Falco Builders Letter

Marcelo Bellodi taxies out for the first flight.

First Flight: Marcelo Bellodi

We now have a Falco flying in Brazil. Marcelo Bellodi got his Falco into the air for the first time on February 13.

Marcelo's great-grandparents were Italians who came to Brazil at the end of the last century, and the family has grown working the land. Since 1937, they have had a sugar mill and a distillery. Last year they produced 62,500 metric tons of sugar and 120,000 cubic meters of alcohol. They also have farms where they raise cattle.

Since he was a baby, Marcelo's father had airplanes to go to the farms. They've used Skyhawks, Skylanes, Centurions, C-310, Senecas and now a King Air C-90A. Marcelo says that he has felt like a bird ever since he was born, and got his private license when he was 17—before he got his driver's license. He now has an IFR, commercial and multi-engine licenses and flies regularily.

After graduating as a mechanical engineer from the University of São Paulo, Marcelo started working at the huge Brazilian aircraft company, Embraer. He was a flight test engineer, where he worked on the certification of the EMB-120 Brasilia and EMB-312 Tucano. It was there that he met a lot of people "who love experimental aviation", and they influenced him on starting the construction of the Falco.

Marcelo admits that the Falco was a love-affair at first sight. He says that when he saw the Falco for the first time in a magazine advertisement, he immediately identified with its sensual and sleek shape.

Stelio Frati has always had a strong following in Brazil, and the ever-colorful writer Fernando Almeida wrote a series of articles about the Falco, culminating in a report of flying Karl Hansen's airplane. He called the Falco, "The Best Airplane in the World". Fernando caught a lot of grief from his friends at Embraer who said it was not possible for an airplane to be as good as he described it. There are always trade-offs and compromises, they said.

So at Oshkosh '88, Fernando brought along a few friends who had to see for themselves. Joseph Kovacs was the Hungarian-born designer who moved to Brazil 40-some years ago. Kovacs designed a glider, the Neiva Regente, then later the T-25 Universal, a 300-hp military trainer that bears an uncanny resemblance to the Falco. Kovacs's masterwork, though, is the T-27 Tucano, a turboprop trainer selected by the RAF and many other airforces as a basic pre-jet trainer. Kovacs has always been an admirer of Stelio Frati, and he brought along Marcos Tabacnik, the test pilot for the Tucano.

We decided to conquer South America. We put Joseph Kovacs in Karl Hansen's Falco, and Marcos Tabacnik in Pawel Kwiecinski's plane. When they returned, both men emerged shaking their heads. "Fernando was right," Kovacs said, "It *is* the best airplane in the world." Tabacnik just kept muttering, "Fernando was right."

Marcelo Bellodi had already begun work on his Falco three years before, and it didn't hurt his feelings any to have Kovacs and Tabacnik come back with their reports. Joseph Kovacs has stayed in close contact with the project all along.

Marcelo decided to do all of the woodwork himself using a local *freijo* wood. Sometimes called "Brazilian spruce", it is 25% heavier and stronger. After fighting the import bureaucracy and also losing a few thousand dollars with a 'importer' who took his money and ran, Marcelo finally ordered the Sequoia Falco kits direct. He says the disadvantage of being so far away from Sequoia and other Falco builders was compensated by having fantastic partners in Izildo, a skilled woodworker, Silvio, an excellent mechanic, and Joseph Kovacs as consulting engineer. Also Joao helped with the finishing and painting.

Marcelo expected the Falco to be a very difficult task since he had never built any-

In This Issue:

Marcelo Bellodi takes off for the first time in his Falco.

thing before—in fact, he was 23 when he bought the plans. He said the beginning was very tough, and it was sometimes discouraging, but the difficulty also made the goal more enticing and the challenge more exciting. In all, it took 6.5 years of hard work at an average of 80 hours a month. His jigs and fixtures are the stuff of legend.

Marcelo followed the Falco plans scrupulously, and by the time he finished the project he was absolutely confident he had made the right choice.

In the process of building the plane, he left Embraer to return to his family business, where he works as an industrial manager in charge of the refining process and new designs. Marcelo says that even though everyone says that building an airplane is a good way of getting out of a marriage, he got married in 1990 and his wife has helped him a lot during the construction.

The Falco has a factory-new 180 hp Lycoming IO-360-B1E ($32,000), a full inverted fuel and oil system. There is a full radio stack including a King KX-125 nav/com, a Garmin GPS, a King KR-86 ADF,

The Falco Builders Letter is published 4 times a year by Sequoia Aircraft Corporation, 2000 Tomlynn Street, Richmond, Virginia 23230. Telephone: (804) 353-1713. Fax: (804) 359-2618. Publication dates are the 10th of March, June, September and December.

Subscriptions: $16.00 a year, $20.00 overseas. Available to only Falco builders and Frati airplane owners.

Articles, news items and tips are welcome and should be submitted at least 10 days prior to publication date.

Marcelo Bellodi is one happy Falco owner.

and a RST marker beacon receiver. The instrument panel is the standard gray used in most business jets. The upholstery is a light blue leather and with carpeting of the same color.

The Falco, registered PP-ZMD, weighs 1,285 lbs empty with the CG at 64.8". The total cost was $125,000 in U.S. dollars—shipping, tariffs and other charges add up quickly—so that makes it come out to about $100 a pound.

The paint scheme is a slight modification of one of ours, and it was created by a girl who works at Embraer. The stripes go up toward the rudder instead of down on the fuselage in an attractive scheme. The plane is painted white with light blue stripes and black trimming.

The first flight was planned for January, but they had a problem with a malfunctioning transistor in the voltage regulator and the standard clearance problems with the exhaust pipe touching the cowling. Marcelo followed the flight test guide carefully, and even installed a video camera behind the right seat to film the instruments.

"After takeoff, I climbed to 5000 ft AGL and did stability and control maneuvers. Everything was going well with good response and fantastic handling. Though I had planned a few partial and full stalls, I only did one since the stall recommended a well-trained test pilot (no warning and fast nose down). The first landing was very soft and with no difficulties."

On the first flight, for some reason he was unable to communicate with the chase plane. The EGT gave no indication due to a faulty calibration—since fixed. Other problems: low suction pressure, high cockpit noise level and no stall warning. Marcelo did the first flight without stall strips, and he does not recommend doing that.

On the positive side, Marcelo reports no oil or other leakage, no vibration during the flight, "fantastic handling, with very powerful ailerons and elevator", and very good numbers on the climb performance with the landing gear down (1400 fpm at 85 kts). The first flight lasted one hour, and on landing Marcelo said he became very emotional when his wife said "Marcelo, yesterday you gave wings to your dream, today you fly on them."

On subsequent flights, he reports that the stall strips give him a warning buffet with no tendency to roll. Stall speed clean is 55 kias, and 52 kias with the gear and flaps down. The handling is "perfect, no wing-heaviness, no tendencies." Without gear doors, he's getting 143 kias at 6,500 feet, 23"/2400 and 17°C. The landing gear takes 9 to 10 seconds to retract. The systems are checking out well with a few minor problems with the avionics.

With about six hours on the Falco, the only problem remaining is that the CHT gets up to the yellow arc on hot days and stays near the yellow even during cruise. Both Joseph Kovacs and Fernando Almeida have flown the Falco and both are very impressed, particularly with the handling as well as with the quality of the construction and the finish.

Marcelo says "I am impressed with the light controls, as in the T-27 Tucano, and with the aileron power. I have no doubt I have the right choice in building the Falco. Thank you for your help during all those years. You are part of my team even being so far."

Congratulations, Marcelo, on getting the 35th Sequoia Falco into the air. May you have many happy years flying your Falco.

—*Alfred Scott*

The Glider
Part 2 of a Series

by Dr. Ing. Stelio Frati
translated by Maurizio Branzanti

In the second chapter of Stelio Frati's classic work, we can see some hints of Frati's beliefs and methodology that eventually found their way into the Falco. Steve Wilkinson and I have edited Maurizio Branzanti's literal translation.—Alfred Scott

Chapter 2
General Characteristics of Gliders

6. Introduction
Because of their specialized use, gliders are quite different from powered airplanes. This is made obvious by several characteristics. One is the completely different arrangement of the landing gear, a result of the light weight of the aircraft and the absence of a propeller. Others are that the pilot's seat is located toward the front for center-of-gravity reasons, the wing span is always considerable, and the fuselage and other components are well streamlined to obtain the maximum aerodynamic efficiency.

