Falco Builders Letter

Guido Zuccoli in the Sea Fury flies wing on Dean Hall and Lynette Zuccoli.

Mangalore Dispatch

by Dean M. Hall

In April, Dean Hall flew to Australia at the invitation of Guido Zuccoli to fly the Falco to the Mangalore show, Australia's 'Oshkosh'. Here is his report.—Alfred Scott

The Australia trip was outstanding. The Zuccolis are *world class*, and you can cast that in bronze. They in particular, and the Australians in general, are the most hospitable people in the world.

You and your readers know the basic story. I was instrumental in guiding Guido to you and the Falco at Oshkosh '88. After he had contracted for the kit, Guido told me that when the airplane was done, I could come to Australia and fly it to Mangalore—their equivalent of Oshkosh.

Now we all know how that kind of invitation goes: sure, "just let me know, and I'll be there!" The difference this time was that I was dealing with a quiet man, and when I looked inside Guido Zuccoli, I knew that he meant it. The airplane was finished a few months ago, being the first in Australia, the invitation was reconfirmed, and tentative plans were made.

Then came the gear-up incident three weeks before Mangalore. Guido called me and said that it was off; and 40 minutes later he called to say that if I were still a gambling man, I could make plans to come ahead because they thought that they could fix it in time. I had to commit to an airline ticket then or never, and elected to take the chance. Your photo in the December '92 FBL showed Wayne Milburn and Tony Chamberlin, the two who had done the actual building of the plane. Wayne made it his own personal project to get it ready, and he burned a lot of midnight oil to get it done.

This I found to be another example of the friendship and spirit of the Australians.

These guys not only built the airplane, repaired it to perfection in record time, but were genuinely friendly and helpful to this American interloper who, after all their blood, sweat, and love's labor, came down there and was about to take their plane off to the big show and bask in the accolades. They deserve a medal for effort "above and beyond the call of duty."

And accolades there were. Everywhere we went the Falco was the star of the show. The airplane itself is perfection. It won the "Best Wood Airplane" award. Interesting, many Australians referred to it as being made of 'timber'. Being the so-called 'chief judge' at Oshkosh, I can say that it would have been in contention for the very highest awards at Oshkosh.

I can go further and say that the calibre of the homebuilts at Mangalore was across-the-board the equivalent of Oshkosh. Their workmanship in general is superb. The Australians were inclined to be self-effacing and to preface their remarks and questions about Mangalore by saying, "Of course, it isn't Oshkosh." But once you get past that point, there was no difference. The numbers and size were less, but the planes, the camaraderie, the flying, the workmanship, the spirit was the same. I thoroughly enjoyed Mangalore.

On the trip to Mangalore, Guido flew the Sea Fury, Wayne flew the Boomerang, and I flew the Falco. Guido is the quintessential pilot. He was a member of the Australian national aerobatic team. He moves with equal ease from a fighter plane to a Pitts to a Falco or a Cub. I saw him fly, for his first time, a 50-hp ultralight, all aluminum, semi-scale P-51. I saw him do beautiful vertical rolls in his Pitts, and a T-28. He did a great airshow in the Boomerang, and nobody has accused the Boomerang of being a great airplane.

The Falco. First off, the Falco is the prettiest small airplane ever built. There are certain airplanes that are classics of design: B-17, DC-3, Super Connie, Staggerwing Beech, Gullwing Stinson, and so on. The Falco is one of these. Period.

In This Issue:

Above and below: Guido Zuccoli.

You have already published some of the details of Falco VH-LZF (Lynette Zuccoli's Falco) and its performance as written by Tony Chamberlin. I would add that it is a delight to fly. I was particularly impressed with its stability in cross country. It flew like it was held by a thread suspended in outer space, perfectly balanced and responding to the slightest touch.

Tony has described his wooden dowel (taped under the right aileron trailing edge) trim tab, and it worked perfectly in maintaining the wings level. I would comment that having the entire 12-inch tab under the right aileron caused more drag on that side with a resultant need to keep a soft touch on the left rudder to counteract it and that moving half of the tab to the top of the left aileron, even though unsightly, would balance it out.

I was pleasantly surprised that there is no need to re-trim the aircraft for landing. The controls are light and well harmonized. They do load up a bit at speed and 'I like that'. Climb is great; forward visibility in the climb is not so great. At 5' 9", I found the Nustrini canopy a bit confining, and the thin seat cushions, modified to accommodate the canopy, uncomfortable after a couple of hours.

Limited aerobatics are outstanding. The roll is as good as it gets. The loop was great; being clean, speed on the backside has to be watched. The handling in the pattern in great. I would caution the new Falco pilot that because of its speed and complexity, things happen fast and that the average pilot, and that includes me, should get some dual and familiarization time before tackling it. In my case, I had the additional advantage of getting that dual time with Guido, who is a masterful pilot. The rudder nose gear linkages caused some different feel in the takeoff, and there was some rudder input during the gear down cycle which, until it was figured out, was slightly disconcerting.

My observation was that the stall is not quite as predictable as I had expected with its stall strips. Let me digress to say that I disagree with the present instruction of pilots who experience the stall essentially only in the straight-ahead nibble in a trainer that is very spin resistant. Secondly, I contend that a lot of the new high-performance airplanes are achieving the last ounce of speed by ignoring basic aerodynamic safety lessons that were learned in the 30's. In addition, I think a lot of pilot reports of stall characteristics are biased by being limited to the most sanguine of stalls.

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Now, back to the Falco: In the gliding, straight-ahead stall, it would usually give warning and break straight ahead. A non-soloed student could handle that. As I remember, it was not totally consistent. Everybody knows not to cross-control in a stall, but the classic low turn to final, especially with a slight tailwind in the base leg, can lead the pilot into trying to steer it around or 'cheat' with the rudder as I call it, and the result is catastrophic.

When I duplicated this in the Falco, at altitude, the result was a very sharp break without warning, and the roll went past the vertical before it could be stopped. This is not unique to the Falco by any means, but it is something to be aware of, and as a surprise to me the roll was quicker than in my Skybolt which being aerobatic might be expected to be worse. I suggest that the pilot of any airplane do stalls in all the combinations of turns with cross controls in order to really know what to expect.

