confused as to what shape this should conform to. I can roughly guess how it all comes out, but some guidance would be appreciated." Between frames 3 and 4, the fuselage is skinned with plywood that wraps around the lower longeron, thus you have a skin that continues the fuselage shape back to the main wing spar.

The lower wing skin then continues the wing shape directly into the fuselage and where it hits the fuselage shape, you scarf the plywood to fit the fuselage and also add gluing strips as necessary.

For the area covering the main wing spar and back to fuselage frame 6, the skin must go over the bottom center longeron, so it needs tapered shims to carry the skin over the bottom center longeron.

Then the walls of the wheel wells are extended to where the skin is, and thus you shape and sand the rings of the wheel well to the shape that the wing skin takes. Some of this is simply a matter of sculpture and sanding things smooth for the skin to cross the bottom of the fuselage. It's a difficult thing to visualize, but it is shown in a number of places in the drawings for the fuselage and wing, and also you will see many photos of this in the Falco Skunkworks. I'd suggest looking at Al Dubiak's and Mel Olson's entries in the Falco Hangar.—Scoti

Thanks to Robert Bird, we have located a company in Florida that will import Aerolite, however you must be willing to commit on a fairly substantial order. It usually means that you get at least five Falco builders to split the order. We have used our website to help builders who place and order and then split it up, and that has worked well so far. We have also been working with Wicks Aircraft to get them to once again offer Aerolite in their catalogue. At this point, we don't have a final decision, but they are interested. We will keep you posted as things develop.



Top: A minimum order of Aerolite. Above: Hardy Vad cleanses the Danish air.

Sawdust

• The spy photos that came in from the cold. Reuters reports that a British satellite enthusiast has discovered that anyone can tune in live to U.S. spy plane photo transmissions over the Balkans. John Locker said he picked up the broadcast from the Telstar satellite over Brazil on his satellite dish. He stressed that it was not a hacker/ intercept, just free air programming. The pictures are real time within three seconds, and you can see troops on the ground and a helicopter whizzing underneath the camera. Locker is a freelance journalist who writes for satellite communications magazines, and when he alerted NATO, their reaction was "So what?" but American officials said plans were in hand to encrypt the data.

• Now we are 72. Harry Castermans got his Falco into the air on June 17, first by test pilot Rudolf Hankers, and then with Harry at the controls. This is the second Sequoia Falco to fly in Germany, and we should have a full report in the next Falco Builders Letter.

• Seeing is believing. A friend of ours in New Jersey reports on a family they know where all seven children have some form of mental illness. Four are bipolar, and three are schizophrenic. While you can't cure schizophrenia, you can medicate it, and one son had responded so well to medication he was able to have a normal life and even had a job as a truck driver. On September 11, he was driving near New York City and saw an airplane fly into one of the World Trade Center towers. He turned the truck around, drove it home, parked it and checked himself into the hospital.

• Fast bird. Dave Nason reports that his Falco is turning out to be a very fast airplane. He is now getting 221 mph TAS (192 knots) with 24/2400 at 7,500' and 23/ 2400 at 8500'. Both are with the throttle fully forward, but that's still a cruise setting. That's a full 40 mph faster than the factory Falco's advertised cruise of 180 mph with 160 hp engine. And with full throttle at 1500', he gets 233 mph TAS. Not bad. Not bad at all.

Susan's Corner

Well, in case you hadn't noticed, we missed the March Builder Letter. Alfred and I have both had so incredibly much on our plates that I'm convinced we need bigger plates!

I'm getting some of the parts in stock that have been back-ordered, so those of you



In the air. Rudolf Hankers lifts off in Harry Castermans' Falco for the first time. This is the 72nd Sequoia Falco to fly, and the second in Germany.

that are waiting on them I'm sure will be pleased to hear that. I'm also ordering stuff that we've run out of in the past few months—you guys have been building like crazy, but I've gotta say, we love it. Keep up the good work.

By the way, if any of you are going to have a crisis this summer and think you might need a part "yesterday", don't do it between July 2 and July 15. I'll be out of the office, Alfred will be on his own, and we all know what that means. I'm having some surgery—nothing serious—just some repair work on my aging body, but it will have me out of commission for a bit and somewhat restricted when I do come back.