Wood has been almost universally accepted as the prime building material. It is fairly inexpensive, practical to use, and easy to repair, even with simple tools. In some cases, a fuselage of welded steel tubing with fabric covering has been adopted. This provides a light and simple structure, but it will never beat the rigidity and aerodynamic finesse of wood construction.

A few examples of all-metal gliders are available, but this method of construction requires a well-equipped shop and specialized, skilled labor. The high cost involved limits such construction to high-volume, production-series aircraft, seldom the case with gliders.

Let's now consider the two major classes in which we categorize gliders and explain their characteristics in detail.

7. Training Gliders
This type of glider should be of simple construction, for low cost and easy maintenance. This is an important consideration, since a flight school often uses its own students to carry out small repairs, and the equipment at their disposal is usually not the best.

Gliders in this category should also be quite rugged, especially in the landing gear, since they often aren't flown with great skill.

A certain uniformity of design is characteristic of this class of glider. The wingspan is usually 10 meters, the wing area is 15-17 square meters, and the glider has a high, strut-braced wing of rectangular planform and a low aspect ratio.

The fuselage may be only an open framework of wood or tubing with the cockpit completely open, or it can be a closed, plywood-skinned box section. The wing loading of these aircraft is always very low, usually around 12-14 kg/square meters, and with an empty weight of 90-120 kg.

The wood wing is a double-spar structure, the spars braced together for torsion strength and the whole covered with fabric. The control surfaces are driven by steel cables and bushed pulleys, and the landing skid is incorporated in the fuselage and can be shock-absorbed.

In this glider there is absolutely no instrumentation, since due to their use it would be meaningless. The use of a parachute is also senseless; because of the low altitude of flight, a parachute would be useless in case of emergency. The common cruise speed is on the order of 50 km/h.

8. Sailplanes
Training Sailplanes. The uniformity of design that we have seen in training gliders does not exist in this category. In general, these designs have strut-braced wings, box-section fuselages, and open cockpits. The wing span is between the 12 and 14 meters, wing loading 15-17 kg/sq m, and they all have basic instrumentation.

Competition Sailplanes. As mentioned before, there are many variations of sailplanes. One may have a simple high wing and V tail, another a gull midwing. The wingspan may reach over 20 meters with variable flaps and up to 33 meters in some cases.

Particular care is given to the cockpit area, in terms of both instrumentation and pilot position. Reclining seats, adjustable pedals, cockpit ventilation, and anything else that might provide the pilot with the greatest possible comfort are important in these gliders, since endurance flights have lasted longer than 50 hours, and distance flights have reached the 700-km mark.

Almost all these gliders are single seat, but two-seat sailplanes are increasing in popularity, especially for endurance and distance flights. In these cases, the sailplanes have dual controls. The seats can either be side-by-side or tandem.

In the case of a tandem configuration, the second seat coincides with the aircraft's center of gravity, so the balance does not change whether flying with one or two persons. One advantage of the tandem configuration is to maintain the fuselage cross-section at a minimum, therefore increasing efficiency. While the aerodynamics of the side-by-side configuration aren't as good, the pilot's comfort and the copilot's visibility are improved.

9. The Structure of Sailplanes
While today's gliders may differ in design, they are all very similar in basic structure. Let's quickly describe the principal structures, keeping in mind that we will referring to wood construction.

Wing Structure. The wing structure that has been in use for a number of years is based on a single spar with a D-tube torsion box. This design was developed in order to obtain the necessary strength in the long wingspan with minimum weight—an important concept in gliders. This is

Frati's F.M. 1 Passero was an all-wood motorglider with a 20 hp engine.

achieved by placing one single spar in the area of maximum wing thickness, of roughly 30-35% of the wing chord.

In these wings, there is always a second smaller aft spar, between 60-70% of wing chord. Its purpose is not to increase the wing strength, but merely to supply a mounting surface for the aileron hinges and to maintain the wing ribs in the proper position; otherwise they would be distorted by the tensioning of the covering fabric.

Notwithstanding the actual shape of the wing, the spar can be of three classical types: (a) double-T frame with center web, (b) C-frame with one side web, (c) box spar with two webs, one on each side. In sailplane construction, the most-used method is the third one—the box spar.

The spar is the element that withstands the forces of bending and drag. The wing is also affected, especially at high speeds, by great torsion forces. In the single-spar structure, this torsion is resisted in part by the box-like structure that exists between the leading edge and the spar (an area covered by thin plywood) and in part by the spar web itself.

The torsion is then transferred to the fuselage by the wing attachments. The usual solution is to transfer the torsion through a properly placed aft diagonal member that extends from the spar back toward the fuselage.

The area between the spar and the diagonal member is also covered with plywood to produce a closed and torsion-resistant structure.

A much simpler and more rational system is to transfer the torsion by means of a small forward spar. This will not only improve the flight characteristics of the assembly, but it offers a gain in weight due to the elimination of the cover between the spar and the diagonal.

The reason that this system is little used is due to the difficulty encountered in the connection of the forward part of the wing with the fuselage, which at this point usually coincides with the cockpit, and which does not offer sufficient strength for the connection.

The other structural elements of particular importance, since they contribute to the wing's shape, are the wing ribs. In most gliders, these ribs are of the truss style of design, and the members are glued in place and reinforced with gussets on each side. The truss may be made up of both vertical and diagonal members, or only diagonal members.

Sometimes, the ribs are completely covered with plywood on one surface, and in this case the diagonals members are omitted and only the vertical braces are used. This structure is much simpler than the truss, but it is slightly heavier and more costly.

The ribs are joined to the spar in two ways: full-chord ribs are slid over the spar, or partial ribs are glued to the spar faces and reinforced by gussets. The second method is more common because it allows for a thicker spar without any increase in weight.

Fuselage Structure

The fuselage is made up of wooden frames connected to each other by wooden stringers and finally covered with plywood. On tubular metal frames, a fabric covering is usually used. The fuselage frames are always of the truss type, with gusset connections like the ones we have seen in the rib construction. For the frames subjected to high stress, a full plywood face on one or both sides is used.

With a plywood skin covering, it is possible to obtain great torsional strength, while bending forces are resisted by the horizontal stringers and the portion of plywood covering glued to the same stringers.

The strongest frames should be the ones that attach to the wings, because they must support the plane's full weight. The frames that support the landing gear should also be particularly strong.

A fixed single wheel is attached to the fuselage with two wooden members between frames. There is no need for shock absorption, since the cushioning of the tire itself is sufficient. In the case of retractable gear, various retraction systems are used, but they always have considerable complications.

For the wing/fuselage connection, as in the most common case where each wings is a separate piece, the system currently adopted is one in which the wings are first connected with metal fittings and then the wing, now as one unit, is connected to the fuselage by less complicated attachments. This way, the fuselage is not affected by the considerable forces of wing bending and needs to support only the wing weight and the forces applied to it.

Tail Section

The structure of the tail section is similar to that of the wing: a spar of box or C shape, truss-style ribs, plywood covering for the fixed surfaces (stabilizer and fin), and fabric covering for the control surfaces (elevator and rudder).

Sometimes the stabilizer is of a twin-spar structure with plywood covering from leading edge to forward spar and fabric covering for the remainder. This solution is of limited value, though, since the weight saving obtained the reduction of the plywood covering is balanced by the extra weight of the double spar, and obviously also by the extra construction complication encountered.

The elevators and the rudder, like the ailerons, are fabric-covered to reduce the weight, and this is also necessary to keep the inertia of the moving mass small. The required torsional strength is achieved by diagonal members between ribs, while more sophisticated gliders have a semi-circular plywood section on the leading edge of the control surfaces. □

This Ambrosini F.4. Rondone held the world speed record in its class in the 1950s.

How to Annual Your Falco

by Steve Wilkinson

The first thing you need to do is get an FAA repairman's rating, which allows you to maintain, inspect and sign off the airplane you've built (and only an airplane you've built). Get an application from your GADO or FSDO, fill it out and submit it; that's all you need to do. (My application form said I needed to appear in person at the GADO and submit three passport-type photos, but that's no longer required.)

The order in which you do things during an annual inspection is largely immaterial, it seems to me, other than making sure you remember to do the retraction test while the airplane is still up on jacks after doing the wheels and brakes, that sort of thing.

I tend to do things by "category"—i.e. all filters, or all greasing, or all control-system oiling—while other people work from area to specific area of the airframe. As long as you have a checklist, either method works. (I do preflights the same silly way—all the fluids first, then all the control surfaces, all the lights, etc. So I end up making about six laps around the airplane. But at least you won't look quite as foolish doing it that way during an annual.)