I'm aware that we aren't supposed to cross-control, but having witnessed two fatal accidents in exactly that configuration, I know that it can happen; and I know from sad experience over nearly fifty years of flying that it is too easy to say that the last of our friends that got killed did something "stupid" that we would never do. But would we, when circumstances overload us? Good pilots have done it.

By the time we returned from Mangalore, I had 13.8 hours of Falco time in my log book, and as Guido observed, "That makes you the high-time Falco pilot in all of Australia." However, I don't attach too much to that; as they say, "In the land of the blind, the one-eyed man is king."

The bottom line is that I like the Falco very much, and needless to say, I wish I had one.

Overall, this was a classical once-in-a-lifetime trip. The flying was superb and gave me a chance to see almost 2,000 miles of Australian countryside that could not have been so well appreciated at airline altitude. We had the camaraderie of many airplane-type people, stopped in small towns, took part in municipal airshows, and generally appreciated the country and the people in ways that could not have been done otherwise.

Thanks to the Zuccolis, and to the Falco.

Top: Guido and Lynette Zuccoli with the Boomerang. Center: Wayne Milburn. Bottom: Lynette Zuccoli.

The Glider
Part 3 of a Series

by Dr. Ing. Stelio Frati
translated by Maurizio Branzanti

In this chapter, Stelio Frati begins to discuss the fundamental elements of aerodynamics. Included below is the first half of the chapter.
—Alfred Scott

Chapter 3
Elements of Aerodynamics

11. Aerodynamic Force

A stationary body immersed in a flow of air is subjected to a force that is the total of all forces that act upon it. This resultant force is called the aerodynamic force and is designated by the letter *F*. Generally, the direction of this force is different from the air flow direction.

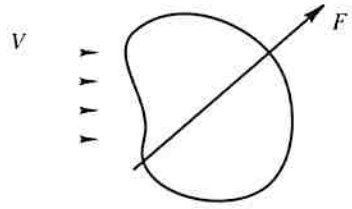


Figure 3-1

If the body has a symmetrical shape relative to the air flow, the aerodynamic force is also in the same direction.

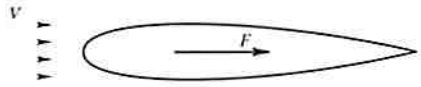


Figure 3-2

However, if the same body is rotated in relation to the air flow at the angle α ("alpha"), called the angle of incidence, the direction of the force *F* is no longer in the direction of the air flow and is usually at a different angle than the angle of incidence.

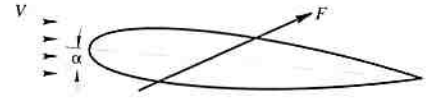


Figure 3-3

The reason the force *F* is not in the same direction as the air flow is due to the difference in velocity of the air particles between the upper and lower surfaces of the body. This phenomenon was studied by Magnus and is demonstrated by Flettner's rotating cylinder.

Rotating Cylinder. Let's immerse a cylinder in a flow of air. This flow will produce a force *F* on the cylinder in the same direction, because the cylinder is symmetric with respect to the flow.

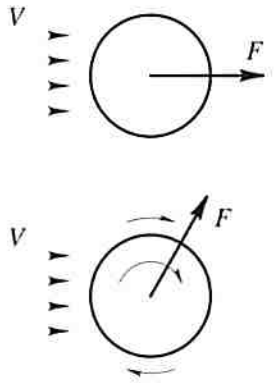


Figure 3-4

Now, if we rotate the cylinder around its axis in the direction shown, the fluid particles in direct contact with the surface will be carried by friction. Notice that while the velocity of the particles over the upper surface will be added to the stream velocity, in the lower portion the velocity will subtract. The result is a higher stream velocity in the upper surface and a lower velocity in the lower surface.

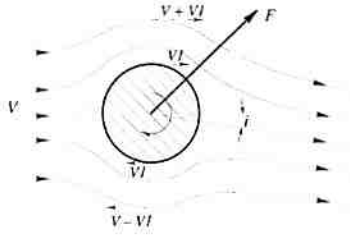


Figure 3-5

Thus, the motion of the fluid particles around the cylinder is a combination of the effects of the direction of the stream and the rotation of the cylinder. The direction of the air downstream of the cylinder is now at the angle *i*, called the induced air flow angle. The value of the aerodynamic force depends on various factors:

- air density ρ ("rho"—mass density of standard air)
- area of the body *S*
- relative velocity *V* (air flow velocity in relation to the body)
- shape and orientation of the body in relation of the direction of the air flow, a factor we will call *C*.

Analytically, the dependence of *F* is expressed by the following equation:

$$F = C \cdot \rho \cdot S \cdot V^2 \quad [1]$$

where the units of measurement are:

F = force in kg.
V = velocity in m/sec.
S = area in m^2
ρ = density in kg. sec^2/m^4
C = nondimensional coefficient

12. Airfoils

A solid section of particular importance is the airfoil. Its shape is such that the air flow around it generates a field of pressure that is a combination of fluid movements along and around it, as in the case of the rotating cylinder. In other words, a uniform air flow will undergo an increase in velocity over the upper surface of the airfoil and a decrease over the lower surface.

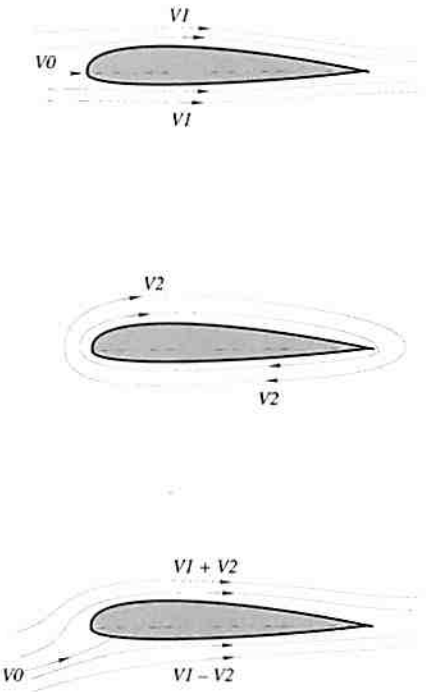


Figure 3-6

Due to the well-known Bernoulli theorem, we will have a decrease of pressure where the velocity increases and an increase of pressure where the velocity decreases. The aerodynamic force *F* therefore depends on positive pressure along the bottom and negative pressure—suction—on the top. The pressure and suction vary with the angle of incidence of the air flow.