I've had a couple of inquiries about rooms at the Paper Valley Hotel in Appleton, WI for the EAA Air Venture 2002 this year. Alfred and I will not be going and the hotel has evidently made major changes to their policy regarding rooms. We can no long reserve a block of five or ten rooms and then 'give back' the ones we don't need or can't use. What they're doing now is booking the rooms in blocks of 20 and if all the rooms are not used then the company booking the rooms would have to pay for them anyways, so I guess in the future we'll all be on our own. The only exception might be in 2005 for our 50th anniversary of the Falco and if we are certain we could use the 20 rooms then we could book a block of them. So think ahead guys... I'm sure I'd have to book those rooms at least a couple of years in advance. Give me some feedback and tell me your thoughts on that.

I've had some correspondence with Pat Purcell, VP of U.S. Air Race, Inc. in Sadler, TX and she has asked me to mention their "7th Annual Celebration of the Freedom of Flight". The Marion Jayne Air Race will be July 13-19 and the Fargo 300 Air Race will be July 14. There's \$27,000 in Cash, Prizes and Awards and the races are a test of pilot skills. Each plane is individually handicapped so that pilots in a rental 172 can compete with pilots in a custom Comanche or Falco. In Pat's own words, "Glasair has won our last two events...the Falco needs to give them a run for the money". I told her that "my" builders are a rare and special breed of guys and I thought some of them might just rise to the bait. Cecil, are you paying attention?

Do check out their website at www.usairrace.org for more information and entry kits or you can e-mail Pat directly at ppurcellk@aol.com.

That's about it for this time guys. Short and sweet. Do keep the letters and photos coming. We always love hearing from you. Susan Stinnett

Calendar of Events

West Coast Falco Fly-In. September 26-29, 2002 at Galveston, Texas. Contact: Karen & Cecil Rives, 547 Three Corners, Houston, TX 77024, 713/467-9894 email: Falco@flash.net or Louisa & Bill Russell, 713/952-7771 email: Lsruss1@aol.com

Mailbox

After a long hard delivery, I am please to announce the safe delivery of a new baby Falco. The 20-mile trip to the airfield was rather nerve-wracking and caused quite a stir in Felixstowe High Street. I have a few pictures—not for the faint-hearted.

Tim Painter Suffolk England

Three weeks ago, I was at the Forumla 1 Grand Prix of San Marino, in Italy. There were a zillion ginzos with flaming red Ferrari hats, shirts, pants, flags, umbrellas and banners, but my little beige Falco shirt got more than a few admiring glances. Certainly more than any of the Ferrari *tifosi* did.

> Stephan Wilkinson Cornwall-on-Hudson NY

The last time I wrote to you was when my parents died in their Falco. A sad time for a lot of people. Today I write to you on a much happier note: I have bought a Falco, a Sequoia Falco!!! It is the one that Syd Jensen built in Kerikeri, New Zealand, many years ago.

I picked it up, together with George Richards, on Monday, and after a fantastic flight that took us from the bottom of the South Island of New Zealand all the way to Auckland. ZK-TBD is now parked in the very same hangar where ERNA was parked!

I am still excited about the whole thing: a life-long dream has come true. As you know I was born in a Falco (I sort of get attracted to them—I guess it is called 'imprinting'?), and I still remember when you came to Florence to meet my father and fly ERNA! I remember you having dinner at our place! And then the airport the next day, when Dad took you for a flight on his 'rocket.' Good memories, great memories!

I can only thank you for all that you have done for Falcos, and for believing in it all the way. It is because of this that today I can have a Falco. I have made my dream a reality! Now I have a lot of work to do to make TBD fly faster and faster! I guess it runs in the family! More photos will come soon! *Giovanni Nustrini Papakura, Auckland New Zealand*

I've just got a computer after a long period of absence. Wow, the Sequoia site has come a long way! I have been building a Falco for a long time, slowly. However



Tim Painter moves his Falco to the airport, thus disturbing the peace and alarming the town of Felixtowe.

we've been amidst a family crisis with my wife contracting breast cancer—sadly the problems are not yet fully resolved but fortunately my wife is tracking okay for the moment.

Progress on my project has been very slow as you can imagine under the circumstances, still, whilst progress is slow it is still progress. It will still be a long time before it flies, however I know the wait will be worthwhile. It has been nice to see a number of Falcos flying in Australia now. Neil Kowald Linden Park South Australia

I bought the plans some years ago, but it was impossible, until this moment, to start building. I actually fly a Mooney 231 and a Yak 52. But what I want to say to you now is that my Yak sleeps near the number-two Falco (the first in production with a Lycoming 135 hp) named I-TRIP, in a wonderful place in Toscana, Italy. After 50 years, it is still the best in elegance and performance.