If for some reason you want a licensed shop to do your annual, you might be surprised by the reluctance of some A&Ps to undertake the job. Not so much because they don't know the airplane but because they have no interest in taking responsibility for signing off an airplane the build quality of which they have no way of determining.

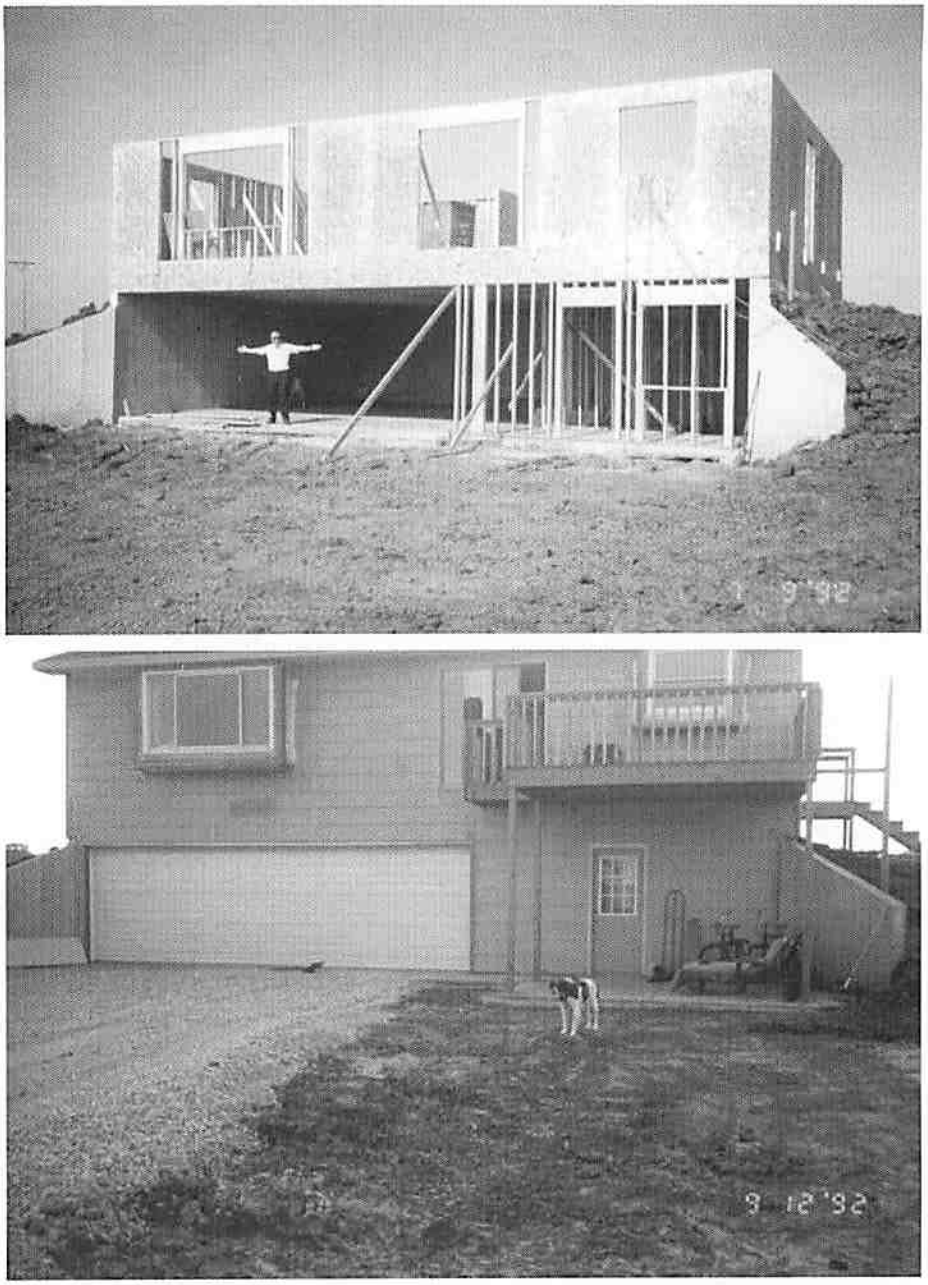
In the case of my airplane, I did the entire airframe annual, changed the oil and filter, cleaned and gapped the plugs and then took the airplane, still uncowled, to a shop on the airport to inspect everything firewall forward, check the timing and compression and do whatever else they'd routinely do to an engine and prop during an annual. (No signoff required—I just wanted them to do the work.) I'm confident inspecting the airframe that I built, but I still feel a little leery of messing with an engine and prop. It also gave somebody who knows what he's doing the opportunity to confirm that my installation was correct in every detail.

For example, last time the same A&P looked at the engine, he noticed that I'd never installed the drain line and weep valve that clears the intake manifold of puddled fuel and prevents flooding during hot starts. The engine came from Mattituck with the hole in the oil sump plugged and no line installed, and I never knew such a thing was standard.

This time, he discovered that the shop that had dialed the crank and replaced the prop after the airplane's gear-up landing a year ago had refitted the starter ring-gear flange one stud off its proper orientation—supposedly impossible to do, but they'd somehow forced it into place—and as a result all the prop nuts had lost their torque, and I'd been flying around with essentially a loose prop. Nice, huh?

You might also want to consider establishing an annual-inspection schedule that puts your airplane down during a time when you wouldn't be flying much anyway—winter in New England, say—rather than having your airplane in pieces in the middle of July. Of course, that presupposes a hangar, but who leaves their Falco outdoors anyway?

I highly recommend, by the way, Kas Thomas's book *Personal Aircraft Maintenance: a Do-It-Yourself Guide for Owners and Pilots*, available through several mail-order aviation booksellers. Lots of hints, diagrams and photographs entirely applicable to a Falco.



This explains why Howard and Marty Benham have been making slow progress on their Falco. They've been busy building a new house around the Falco, complete with their own landing strip in the back yard.

Moving day for the Benhams. Falco N11HM sees the light of day for the first time as it is extracted from Howard and Marty's old shop.

FAR 43 Appendix D lists the scope and detail of items to be covered in an annual, and essentially it says to inspect literally everything in and on the airplane. It says nothing about lubrication, maintenance or servicing; that's up to you, unless it's required to bring the airplane into compliance. Elsewhere in Part 43, it says you have to use "a checklist while performing the [annual] inspection. The checklist may be of the person's own design, one provided by the manufacturer of the equipment being inspected, or one obtained from another source." Here's the one I invented. It certainly doesn't cover every nut, bolt, bracket and switch, but I think it hits all the big stuff:

Remove seats. Starting right here, it helps to have a bunch of plastic baggies (and a Magic Marker with which to label them) so you can keep the various categories of screws and fasteners separate.

Remove all floor and baggage-compartment carpeting.

Remove baggage-compartment rear bulkhead.

Remove baggage-compartment floor.

Remove center console. (Aft-most fiberglass section of console can be left in place, negating the need to remove the center seatbelts, and you'll still be able to lubricate the flap actuator.) Don't be surprised if you find a large bird's nest in the center tunnel. I did. The buggers apparently use the jackscrew opening in the wheelwell as their front door.

Remove cockpit flooring above control stick/aileron/elevator control mechanism interconnects.

Remove all inspection panels: tailcone, aileron-bellcranks, landing-gear-trunnions, autopilot if applicable, wheelwells if applicable.

Remove all removable rudder, elevator and aileron hingepoint fairings, if you have them.

Remove entire engine cowling.

Remove all asbestos heat tape from exhaust system, if applicable. Inspect entire exhaust system carefully for cracking. Inspect exhaust-gasket flanges for signs of leakage. (If you're Tony Bingelis and don't trust using hot rod heat tape on the exhaust system, don't replace the tape. Mine was on for 140 hours with no ill effects, so I think I'll renew it. You can't re-use the tape, by the way; it disintegrates once removed.)

Remove cabin-heat air muff. Inspect interior for cracking. Replace cabin-heat air muff. (Now's the time to do something that might give you more cabin heat on cold days, such as stuffing the muff with stainless-steel metal mesh or something.)

Check the alternator belt for proper tightness (about a quarter-inch of displacement possible with moderate thumb pressure) and adjust if necessary.

Remove battery. Clean, top up electrolyte if necessary, check cells with hygrometer, replace and re-safety battery hold-down wingnuts. Replace the strip of baking-soda-soaked paper towel that you ought to have resting atop the filler caps to absorb outgassing.