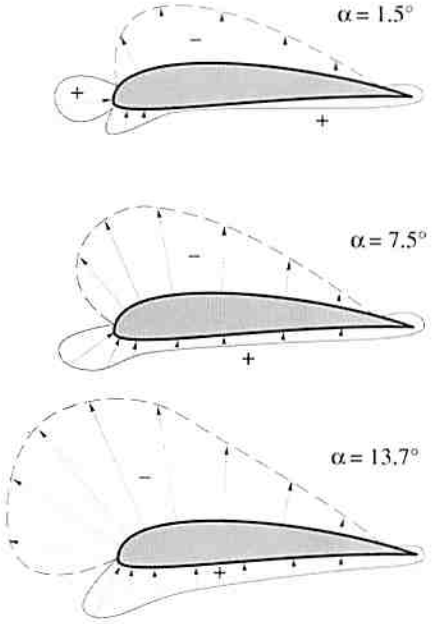


Figure 3-7

As you can see, the suction is much greater than the pressure at normal flight conditions. This means that the lift of the wing is due more to a suction effect than a pressure effect, contrary to what it may seem at first sight. In short, we may say that an airplane flies not because it is sustained by the air underneath, but because is sucked by the air above it.

This experimental observation was of great importance in the understanding of many phenomena of flight. Moreover, this should be considered when designing the wing structure and skin covering, especially for very fast aircraft.

Lift and Drag. When we say "airfoil," we are really talking about a section of a wing with its vertical plane parallel to the longitudinal axis of the aircraft. Let's consider the force F in this plane, and let's split it in two directions, one perpendicular to the direction of the relative velocity, and one parallel.

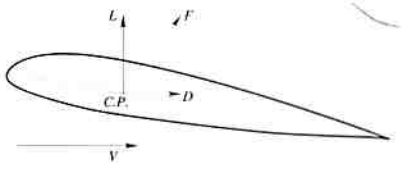


Figure 3-8

Let's call lift L and drag D. Flight is possible when the lift L is equal to the weight W. In the same manner as we have seen for the aerodynamic force F, lift and drag are expressed by the following equations:

$$L = C_l \cdot (\rho/2) \cdot S \cdot V^2 \qquad [2]$$
$$D = C_d \cdot (\rho/2) \cdot S \cdot V^2 \qquad [3]$$

where the non-dimensional coefficients C_l and C_d are called the coefficient of lift and coefficient of drag, respectively.

These coefficients are obtained in wind tunnels, which work on the principle of reciprocity. In other words, an air flow with velocity V will impose a force on a stationary body equal to the force derived from the body moving with velocity V in an atmosphere of stationary air.

The airfoil model under analysis is suspended from scales, which will register the forces that are caused by the wind. By changing the dimensions of the model and the velocity of the air, the forces on the airfoil will also change. The results are then reduced to standard units independent of the airfoil dimensions and the air velocity. The units measured are square meters for the surface area and meters per second for the velocity.

In reality, things are not as simple as this. The measurements given by the scales require a large number of corrections. These depend upon the characteristics of the wind tunnel and the Reynolds Number used in the experiment. However we will not elaborate on this, because the subject is too vast.

Center of Pressure. The intersection of the aerodynamic force F with the wing chord is called the center of pressure. It is shown with the letters C.P. in Figure 3-8.

As we have seen so far, the aerodynamic force F is represented in magnitude and direction as a resultant of L and D. But as far as its point of origin (center of pressure) is concerned, things are not that simple. In fact, the force F for certain angles of incidence of lower lift will no longer cross the wing chord; therefore the C.P. is no longer recognizable. We will see later how we can get around this.

Angle of Incidence. The pressure, suction, aerodynamic force, lift and drag will vary with the angle of the solid body form with the relative direction of the air flow. This angle of incidence is normally defined as the angle between the relative direction of the air flow and the chord line of the airfoil.

Efficiency. The ratio between lift and drag is very important in aerodynamics. This ratio is called efficiency, and it is indicated by the letter E.

$$E = L/D = C_l/C_d \qquad [4]$$

Physically, efficiency represents the weight that can be lifted for a given amount of thrust. It is obvious, therefore, that is important to always obtain the maximum value of E by reducing drag to a minimum. The efficiency $E = C_l/C_d$ improves gradually by increasing the wing span, as we will see later. The experimental values of C_l, C_d, and E of airfoils obtained in wind tunnels are generally for aspect ratios of 5 or 6.

(to be continued)

Below: Stelio Frati's first jet, the 1952 F.5 Trento.