Gianfranco Caprai Toscana Italy

Just a note to let you know the plans arrived along with the rest of the documents last week. I have been immersed ever since. Your back issues of the the Builders Letter are most intriguing. In reviewing the plans, I have found they are great. In my work day I spend a good deal of time working my way through endless pages of Airbus drawings. Your drawings are a great relief, to say the least. When you get your exploded 3D assembly views done, these plans will be most complete.

> Clive Perry Winnipeg Manitoba

I am in the process of building the wing ribs. Your comment about "your labor will be worth about \$1 an hour" is mostly correct; however my woodworking experience since grammar school is limited to the building of one canoe, so it seems like a good idea to improve my precision woodworking skills. Larry Black and Stan Weiss have been a big help.

Mark Wainwright Los Gatos California

Things are moving along slowly at the Rampley Falco Factory, and I am preparing for work on the fuselage and electrical system. I have the engine mount 808-2 for 180 hp which accepts several '360' engines, and while the mount will take all



Top: Gayl Boddy's Falco takes shape. Above: Falco, Nibbio, Picchio gather in Tuscany, Italy. Aerodynamic purity corrupted by Yak and An2.

engines listed on the plans, I wonder about the equipment kits.

Will kit 817-2 Engine Controls and Equipment work with all engines listed, and will the exhaust system fit them all? How about 813-1 Cowling, 817-4 Baffling, 817-6 Prop, Governor, and 817-7 Fuel System and Hoses? Will these kits accomodate all engines listed?

I have much experience flying planes with carb engines and limited experience with fuel injected engines. I never have had any great problems with carb engines and will probably pick one of them because of the cost savings. Right now, I want to leave my options open, and I wonder if you know whether any of the listed engines should be avoided for any reason?

As to making electrical terminal connections, an article I read by some "expert" who has extensive experience on the subject recommended that all connections be soldered after crimping. Is this advisable or necessary?

I look forward to seeing everyone at Galveston.

Wayne Rampley Muskogee Oklahoma

On the engine, my best advice is to stick absolutely to the specified engine, or you will find yourself in a nightmare situation. Try to get an engine overhauler to make the engine into an IO-360-B1E as specified in our engine memo in the Skunkworks. You will not believe how much trouble you will make for yourself if you deviate from the standard installation.

If you have trouble justifying the cost, then remember that a standard installation will greatly affect resale value. People who pay good money for a Falco want to be able to call up here and buy replacement parts, and when they hear they are on their own, they lose interest very quickly.

Ah, an 'expert' has advised soldering and crimping, has he? There are a lot of selfstyled experts out there. In fact, there are a lot of diverging opinions on this. The most knowledgeable people advise against it. It's true you may get a better connection between wire and connector that will be less susceptible to corrosion over time, but what you give up is reliability in the wire, and you give up a lot.

When you solder the connection, the solder runs up into the wire and then stops at some point, so the wire is very stiff and then it is flexible, and the wire will have a tendency to break there due to vibration over time, if it is subjected to vibration, and that's a very difficult thing to predict. In fact, the AMP connectors are specifically designed as a two-crimp system, one to make the connection and one to support the wire, and you defeat the best thinking of the connector designers when you solder a connection. It may make you feel good, but it's not good for the wire.—Alfred Scott

I am enclosing some pictures of my Falco project. After reviewing your great Falco plans, I got started building the tail pieces in March 2000.

I purchased the tail wood kit from Jean Peters in Canada. At about that same time, I purchased a past Falco enthusiast Project from Chapter 14, San Diego. He donated his project (tail spars, tail equipment and fuselage equipment) he had purchased in 1980, from Sequoia. The metal parts were to the correct dimensions per your drawings. The wood parts were too dry and warped from setting around that long (I used them for guidance). Since Jean Peters was getting close to selling his business. I decided to buy the fuselage and wing kits from him. His kits are great! I had purchased a Cavalier Kit 30 years ago, and it was very good even then. I gave up the Cavalier and built a Thorp T-18. The Thorp was a very good airplane.

I sat in Pur Burholm's Falco and fell in love with it. That is why I purchased the Falco plans. I wanted a project that I couldn't lose interest in, and I have found it. Your plans are very complete and exact! I am enjoying working on this aircraft and am amazed with every part I complete.

Thank you for the great work!

Gayl V. Boddy Santee California



Top: Bob Hendry now has his Falco in Melbourne, Australia, following an uneventual 14,500-mile ferry flight. Center and Above: Giovanni Nustrini and his Falco.