Check the prop for nicks and any signs of oil leakage. If you know how to dress out nicks, do it. Otherwise, learn. It's more than just a matter of taking a big rat-tail bastard file and whacking away.

Remove and replace the induction-air filter element. It takes a Brackett 5805 element—same size as certain Cessna 172s and 177RGs, though oddly enough, you won't find it in the Aircraft Spruce or Wicks catalogues.

While we're doing filters, also replace the foam-rubber filter element for the vacuum-system regulator valve.

If necessary or advisable—500 hours is the normal recommended time—also replace the vacuum-system inlet filter.

Check the vacuum-pump outflow tube for signs of excessive carbonization, which would imply a pending pump failure. (A slight amount of carbonization—blackness—is okay, since this is how the pump lubricates itself, but the tubing should at least be unmistakeably translucent.) Check the vacuum-pump Garlock seal for leakage.

If you're anywhere near oil-change time, now's the time to do it, since you've got the engine uncowled anyway. Change the filter as well, of course, and open and inspect the can and element carefully.

After inspecting the engine compartment for any evidence of existing oil leaks or other anomalies, wash down the engine with Varsol or other appropriate solvent. (Remember to plastic-bag your vacuum pump, since introduction of solvent into the pump during an engine wash is the leading cause of vacuum-pump failure.)

Ideally, you'd now do a runup and leak check, but you might want to wait till you've got the airplane put back together. As long as you do remember to do it. FAR 43 requires a runup as part of an annual, whether you've changed the oil or not, and you're supposed to "determine satisfactory performance" of the static and idle-rpm power output, magnetos, fuel and oil pressure, and cylinder and oil temperature.

After you've done the runup, when the engine is warm, check and if necessary reset the idle and idle mixture. You check it by pulling the throttle back to idle, then slowly closing the mixture. You should get a 50-rpm rise just before the engine begins to die. If the engine flat dies with no rise, your idle mixture is too lean. If you get more than a 50-rpm rise—it can go as high as 300-400 extra rpm—it's too rich. If you don't know where it is, have somebody show you the idle-mixture adjustment. It'll be stamped with an "R" and an arrow showing the direction to turn the thumbwheel to richen the mixture. Adjust it a click at a time unless you're way too rich or lean. The idle speed itself, once you have the mixture right, should then be adjusted for about 600 rpm. An idle set too high will make it hard to do short-field landings—you'll have too much residual power with the throttle closed—and if it's too low, the engine can die on rollout. Or, worse yet, on short final.

Pull sparkplugs, clean and check gaps. Regap if necessary. Avoid sandblasting the plugs unless truly necessary; pick loose whatever deposits that you can, and remember that sandblasting does more damage to plugs than anything else.

Replace bottom plugs, carefully using thread lubricant and proper torque. Use new washers or heat-anneal and quench existing copper washers before reusing them.

If you have access to a compression tester and know how to use it, check compression of cylinders using top plug holes. (You should understand that interpreting a compression test properly takes a bit of skill; get an A&P to explain the vagaries of the procedure, if you can.)

Replace top plugs.

If you have a timing tester, check timing of magnetos.

Check entire engine compartment visually for fraying, rubbing, loose wires, leaks, protruding connecting rods, etc. etc.

Check for any airworthiness directives that might affect your engine and/or propeller. And, of course, comply with them. (Unless, like me, you have what the local GADO considers an "experimental" engine...)

Put the airplane on jacks with the tail on a jackstand and appropriate weights on the horizontal stabilizer—I put old Army blankets under three or four solid cinderblocks—and remove the main wheels, repack the wheel bearings with grease and replace. If this is the first time you've ever checked the wheel bearings, you may notice that the axle-nut adjustment was looser than when you'd installed the wheels. Apparently—at least on my airplane—the bearings and axle spacer took a "set" between the time I first snugged up the axle nut and then later rechecked it. The perfect axle-nut setting is exactly at the point where all play is taken out of the bearings—you can't rock the wheel laterally at all—yet you can spin the wheel and feel no physical pressure forcing the bearings against the races. But be careful; the adjustments available via the large axle nut are relatively coarse, and tightening the nut one castellation can move the bearings from too loose to too tight. Too loose is better; too tight will cause the aluminum axle spacer inboard of the wheel to gall. If you have high time on the airplane, you might want to do the nosewheel bearings as well, but I don't think it's necessary to regrease those bearings every 100 hours or so.

At the same time, check the brake discs for scoring and the brake pucks for wear. If the pucks are getting close to worn too thin but still have some life left, you might want to reline them anyway, rather than going through the whole jacking and wheel-removal procedure again three months later.

Check the level of fluid in the hydraulic reservoir. If your brakes have been getting spongy, now's the time to bleed them. Using a homemade "pressure pot"—it's quite easy to fabricate one—will allow you to perform the much easier and cleaner

pressure-bleeding method (i.e. from the bottom up, rather than by gravity from the reservoir down).

Check tire pressure, all three tires; it should be 30 psi cold.

If your main-gear struts need replenishment and you're near enough to a shop that has a high-pressure bottle, get them to bring it over and give you 600 psi in each strut, which must be done with the airplane on jacks. Or at least with the wheel off the ground, which you can do, if you have a strong back, by getting under each wing and acting like Atlas. Nosegear strut takes 115 psi—normal air-compresser or shop-air bottle pressure—but this also requires that the nosewheel be off the ground, else you'll get a faceful of hydraulic fluid. Trust me. I did.

While the airplane is on the jacks, run a retraction test. (I like to do this by first placing the gearhandle in the up position with the master switch off, then activating the master switch while standing in front of the left wing root. Then I can watch the gear in progress.) Ideally, to do an accurate test of the gear and doors, you should swing the gear while the airplane is being powered by not only its own battery but the battery of a running automobile, to simulate the power of a battery in flight, and you should push against the nosegear with what you imagine to be the pressure of the slipstream helping it retract.

Do you need a static-system and/or transponder check for legal IFR flight? Now's the time to get it, while the systems are exposed.

Oil all external control-system hinges and pushrods with Tri-Flow.

Oil and grease (Mobil 28 red grease), as appropriate, all pivot points and rod ends at the aileron bellcranks, accessible through underwing inspection hatches.

Grease all three landing-gear jackscrews *lightly* with Aero-Shell 17 black grease.

Apply greasegun to all main and nose-gear grease fittings, using Mobil 28. Remember that there's one on the nose gear that requires removal of the nosegear door.

Use your finger to slather a little Mobil 28 grease on all other appropriate landing-gear and gear-door pivot points. Use Tri-Flow on small, light-duty rod-end bearings.

Oil all control-cable and control-system pivots, bushings and pulleys inside the airplane with Tri-Flow. While you're at it, rotate each phenolic pulley 90 degrees, just in case the pulley hasn't been rotating and has taken a set with the control cable sliding back and forth across it, creating a flat rub point.

Check both fuel tanks for leaks, particularly around the bottom seams and welds. Pinhole leaks will be made obvious by blue fuel-dye stains and can be patched externally, after being carefully cleaned with denatured alcohol, using a two-part fuel-tank sealant compound that you should be able to buy for about $20 from any friendly maintenance shop, for mechanics use it frequently.

Lubricate the flap-motor pivots (Tri-Flow), actuator jackscrew (Aero-Shell 7) and flap torque-tube pivots (Tri-Flow).

Replace the ELT battery if its two years are up. Again, it might be your choice to replace it slightly prematurely—or, if you're not big on regulations, to let it go till the next annual—if it's a matter of doing that versus opening up the tailcone again several months later. Check the ELT for proper operation.

Put it all back together.

Do the required runup, leak check and idle-mixture check if you haven't done it already.

Put the following certification in your logbook, date and sign it and you're done: "I certify that this aircraft has been inspected in accordance with the requirements of an annual inspection and was determined to be in airworthy condition."

Wasn't that fun?

Construction Notes

The other day a salesman for Carborundum paid a visit. Ordinarily I don't welcome such visits, but this guy sells high temperature insulation fibers, and I decided to pick his brain. It didn't take long to establish that we're already using his products, since Fiberfrax is one of their products.

"What is this stuff?", I asked, and he explained that it's an alumina/silica fiber. It's one of the best insulators in the world, and it was developed almost by luck around the turn of the century by a guy in one of their labs. Curious to see what would happen, he combined alumina and silica, heated both to the melting point, and then opened a valve on the steam heating system and dribbled the stuff down in the steam.