The Flying Pidgeonhole

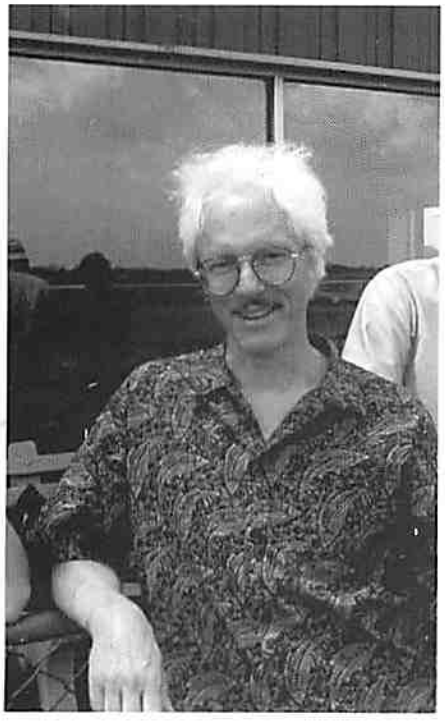
by Stephan Wilkinson

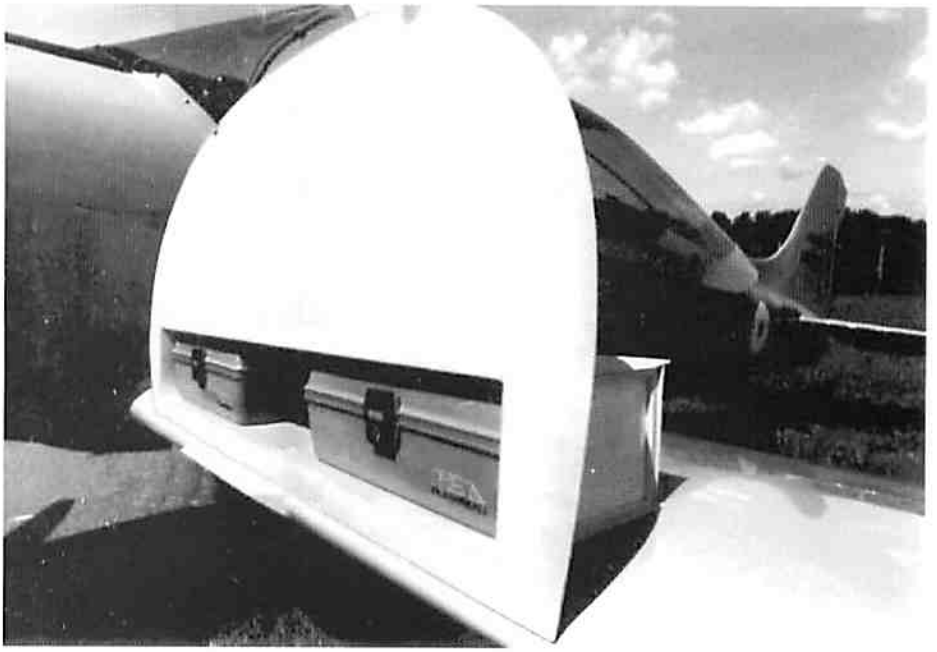
Since we're both avid bicyclists, I have artfully rationalized to my wife the effort and expense of building the Falco as creating a device that will rapidly transport us to an enormous variety of biking spots, rather than our having to spend the next 30 years grinding around the same network of Hudson Highlands roads.

The next step was to find high-quality bicycles that would fit in the Falco. All of the folding bikes generally available up until now have been complete junk, made from gaspipe and fitted with department-store componentry. They're good for nothing more than carrying in your motorhome so you can look silly while you pedal around a KOA campground.

But just in time, an outfit called Green Gear, in Eugene, Oregon, came out with a truly splendid folding bike called the Bike Friday. It's about 98 percent as good as a conventional bike in the same price range ($900 to $1,200, depending on how you want to equip the Bike Friday); I'd characterize a Dahon—typically, the bike you see advertised in *Trade-a-Plane* and the Sporty's catalogue—as being about two percent as good.

So I gave a Bike Friday to Susan for Christmas, custom made to her measurements, figuring we'd try that one and get a second one for me if it proved to be as good as I





thought it was. (I'd already test-ridden one, provided by neighbor/aviation journalist/*Outside* magazine writer David Noland, who was doing an article on the Bike Friday.)

The bike has proved to be terrific. It fits in a standard Samsonite suitcase and can be checked as luggage on airline flights—which we did with it—with no ticket agent the wiser that he should be charging us the exorbitant ($90 round trip now, I think) bike-as-baggage surcharge.

But it didn't quite fit in the Falco. It didn't come anywhere near fitting when encased in its suitcase, but I made a canvas bag for it, and that takes up a lot less room. Still, it needed about six inches more space, and that's the reason for the odd little baggage-bulkhead modification I made, as shown in the accompanying photo.

The modification consists of a pidgeonhole-like area slotted into a conventional bulkhead, sited to fit just below the rear fuel tank and to extend far enought aft that it doesn't interfere with the fuel line from that tank. Since our airplanes are typically nose-heavy, with constant-speed props and, in my case, a 180-hp engine, it creates no unusual weight-and-balance considerations.

It's an easy modification to make, and the construction should be intuitive simply from a glance at the photo. I used 1.5mm plywood for the box itself and the conventional 2mm plywood for the bulkhead. The first caution is that you should build the thing fairly strongly—use beefy triangular strips to fasten the box to the back of the bulkhead—because you don't want the box and whatever you're carrying within it to tear away if you hit severe turbulence.

The second caution is that you should never carry within it a load that you can't multiply times six, say, and not have the box fail. Below it are control cables, a fuel line and your static-system line, and you don't want to deal with flying into a thunderstorm *plus* having a mess of plywood and baggage fouling up your elevator cables. It makes a nice place to stuff a down parka or a light sleeping bag, but I'd be careful with anything much more substantial until you've screwed the thing to a supporting framework and loaded it with 100 pounds of bricks to proof-test it. I haven't done that yet, but I'm going to.

In fact, I'm also going to see if I can add some kind of permanent crossbrace under the box, across the inside of the fuselage, simply to help prevent catastrophic failure of the box from a turbulence overload. This won't be a consideration when I'm carrying the bicycles, since the pidgeonhole will be unloaded, just providing "airspace" for the bikes' front wheels, which extend slightly too far aft. But it also happens to be exactly the right size and shape to hold my traveling toolkit and my survival kit, which are in plastic toolboxes (as shown in the photo), and their combined weight is about 15 pounds.

What's in the survival kit? You'll have to read the September Builder Letter to discover that. But I'll give you a hint: among other things, it contains three condoms. (No, not in case I get lucky after I crash.)

Construction Notes

Steve Wilkinson points out that if you're shopping for a used Century I autopilot for the Falco, the model that we use was also used in a Cherokee Arrow. We've always told people that you want the one from a Yankee, but Steve found that the Pipers used the same thing and that they're far more plentiful in salvage yards.

In our landing gear retraction gearmotor, there are a number of gears inside the case. Depending on the model, there are either one or two 'change gears', an assembly of two gears of different sizes on the same shaft. These change gears are made in the standard method of pressing one gear over a slightly-oversized shaft.

This is a perfectly acceptable way of doing it, however it is dependent on a tight fit. We've now had two cases in which the change gear has slipped. It first happened to Steve Wilkinson, who asked if there was an internal clutch in the gearbox that might cause it to slip. That was a couple of years ago, and then the other day, Jim Shaw reported the same problem.