It made fibers, and that's essentially the same thing they do today, but obviously under tightly controlled conditions. The fibers are processed and woven into a wide variety of products, from felt-like papers in the case of Fiberfrax, to woven cloths, tubes, blankets, and even molded with a binder into tiles for the space shuttle.

I showed him how we are using Fiberfrax for the firewall and in the exhaust ports of the Falco, and he said it was an ideal way to use the material.

I also asked him about the practice of using insulating materials on the exhaust pipes. He said he was familiar with the practice with race cars, and said there were several factors to be aware of. On cars, and presumably on aircraft engines as well, insulating the exhaust pipe raises the cylinder temperatures. On an aircraft engine with an installation like the Falco, it has other benefits as well. By keeping the exhaust gasses hot, the exhaust remains at a high speed, and you get better thrust from it.

Also, by insulating the pipes, you prevent the heat from the exhaust pipes from heating and expanding the lower-deck cooling air from the engine. Expanding this lower-deck air increases the cooling drag. While the effects are probably slight, this practice is one that is being slowly adopted by homebuilders in pursuit of speed.

Steve Wilkinson has used some Thermo-Tec Wrap sold by Aircraft Spruce. This is a woven fiberglass material that's not greatly different in makeup from the fiberglass cloth that's used for laminating with epoxy. While it's a decent insulating material, the woven fiberglass cloth will crystalize when exposed to heat, so you can use it only once. The man from Carborundum also cautioned against using this type of material for a second reason—an oil leak that dribbles oil on a porous material like this can result in a fire that's hard to get out. He cautioned against using any porous, absorbant materials for this reason.

A better approach, he said, was to use the method Karl Hansen used. Wrap the exhaust pipes with Fiberfrax (which is a better insulator than fiberglass anyway) and then cover it with a heavy aluminum foil tape. It gives you better insulation but without the problems associated with porous, absorbent materials.

The use of an insulating wrap on exhaust pipes is a practice that's still in the semi-experimental stage. There have been some worries that, because of the higher temperatures of the exhaust system, there might be a problem with cracks appearing in the pipes. So far, I haven't heard of any problems 'in the field', but it still pays to pull the stuff off every year and inspect the exhaust system.

For years now we have been standardized on using the David Clark Isocom, however this model is being phased out of production, and it appears we bought the last one in existance for Stephen Friend. I have talked to the David Clark Company and they have no plans for a replacement that will fit in a 2-1/4" hole.

Unless anyone has any better idea, I think we will standardize on the Sigtronics SPA-400 intercom from now on. It's a popular, reasonably priced intercom that you can order with an optional face-plate so the intercom will fit in the 2-1/4" hole in our panel. Sigtronics is sending us wiring diagrams, and I'll modify our electrical drawing to accommodate this intercom.

Craig Bransfield sent along the following notes:

"I was having a little trouble locating the engine mount on the firewall, so I came up with the following procedure which may be of some interest to the builders.

"1. Place frame 1 face-up on a table and mark the forward face at B.L. 0 and W.L. –20 (thrust line location).

"2. Tie a pair of fishing lines across the Dynafocal ring to form an X with the intersection also at the thrust line.

"3. Hang a plumb bob from the fishing-line X with a loose loop, so as not to influence the point of intersection of the crossing lines.

"4. Hang an second plumb bob from the nose gear steering tiller bar pivot hole on the engine mount.

"5. Trial-clamp the engine mount to frame 1 starting with the locations for the brackets shown on the drawings.

"6. Level the entire assembly using only a spirit level set on the highest points on the Dynafocal ring. In my case, some compromise was needed here to produce the best average of measurements, and especially to be sure that I was not building in any 'up' or 'left' thrust.

"7. Note where the plumb bobs fall. The thrust-line plumbob should point to the mark on frame 1 and the lower plumb bob should fall somewhere on B.L. 0. If not, adjust the positions of the engine mount brackets, re-level the assembly, and try again.

"In my case, the upper left engine mount bracket came out spot on, but the upper right bracket ended up about 7-8mm 'low'. The nose gear retracted perfectly. No doubt these variations are due to warping of the mount from the heat of welding.

"I plan to jig up this assembly for fuselage construction by placing a piece of plywood in the Dynafocal ring to hold one end of the fuselage alignment string, with a 1/8" hole in frame 1 as a 'gunsight'. This way, I can be assured that the engine thrust line is neither displaced nor tilted from its design zero-zero setting."—*Craig Bransfield*

In this discussion, Craig does not mention the nose gear and its retraction mechanism. This is very important, and you need to put all the pieces together and make sure the nose gear sits in the middle of the nose gear bay and that the retraction mechanism works. Everybody who tried doing it without the nose gear and the retraction mechanism in place eventually had big problems.

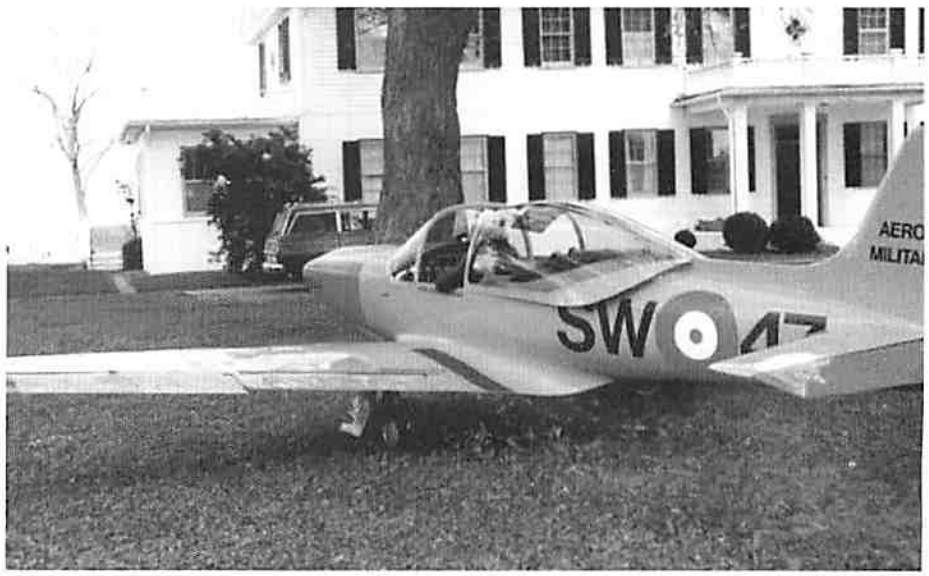
Guido Zuccoli and friends took their Falco for The Big Slide the other day. They were doing the last of the landing-distance tests for the Australian first-of-type approval. They had the warning horn turned off, and they're not exactly sure what went wrong. Even though they have the 13-second gearmotor, they were popping the circuit breaker 9 out of 10 times. They aren't sure if the circuit breaker had popped without them noticing it, or if they forgot to lower the gear.

The reason for popping the circuit breaker is a mystery to me. Even with full gear doors, the 13-second motor pulls the gear up with little strain on most Falcos. Something is clearly out of kilter on this Falco.

Guido said that if he had installed Steve Wilkinson's suggested landing skids, the airframe would not have been damaged at all. Instead, they suffered minor damage and will have the plane back in the air within a couple of weeks of the accident. The prop was a total loss, but as we have done so many times before we were able to find a Falco builder who didn't need this propeller right now. Al Aitken graciously came to the rescue.

When you are assembling the P/N 520 gearbox, there's a consistent problem with the lower miter gear on the vertical drive shaft not lining up perfectly with the gear on the horizontal shaft. Before you drill the hole for this gear on the vertical shaft, be sure to check to make sure it is going to mesh well with the gear on the horizontal shaft. Most don't fit right the first time, and you'll need to grind a little metal off the hub of the gear on the vertical shaft.

—*Alfred Scott*



Goings On at Sequoia Aircraft

Those of you waiting for the fuselage frames will be be delighted to hear that things are moving. We have ordered the wood for the laminating strips and this is expected in any day now.

I've designed the laminating jigs, and we're in the process of making these now. The shapes are plotted out on mylar, then glued to 1/4" plexiglas and cut to shape. We then use these as patterns to cut pieces of 3/4" plywood on the inverted pin router. By using a series of holes for dowel pins, we are able to stack these up and glue them together all in perfect alignment.

After we ship this newsletter, I expect to devote the vast majority of my time on making these jigs and getting the process of laminating the frames under way. Because we have some builders who are being held up by this, we will be completing frames 3, 4, 5 and 6 first.

To make room for the frame production, we've been involved in a fairly sizeable remodeling job in our warehouse. We have been tripping over ourselves and parts for some time now, and we finally bit the bullet. We built a 'mezzanine' storage area over the existing shelves. This almost doubles our storage area. The difference in the feeling of walking around the warehouse is stunning, and we're starting to talk about bowling in our spare time.

Following the flight testing of the Sequoia 300 in September, Al Aitken has written an extensive flight test report following a format long used in the military flight test community. Because testing of homebuilts is an area that's been woefully inadequate and since Al's report is probably the first of its type ever produced for a homebuilt, we'll be printing the document in some quantity and distributing it widely. If any of you are interested in receiving a copy of this document, please let us know, and we'll send you a copy.—*Alfred Scott*

Brenda's Corner

As Alfred has already mentioned, we now have a mezzanine. We are getting organized! When we moved to this location nine years ago, we had enough extra space in the warehouse for a tennis court or for Alfred to build a Falco. That problem didn't last too long. In no time at all it was like walking through an obstacle course. Then came the wood parts, and we were

constantly moving things to make room for something else. I just wish we had taken before-and-after pictures so you could see. Things are so neat that Alfred can almost walk into the warehouse and find a part all by himself.

For several years we have been using Burlington Air Express for all our air shipments to other countries. UPS has been soliciting our business, and since we use them for most of our domestic shipping, we are going to give them a try. It looks like they will be a little cheaper and a lot more convenient since they handle the customs and the brokerage fee is included in their rate. Let us know if this creates a problem for any of you across the big ponds.

Speaking of you builders 'over there', our bank has become very difficult to deal with when it comes to handling anything to do with foreign funds. We use to be able to take a ten pound note to the teller at the bank and the teller would check the exchange rate and deposit that amount in our account.

Those were the good old days. Now the notes have to be sent to their international department, and they will not accept them unless you have a certain amount. Then they charge a ridiculous high fee just to handle the transaction.

On checks drawn on foreign country banks they get worse. The last time we asked them to collect a check on a foreign bank, it took two months for them to tell us they could not collect the check with no explanation as to why. But that didn't stop them from charging us $50 to try and collect a $400 check.

And now we get to credit cards. I know you watch the exchange rate and want the card transaction to go through at a favorable rate. We can't control this either. We have to call and get authorization for any transaction over $50. If the amount is over $1,000 they have to connect you with the foreign wire operator. They in turn want to know everything about the transaction, name, address, amount, is the person there, do you have the card, is it a mail or phone order, what are they buying, what is the name of their first born. Then they have to contact the foreign bank and call you back. Recently, it took eight days to get an approval for a builder in Portugal. So, you see it can take a week or more before the transaction hits your account.

We have already had several requests for rooms at the Paper Valley for Oshkosh this year. We have a block of twenty rooms, and we would like to release the extra rooms back to the hotel as early as possible. Therefore, please let me know by June 1 if you would like a room. You can wait until a couple of weeks before Oshkosh to let me know your arrival and departure dates.

—*Brenda Avery*

Correction

In the Lite Engineering article of our last issue, we included an account of the development of the Glasair. Tom Hamilton advises us that there are a number of factual errors. Hamilton says he did not go to, or drop out of, dental school, rather he graduated from the University of Washington with a degree in business. Hamilton says his first aircraft, which was not a Glasair, was built in conjunction with a graduate aeronautical engineering student. This aircraft did not use a 150 hp engine, and he says he did not burn the aircraft. Hamilton says he did not use the KR-2 design as a guide, and says the sharp corners on the fuselage grew out of a decision to make the fuselage in three pieces and the desire for larger luggage capacity. He defends the choice of the GAW-2 airfoil and says it proved to have laminar flow over 35% of the chord. We're happy to make note of these errors. At the same time, we'd like to observe that airfoil selection, design features and the influence of one airplane design on another have always been the subject of a lively ongoing engineering debate among homebuilders and designers.

Sawdust

• World's Fastest Falco. Move over, Karl Hansen—Guido Zuccoli and company seem to have you beat. The funny thing is that they're not speed freaks at all; they just built a nice Falco. The numbers? As part of the Australian CAA first-of-type approval, their flight tests reveal that at full power and 7500 feet, the Falco's top speed exceeds 202 knots. That's 232 mph, or 4 mph faster than Karl Hansen's fastest test run.

• Wood *Is* Better Than Plastic. You knew it all along, but here's proof: *USA Today* reports that two scientists at the University of Wisconsin have discovered wood cutting boards have a surprise advantage over plastic ones. For years, experts have thought that bacteria might soak into a wood board and contaminate other foods cut on it. Instead, for the most common bacteria that cause food poisoning, salmonella, listeria and E. coli, the scientists found that three minutes after contamination, 99.9% of the bacteria on wood had disappeared and was presumed dead, but none of the bacteria on the plastic died. Also that the bacteria increased on plastic boards kept overnight at room temperature, while none could be found on wood. The scientists say they have no idea why this happens.

• Winging It. Public relations consultants and defense lawyers might want to offer a bit of coaching to Stoddard-Hamilton's Ted Setzer. Explaining to *The Aviation Consumer* why they began shipping a new stretched tail with expanded c.g. limits in 1989 but didn't get around to flying a Glasair II-S prototype until a year later, Setzer is quoted as saying, "Unfortunately, we didn't have the luxury of testing the new tail before we put it on the market. We had to stay in business. We had to keep selling kits." Whoo-eeee!

• Pandering in our time. The March issue of *Sport Aviation* explains that the mandatory Glasair II-S wing/tail modification as being "for those of you who insist on carrying your gold bullion along for cross-country flights."

• Another "red Eyetalian thang". Russia's Mikoyan Design Bureau has signed an agreement with the Belgian company Promavia to produce a two-seat light jet trainer based on Frati's Jet Squalus design. The proposed ATTA 3000 is a tandem-seat twin-engined derivative. Stelio Frati's General Avia has participated in the design of the new aircraft, which will be powered by two Garrett TFE109-1 turbofans give it a maximum speed of Mach 0.8. The first example will be assembled by Mikoyan and is expected to fly in July. A production site for the Jet Squalus has been established in Saskatchewan where a second prototype ATTA 3000 is expected to be assembled by the end of next year.

• Soak the rich businessmen. Slick Willie looks positively generous when compared to the Italians. Italian business aircraft which are not commercially operated are subject to a state tax, which has just been raised by 400 per cent. Italy has always been at the vanguard of taking government programs into the realm of the absurd, and this tax sets a new standard for insanity that other nations can only hope to achieve. The tax is based on aircraft weight, taking no consideration of its age or market value. As a result, the annual tax on an old Bonanza can be higher than its current market value, and the tax on a Falcon 50 will rise from $140,000 last year to almost $700,000 this year. This is in a country, by the way, that has an official minimum wage of $100 an hour but which still seems to operate.

• Hot mike redux. A pilot approaching Dusseldorf was surprised to hear a female voice broadcast, "Darling, if you'll add another 100 marks, I'll spoil you from top to bottom." Apparently a local brothel owner was using a walkie-talkie tuned to the Dusseldorf frequency to check that the girls weren't cheating on their fees!

• Criminalizing mistakes. British Airways captain Glen Stewart had an unblemished 35-year flying career of 14,000 incident-free hours when his Boeing 747 had to go around following an instrument approach to Heathrow after a flight from Brisbane. That was in 1989, since then the British CAA brought criminal charges for allegedly "negligently endangering his Boeing 747 and its passengers." Although widely decried as inappropriate, this lamentable affair came to an end in December when Captain Glen Stewart's body was found in a car near the Old Course at St. Andrews in Scotland. A hose pipe led from the exhaust into the car. Way to go, guys. If you need any more help, we've got this Walsh fellow in Washington we can lend you.

• How do you do. British writer Geoffrey Jones has written an encyclopedic work on homebuilt aircraft. "The Complete Book of Building & Flying Your Own Plane" is a heavily illustrated 288-page tome covering the gamut of homebuilt airplanes. There's some refreshing coverage of the realities of rolling your own with particular focus on Neville Langrick's Falco project. Available for £20 from Patrick Stephens, Ltd., Sparkford, Nr Yeovil, Somerset BA227JJ, U.K. or for $39.95 plus $4.50 S&H from Zenith Books, P.O. Box 1, 729 Prospect Avenue, Osceola, WI 54020.

Fratelli, Bambini, Nozze Piqueres e Turista Chalunkas

Attenzione!

Di onere dis Stelio Frati hereplane spene alata whores makitte nize, quippenitte klene, an skrubbe alle durte anolio offeitte. Beikoze himme isa vere lazimman, hidoane wan noe turistazze steppina onadi wingi, poquine dei finageres ina qoccepitte, an tuchina di instrumenti di volare. Mebe dei breke di machina!