I suppose it's likely that this minor problem will happen again. It's an easy problem to spot, and it will normally show up on the first retraction tests. It's also a very easy problem to solve. All you do is drill a 1/8" diameter hole so that half of the drill is cutting into the shaft and the other half is cutting into the inner face of the gear hub. Then you tap in a 1/8"Ø by .25" long dowel pin. This technique is referred to as a 'dutch pin' and it prevents the outer gear from spinning on the shaft.

Mario Domingues in Portugal asks about the kind of fiberglass that you use on the outside of the airplane for moisture protection, and at the hinges whether the fiberglass should go over or under the hinges.

The fiberglass cloth that we normally use has a weight of 1.5 to 2 ounces per square yard. This type of cloth is commonly used as a protective coating for wooden boats, and it is slightly heavier than the nylon cloth used for ladies' stockings. The only purpose is that there be a layer of cloth ot assure a minimum thickness of the coating and to prevent cracking. If you were to brush epoxy resin alone on the airplane, it could crack, while if a fabric is in there, it will not crack. Secondly, when you drag a piece of plastic (commonly called a "squeegee") across it, the fabric insures a consistent film thickness.

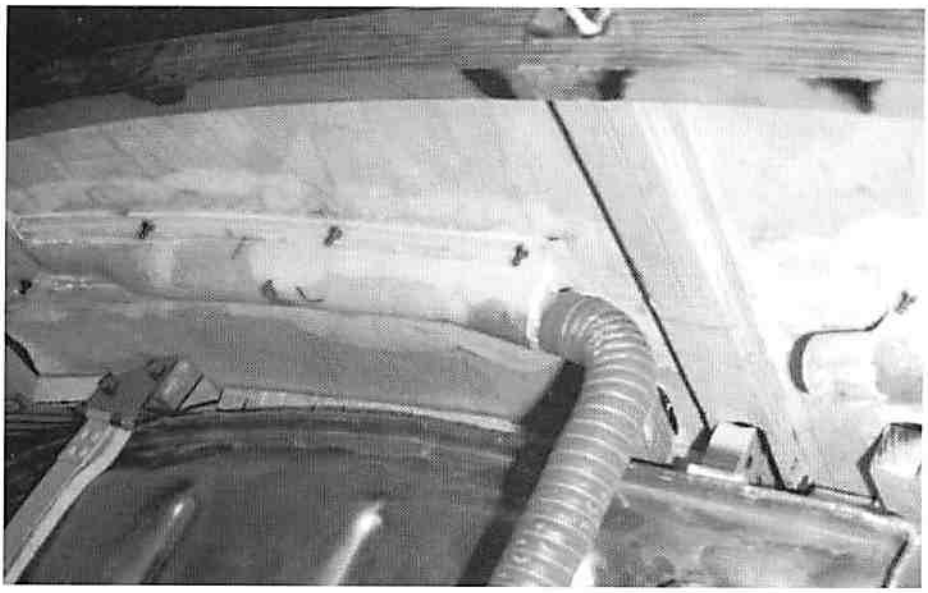
We normally suggest coating the outside of the airplane this way, however in areas such as inside the wheel well and along the aft face of the aft wing spar, etc. (in other words, those areas which are not subject to abrasion from dust in the air, rain, etc.), the use of a fiberglass cloth is not really necessary at all. Most people just paint on a thin layer of epoxy without any fiberglass cloth. However, you may use the fiberglass cloth if you wish, but it should always be under the hinges. You would always want to be able to remove the hinges.

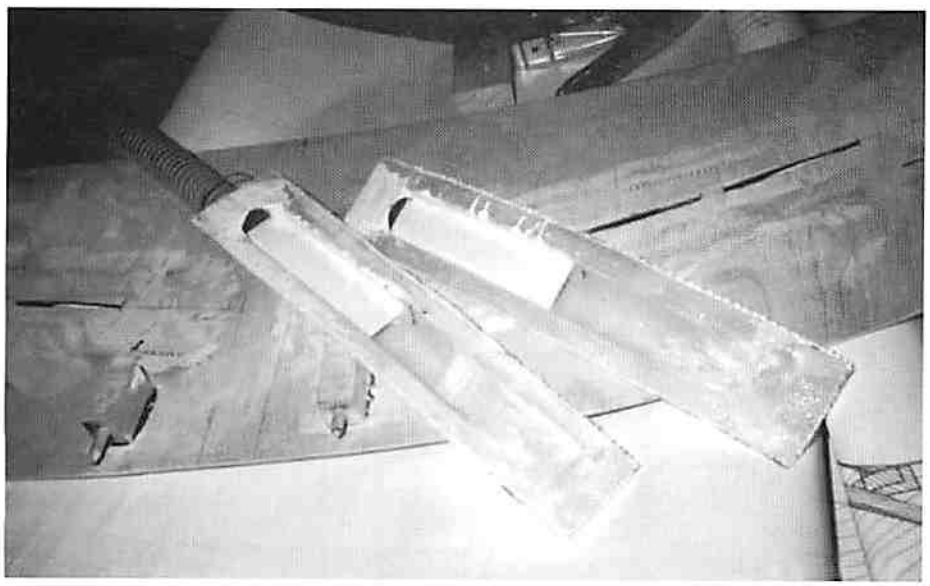
We've had some questions on the technique used for balancing the controls. If you're like most homebuilders, you'll get a lot of free advice from people who don't know what they're talking about, and there's more bad advice floating around about balancing controls than almost anything else.

The balancing of the controls is something that's done as a flutter consideration. There are other factors as well, principally the control cable tension and the harmonic frequencies of the airplane. To be correctly 'balanced' according to the specifications, the center of gravity of the control surface is aft of the hinge line, thus the controls are all 'tail heavy' by the amount specified.

Guglielmo Leggeri in Italy asks about whether you should use a torque wrench when tightening nuts on bolts which go through the wood structure. You don't need a torque wrench for this, and you certainly do *not* want to torque the nuts to standard values because it would crush wood. It is sufficient to tighten the nuts by hand and by feel. You should tighten the nuts firmly but without compressing the wood (although, when a single large washer is used, the washer is often slightly

Stephen Friend sent along these shots of his windshield defrost system.





deformed from the compression).