U tucha dis machina, di onere isagonna gette pizza uffatue, mebbe higonna gette hisa goombah frenze tu cuman breke u neeze, an turnovere yuze vegitible stan—dat wude bibad!

Capice?

The next time you go to an airshow and have trouble with people fondling your Falco, take along a copy of this little baby and hang it from the prop.

Mailbox

Many thanks for your kind comments included in the December '92 issue of the *Falco Builders Letter*. It so happens that I addressed this subject at an Oshkosh Design Lecture given on 2 August 1982; subsequently printed in full in the October '82 issue of *Sport Aviation*. There was so much interest in this lecture—we had over 350 to 400 in the audience—that Nick D'Apuzzo and I looked outside the forum tent to see if rain had driven people inside. It wasn't raining. The subject was of primary importance then as now.

One of the main problems with homebuilt designs is the lack of proper applied loads, resulting in unsound structural design and breakups in flight. In many instances, the wings are simply test loaded without regard to torsion, drag, and flap loads which will usually design the rear spar attachment. A second problem, of course, is the lack of static and dynamic stability, or rather, ignorance of the factors which provide favorable stability and control characteristics.

I was a member of the original AOPA and EAA panels working with Craig Beard, head of FAA Aircraft Certification Service in Washington, D.C. But by the time Paul P. and his various seat-of-the-pants homebuilt "designers" got into the act, I gave up batting my head against the wall—having better things to do. As a final act, I tried for two years to get Paul to establish a test unit to evaluate new homebuilt aircraft designs before describing them or accepting advertisements for their sale in *Sport Aviation*. No way!

David B. Thurston
Cumberland Foreside
Maine

Under the leadership of Tom Poberezny, the EAA is sponsoring exactly this type of testing center which is being set up by the CAFE Foundation at Santa Rosa, California. The CAFE Aircraft Performance Evaluation Center (APEC) will officially open on May 8, and it is one of the most interesting and worthwhile things I've seen the EAA do in a long time. While much of the initial emphasis has been on performance testing, I believe their handling qualities testing will end up being by far the most important part of this endeavor. The CAFE Foundation will be, in effect, an outside auditor of kit aircraft performance and handling characteristics. Their reports will appear in synopsis form in Sport Aviation *and a more complete report will be available on request.—Alfred Scott*

John Devoe just had to join the club.

Above and overleaf: Larry Black's Falco at home and at play.

Wow—you sure know how to stir up a hornet's next. Your article under "Sound Off" was probably one of the best, if not *the* best, I've read.

Eugene Devillier
Wellsville, Kansas

The Lite Engineering article was reprinted in the March issue of The Aviation Consumer *under their "Sound Off" opinion column.—Scott*

I enjoyed reading your article, *Lite Engineering and the Myth of Simplified Certification*. Your narrative is accurate relative to my perspective and experience. It's unfortunate it will have likely little influence on the aviation community, since most of the members of that community prefer to live in a dream world than to face the reality of aircraft design, certification, and cost.

Frank L. Christensen
Jackson, Wyoming

Thanks for the copies of the FBL. I was pleased to have "made" it again. The FBL is great. It is not only articulate, but it is also 'literate'—and that is meant as a sincere compliment—incisive, exuberant, witty, sometimes irreverent, humorous, pointed, occasionally caustic, and it exhibits a consistent ability to be *right*, which is disturbing and even disgusting to us lesser mortals. You have a talent for getting to the essence, the courage and the integrity to call it as you see it, occasionally a willingness to charge in where angels fear to tread, and the ability to keep it all in perspective and treat it all with a sense of humor.

I particularly enjoyed your comments about homebuilt airplanes, safety, engineering, design, certification, etc. Your overall assessment of the EAA and its people is on target, and your summary enthusiasm for the organization is both warranted and appreciated.

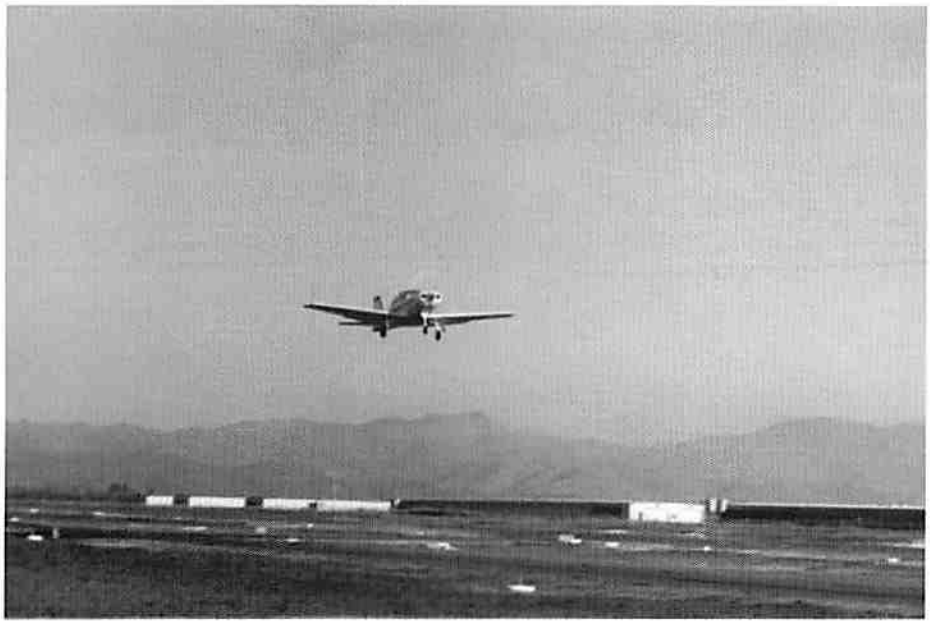
Dean M. Hall
Ft. Collins, Colorado

Dean Hall is an EAA director, and he will be in Australia in April to check out Guido Zuccoli's Falco, Sea Fury, Pitts, Laser, T-28, Boomerang, Fiat, etc.—Alfred Scott

I liked your piece on troglodyte engineering last month. I wish I had written it; it would have made a great Technicalities.

Peter Garrison
Los Angeles, California

I see the March 1993 *Aviation Consumer* has brought further discussion to the topic you brought up in your last newsletter—the design quality (or lack thereof) in amateur-built aircraft. As a pokey-slow builder, my Falco project began back in 1986, but it



followed a lengthy period of trying to decide whether to buy or build an airplane, and which one in either case. I went through all of the perfunctory spreadsheet financial studies comparing the options, as well as the then-current stack of glossy brochures (yours included), and when I got tired of mucking around in numbers, a few significant truths seemed to be emerging:

• Flying a rented spam can isn't a whole lot of fun, but it would do in a pinch.

• Owning a spam can doesn't necessarily remove all worries regarding the thoroughness of maintenance, since without an A & P license, we are required to use the services of others, like it or not. It would put me in the driver's seat of a "known quantity" as far as structural, aerodynamic and systems design, however I could never know the nooks and crannies of a factory-built airplane as well as a home-made one.

• Building a newly-designed fiberglass airplane makes one a bona-fide if uncertificated test pilot, like it or not. This idea bothered me a lot, especially since my idea of a good time flying is to cross the continental US with my family (or parts thereof) in tow.

• If I were to build anything, I would probably fuss over it so much that I would likely only have time for one such adventure in my natural life, so I had better pick the right airplane.

• If I were so fortunate to finish the project and enjoy the use of it, I would probably face the need to convert the airplane back to money in my old age, or maybe sooner. Ideally, the aircraft should have an expected useful lifespan longer than my own, and the market reputation to go with it.

• A "quick-build" airplane didn't interest me much, since I'm an incurable tinkerer anyway, having enjoyed many a rainy Saturday in the garage as a wooden-model builder.

I have noted to myself and Mrs. B with some glee, the recent ruckus about design quality, having pointed out to her at the start that despite the Falco's indicated high cost and long building time, we were talking here about a lifetime appreciable asset, rather than a convenient toy. I feel fortunate indeed to have had the opportunity, resources and good sense to pick the "right airplane" the first time.

We have several fine-looking composite and metal amateur-built aircraft in our neighborhood, but I appear to be one of very few working with wood, and alone in building an aircraft with a properly tested design and a long-period career as a production article. Kind of makes one feel fuzzy-warm all over, if you catch my drift.