In early April, the Falco G-MRCI developed a case of flutter in the left flap. At the time of the flight, the airplane was going through a flight test for the British CAA, since this Falco had been imported from the U.S., where it had been built by Charles Gutzman. The airplane was in a slight dive with the intention of taking the airplane to Vne, when at 205 mph indicated, the left flap developed a severe flutter. While the pilot immediately retarded the throttle, it was all over in a few seconds, and the flap departed the airplane. The pilot landed the airplane without incident, and reported that the Falco flew well with one flap missing.

The outboard flap hinge pulled off the bushing, leaving the bushing and aileron hinge bolt in place and unharmed (the inspector reported that none of the hinge bolts had washers under the bolt heads as called for in the plans). At the inboard end of the flap, the flap hinge remained with the airplane and also a short length of the flap spar.

In a preliminary report which we sent out to some of you, we reported that a substantial amount of free play existed in the actuator after the accident, however we have since learned that this is not correct. The large amount of free play in the system (after the incident) came from the movement of the actuator supports and center torque tube support. In the violent shaking of the flutter incident, these supports became loose because the wood was compressed under the supports and under the screw heads for the supports.

Flap flutter is an extremely rare event, however in consulting with engineers, flutter in flaps can happen if the conditions are right. Large flaps, like the Falco's, are more prone to flutter than flaps of small area. Free play should be reduced to a minimum, ideally less than 1/16" at the trailing edge, but in no case more than 1/8" at the trailing edge.

Steve Wilkinson declared April 14th as Falco Appreciation Day at Manassas to introduce the Falco to the editorial staff of* Air & Space *magazine, since they had already run two articles on the plane and only George Larson had ever seen it. Jonas Dovydenas, Bill Knight and Ing. Scoti showed up as well. Above: Alfred Scott, Caroline Sheen, George Larson, Steve Wilkinson, Al Aitken, and Bill Knight. Right: Steve always wears his Italian bicycle racing hat around the Falco.

Charles Gutzman reported that this aircraft had previously had an incident of flutter in the left flap. This occurred in the first 10-15 hours of flight, and it happened on raising the flaps after takeoff. The buzz in the flaps was momentary and after landing, Charles Gutzman reported that he realized that the flap torque tube had been joined in the center with only one bolt (vs two bolts shown in the drawings). He subsequently installed the second bolt and "tightened the system up". Charles Gutzman reported that after this, the system had very little free play.

Our analysis of this incident has brought us to the conclusion that this incident was caused by six factors:

1. Free play in the flap control system. If you take the trailing edge of the flap in your fingers and jiggle it, there is a certain unavoidable amount of 'jiggling free play' which results from the sizes of the bolts within the bushing and bearing holes. Some of this can be reduced by tightening the bolts on each end of the flap actuating pushrods, however to reduce this 'jiggling free play' requires replacing the existing bolts with close tolerance bolts. The use of close tolerance bolts will reduce the jig-

gling free play to 1/16" or less at the trailing edge.

2. Flexing in the flap control system. If you push hard on the trailing edge of the flap, you can observe that, in addition to the 'jiggling free play', the flap control system also has a certain amount of flexing in it. In our analysis of this, we observe that the center flap torque tube support (P/N 726) moves slightly relative to the flap actuator support brackets (P/N 854-1 & -2). The rigidity of this part of the system depends partly on the rigidity of the three metal components, and also on the rigidity of the mounting on the spruce block in the bottom of the fuselage.

3. Use of countersunk screws. The flap torque tube support (P/N 726) and the flap actuator support brackets (P/N 854-1 & -2) are installed with washer-head screws with the head of the screws on the outside of the plywood skin of the aircraft. On this Falco, the screws were countersunk into the surface with the result that the heads of the screws bear on spruce. This weakens the mounting and adds to the flexing in the flap control system.

4. Out-of-balance condition. Ordinarily, flaps for production aircraft are not balanced. This is true for both the SF.260 and the Falco, which have very similar flap control systems. However, we have found that there is a very wide variation among our builders on the trailing-edge weight of the flaps. A heavy weight at the trailing edge would increase the tendency of the flaps to flutter. It is evident that we must impose an upper limit on the flap trailing-edge weight.

5. Reflexing of the flaps. The flaps of this Falco were reflexed five degrees. This was in an attempt to increase the speed of the airplane, but Charles Gutzman reported that it did not increase the speed at all. While reflexing of the flaps is not something which would cause flutter by itself, when the other conditions are existing, we believe the reflexing contributed to the conditions which caused the flutter incident. To explain, with the flaps in the normal 'trail' position, the air loads would cause a constant 'up' load on the flaps, pushing the flap control system to the limit of the 'jiggling free play' and against the flexing in the system. If the flaps are raised beyond the trail position, at some point they would enter a neutral zone in which the flaps would be neither pushed from below or above, but rather simply buffeted by turbulence. We think this reflexing caused the conditions of buffeting which induced the flutter incident.

6. Omission of washers under hinge bolt heads and nuts. The inspector reported that no washers were installed under the hinge bolt heads or under the nuts for any of the control surface hinge bolts. The outboard flap hinge pulled off its bushing and was not restrainted from doing so by a washer under the bolt head. It is impossible to know, however, if the outcome would have been any different if the washer had been in place.

The Falco has been built with three types of control surfaces. The original Series I and II Falcos, had wood-and-fabric control surfaces with open bays aft of the spars. These were covered with fabric. The Series III and IV Falcos had aluminum control surfaces. Many of our early Falcos were built with the original wood-and-fabric method, but most have been made by covering them entirely with plywood—as was the Falco G-MRCI.

We asked that builders weigh the flaps, by removing the flap pushrod, suspending the flap on its hinges (on the airplane or on a bench), and with the flap in the horizontal (flight) poition, to measure the weight of the trailing edge of the flap at a point 5mm outboard and 5mm forward of the innermost trailing edge point of the flap. The overall weight of the flap is not something we want to know.