I'm sure the other Falco builders and fliers will join me in thanking you for your work in bringing the "right airplane" within our reach.

Craig Bransfield
Bakersfield
California

The Falco has not received yet the full certification, my test flight report is still being evaluated by the CAA. I will advise when all is finalized.

I'm extremely pleased with the aircraft. Its performance and handling characteristics exceeded my expectations by a long margin. I am satisfied that our decision not to install inverted fuel and oil system was correct. The Falco obviously was never designed for inverted flying or negative-G performance, and I do not consider straight-and-level inverted flying to be of any use or significance. In any case, the Nustrini canopy would see that no negative-G maneuvers are possible in the Falco!

We can now accommodate pilots up to 5'11" in the plane, provided that they have a low haircut.

Guido Zuccoli
Winnellie, N.T.
Australia

Luciano Nustrini himself is completely bald and has poor posture.—Scoti

All fuselage frames complete, tail group spars complete, forward wing spar complete, wing tip bows complete, wheel wells complete, some metal components finished—building started in March 1992.

I purchased the spruce kit from Western Aircraft Supply and had it air-freighted over to England. I cannot recommend this kit highly enough to anyone who is considering "building from scratch". My inspector says the finish and grain is some of the best he has seen. Jean Peters is very helpful—he even took the packaged kit to the airport himself. The quantity of timber is amazing. There is always more than is required. I have quite a large box of "off-cuts" already.

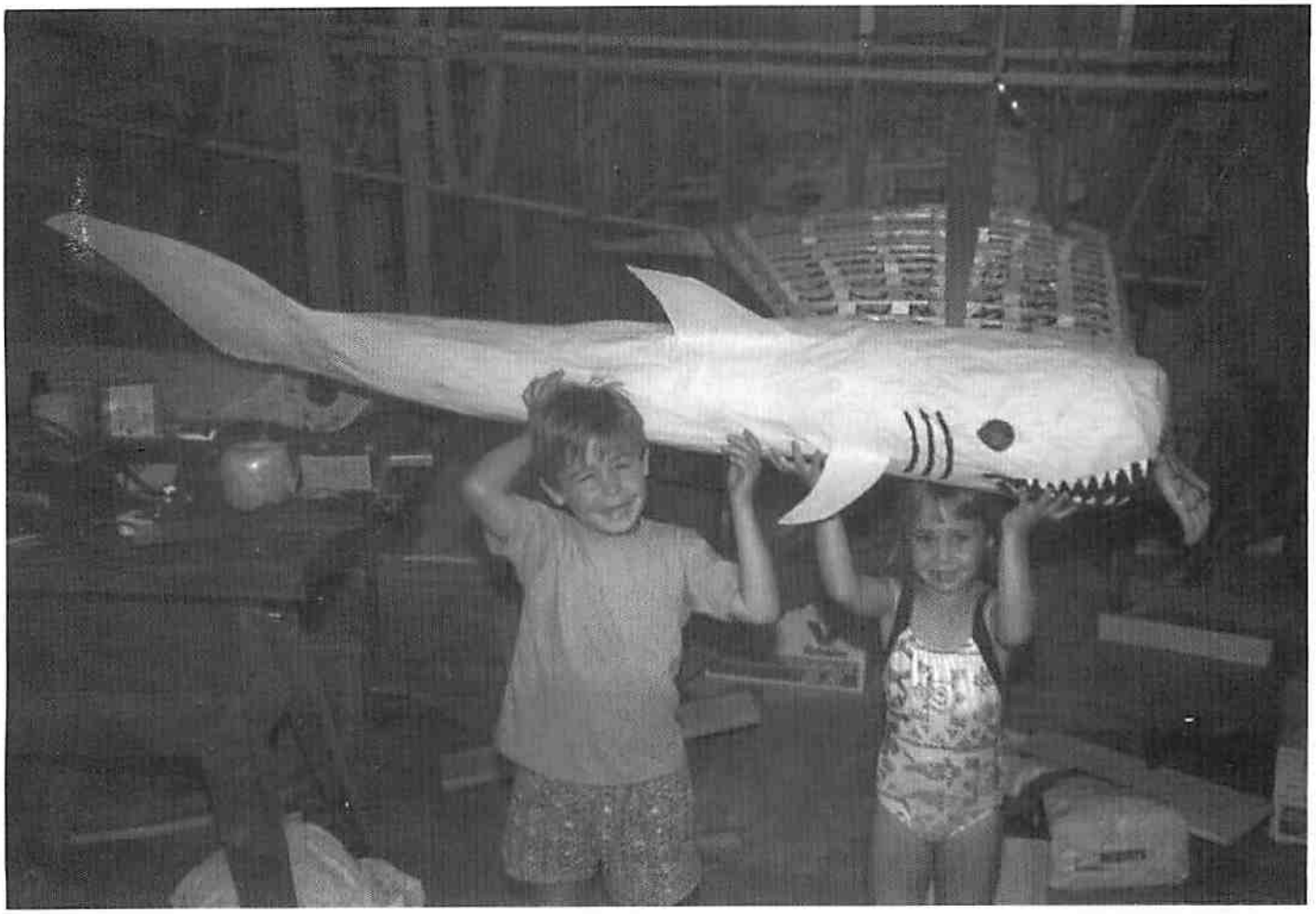
No major problems in working from the plans, and the Builders Letters have been really helpful. I contacted a couple of other builders here in England, and we are occasionally exchanging ideas and knowledge.

I am using Aerodux 500 glue. As it is a dark red—almost crimson—in color, it really shows up the glue line. So it is easy to see how good your laminating skills are. Also, it comes in 'slow', 'medium' and 'fast', so you can use it with confidence at any time of the year.

Alan Powell
East Ewell,
Surrey, England

First half of the year was used to try the glues. After familiarizing myself with them, it turned out that one glue failed. I have not found the fault yet. Second half of the year was used to prepare for my wife's fourth son (my first). He arrived, January 25, 1993.

Harald Pettersen
Bryne, Norway



Ricky and Elise Fitzwater with their range-extending modification.

Just a note to say I received the Falco plans the other day. I was like a kid waiting for Christmas, waiting for UPS to deliver them. After going over the plans the past couple of days, I found that they exceeded my expectations for completeness and thoroughness. In fact, I feel that the quality of your plans are right up there with Boeing and Douglas drawings, being that I work with them everyday. I also showed the plans to a few of the mechanics that I work with, who are in the process of building RV's. Their comments all fell along the lines of "I wish our plans were this detailed."

Shawn Horvath
Half Moon Bay, California

We are writing to let you know that our Dad is making progress on his Falco despite his terrible fishing accident. The enclosed picture says it all. He also wants your opinion on his proposed modification (again, see photo). He calls it S.H.A.R.C. (Supplement High Capacity Auxiliary Range Container). He said it is similar to the famed "Tuna Tanks" on the C-310 but it also incorporates a navigation function with a unique digital display (follow where the digit points). He feels this mod is a must for anyone contemplating long over-water flights. Please feel free to send him your ideas as he needs all the help he can get.

Ricky and Elise Fitzwater
Van Nuys, California

Your tank certainly looks like just the thing for the Falco, and I especially appreciate the thoughtful design of including an integral pylon on the tank and also the stabilizing fins. I also suspect from careful examination of the photograph that in addition to eating flesh, this thing also eats plastic—which is a real good thing in my mind. Take that fish out to the local airport and turn it loose when it's hungry.—Alfred Scott

I'm getting ready to start work on the wing. Work on the fuselage formers went faster than I thought, still need to close frame No. 1 with plywood. Notice that I saved the most complicated for last.

I used one-side frosted drafting mylar to draw up the formers full size, put the slick side up and built the frame bows right on the plans. The glue won't stick to the slick surface. The formers were built on a 4' x 4' jig table of 3/4" plywood using 1" x 1" pieces of angle aluminum screwed to the table around the outline of the formers, the wood laminations were then clamped to these angles.

After making two identical halves, one was flipped over and joined at the top and bottom to make the finished former. After that, all the cutouts were made and the plywood facings were added. Boy, I didn't realize how much plywood the formers would take, especially the firewall.

All in all, it was some of the most enjoyable work on the project to date. In fact, I have decided to make all of the laminations (wing tips, wheel well bows, seat rails) before commencing on the wing.

Bob Brantley
Santa Barbara, California

The woodwork repair is completed. I'm now repairing the metal ailerons and flaps. The rudder and elevators are completed. Working very slowly!

Gar Williams
Naperville, Illinois

Gar Williams is restoring the only other production Falco in the U.S.—Guaducci