Four Falcos with wood-and-fabric controls were weighed this way. The weights were: Karl Hansen 14, Neville Langrick 20, Larry Black 20 and John Oliver 19.5/20.4. (All of the weights are in ounces, and double weights are for left and right flaps.) Gar Williams measured the trailing-edge weight of his Series III production Falco at 21 oz.

For the Falcos with plywood-skinned controls, there was considerable variation. Here are the numbers: Cecil Rives 29 (in primer, not painted yet), Jonas Dovydenas 32, Dick Reichenbach 19.8/20.3, Rex Hume 20, John Shipler 27/27.8, Ray Purkiser 20/21, Guido Zuccoli 27/30, Steve Wilkinson 27, Bob Bready 23/24, and G-MRCI 37.4 (for right flap).

Note the substantial variation from one airplane to another, and also that when both flaps have been weighed for an airplane, with one exception, the weights have come within one ounce of each other. Thus we think it is logical to conclude that the unrecovered left flap of G-MRCI was within one ounce of the 37.4 oz weight of the right flap. As you can see, it is quite heavy.

While the Falco has been flying for 38 years, it's all too easy to dismiss this type of incident as the mistake of another builder. This could happen again if the conditions are right, and we all ought to reflect that this could easily have been a fatal accident.

After analyzing this problem, we have determined that there are a number of sensible steps that we can take to prevent this from happening again. The details of these are included in our Service Bulletin No. 93-1 (which is essentially a word-for-word copy of what is here, along with some instructions for how to accomplish the corrective actions on finished aircraft) and our latest revisions.

The corrective measure are: balancing the flaps, using close tolerance bolts in the flap control system, and installing reinforcing straps between the center torque tube support and the flap actuator support mounts.

The flutter experts say that the most desirable and easiest way to solve this problem is to eliminate the free play in the system, and so that we could fully understand all of this, I put together a flap control system on a bench. This is shown in a photo on page 11, and the components are mounted on 3/4" baltic birch plywood, which is very rigid and strong. With this setup, we were able to push and shove on the system and to locate the free play.

The close tolerance bolts are used to eliminate as much free play as possible. Ideally, we would like to see the free play down to about 1/16" at the trailing edge. Some of our Falcos with the existing hardware have this little, while others have 1/8" or more. On our mockup, the free play went from about 1/8" to 1/16" when the close tolerance bolts were installed.

In addition, you can eliminate some free play by tightening up the bolts snugly against the spherical bearings at each end of the flap pushrod. Because of the slight gap between the slot in the end of the flap pushrod and the bearing in the flap hinge and arm, some builders have put a shim washer in there. You would be amazed at how much difference it makes to tighten up around these bearings.

It was apparent to everyone that there is a certain amount of flexing going on at the center of the aircraft, and this is very difficult to see or measure on finished aircraft because of the close quarters involved. On the test rig, however, it's quite easy to see and measure. If you press down hard on the flap, you can measure about .030" of flexing between the two supports—which translates to about 3/16" movement at the trailing edge. That's when mounted on solid birch plywood; when mounted on spruce, it would certainly flex more.

I was feeling rather sheepish about this, because we designed the actuator mounts, however in watching the movement of the parts in finished aircraft, it's apparent that the original Frati-designed center mount is moving slightly more than our parts. That's certainly because of the use of two mounting screws instead of four, and because of the greater base area of the brackets on the spruce.

On G-MRCI, however, these supports were mounted in the airplane with the screws countersunk into the wood. This makes them bear on spruce, and it is nowhere near as strong.

Let's also look at the bright side of things. We now know that in a case of destructive flutter that causes a flap to break off and depart the airplane, that the flap actuator and other components are sufficiently strong to withstand the forces, but that the center torque tube support and actuator supports will compress the wood under them and become loose. (Those of you who have been for the Big Slide, can expect some looseness in these parts.)

The flexing can be eliminated by installing braces between the supports. I've already done this on the mockup, and it makes a remarkable difference. Once these components are tied together, then the loads that go into the bottom of the fuselage are just the torsion loads from actuator.

We are in the process now of collecting all the necessary parts, and we will be sending them out to those of you who have bought the various kits. The installation of the braces will be a difficult job for those of you with finished or nearly finished airplanes, however it will be quite easy for the rest of you.

Eliminating the free play and the flexing is very important, but it is also obvious that we must establish some sort of balancing limit on the flaps because flaps with heavy trailing edges gets you off into the area of the unknown. In establishing these limits, we're simply requiring that all of you build the flaps with the same sort of balance that has existed in the Falco for 38 years. We're looking for 20-21 oz. at the trailing edge, with an upper limit of 23 oz., however anything under 20 oz. is fine.

Finally, we'd like to see an end to this business of reflexing the flaps. If you get the system balanced, eliminate the free play and the flexing, then reflexing probably doesn't make any difference. But look at it this way: Since reflexing doesn't give you any extra speed and since it is identified as a possible contributing factor to flap flutter, why do it at all?

I'm sure many of you will be tempted to take halfway measures here, or to call me to ask if you really *have* to do it all. The answer is that we can identify four conditions which probably caused the flap flutter and two more conditions which contributed to it. Does that mean that you'll never have flap flutter if you eliminate one, two or three of these conditions? We don't have the slightest idea and, more importantly, we don't have any idea of how 'close to the edge' you will be walking. This incident could have been a fatal accident, therefore it only makes sense to us to eliminate all of the conditions which probably caused the flutter. —*Alfred Scott*

Brenda's Corner

Alfred will be flying his Falco to Oshkosh again this year. Actually, he will be flying to Appleton since he long ago stopped parking the Corporate Disgrace on the flight line. He will be flying in on Sunday, August 1, and leaving on Wednesday, August 4.

The Falco Builder Dinner will be on Tuesday, August 3, at Martini's Restaurant in the Midway Motor Lodge in Appleton. All Falco builders, family and friends are welcome.

We need to know how many are coming, so if you plan to attend, let me know—or if you wait till the last minute, leave a message for Alfred at the Paper Valley Hotel in Appleton (414) 733-8000 or call me here at the office, and I will let him know you are coming. You can arrive for drinks at 7:00 and dinner will be at 8 or 8:30. The menu will be the same old thing—prime rib or baked fish of some sort.

The product letter that is part of the Falco information packet was last printed in 1985. Over the years there were quite a few things about it we would have liked to change, but we had 10,000 printed so we just waited until our inventory was depleted.

That finally happened. We have just rewritten the product letter, and it is a vast improvement over the last one. We had 1,000 printed so we can change it every year if we like. It doesn't contain any new earth-shattering information, but if you would like a copy we will be happy to send it on to you.

It happens every few years—a Falco builder sells his plans and the purchaser contacts us after the transaction because they need this, that and the other. They then find out the builder had signed a Plans Purchase Agreement which specifically prohibited the sale, gift or transfer of the plans.

So here they have a used set of plans, and they must pay $300 and sign a Plans Assumption Agreement to receive revisions and builder support from Sequoia. This leads to a difficult situation for all.

We hope, of course, that none of you have circumstances that force you to sell your Falco project but if it happens please consult us before sale of your plans. The rest of your project can be handled in whatever way you see fit.—*Brenda Avery*

Goings On at Sequoia Aircraft

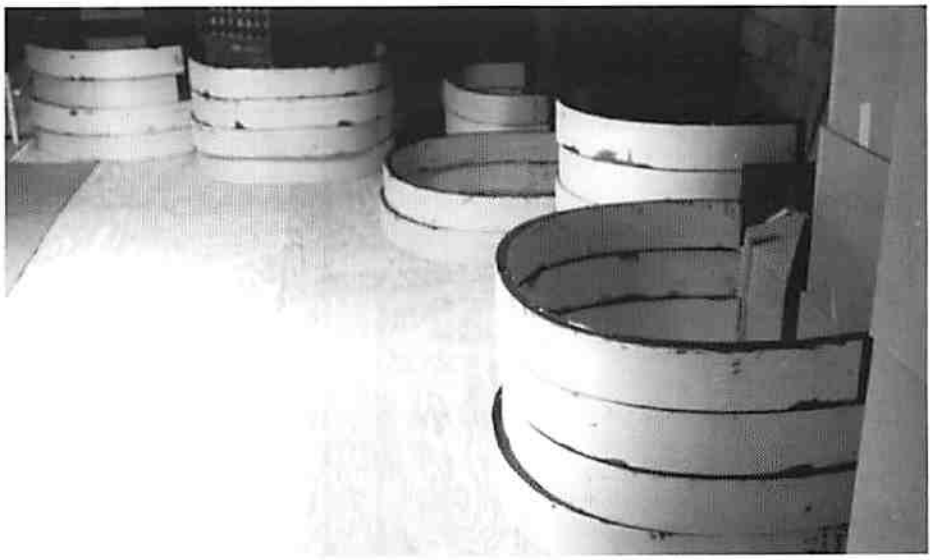
I'm sorry to report that Dan Garn was killed in early June in an aircraft accident at Chino, California. Dan Garn and Wendell Taylor were partners in building a Falco, which crashed when a friend was flying it. After that, Dan built a Lancair 320—his fifth homebuilt. Witnesses report that Garn's Lancair was banking sharply when it ran into a Cessna 150 in midair, killing Garn as well as the instructor and student in the 150. Early reports indicate that Garn was apparently lost and was talking to the tower of a nearby airport while he was entering the pattern at Chino.

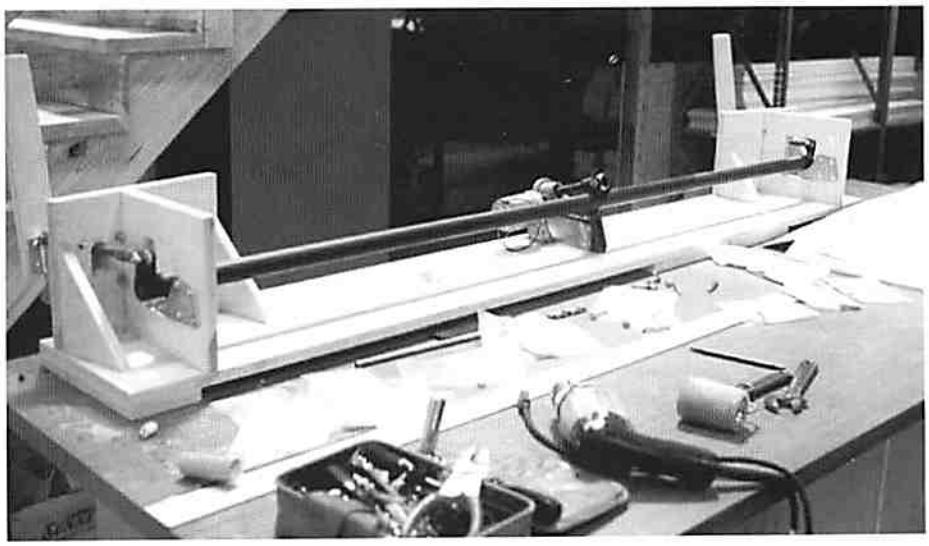
How is the Falco like a Cessna 172? When he was working on the *Aviation Consumer* piece "Homebuilt Stability Woes", Dave Noland mentioned that he had used Dave Thurston's tail power formula to calculate the tail power of a number of kitplanes. Thurston suggests a value of .55 as a minimum. The Lancair came in at .51, while the Venture and Cessna 172 both have a tail power value of .62. We were curious what the Falco might be, and after some figuring, I came up with the following values for the Falco: 107.5 square feet of wing area, 24.5554 square feet of horizontal tail area, wing mean aerodynamic chord of 4.3471 feet, and a tail arm of 11.7987 feet. All that calculates out to a tail power value for the Falco of .62—just like a Cessna 172.

We now have an almost silly number of Falco builders who are 'almost ready to fly'. John Shipler is just a week or so away from flying. Stuart Gane's Falco is now at the airport, and the other day Stuart started the engine for the first time. Alan Hall's Falco has already completed high-speed taxi tests, however Mrs. Hall is very ill and this takes up most of Alan's time right now. Dick Reichenbach has his Falco at the airport and talks of flying in the next few weeks. And the other day, Cecil Rives carted his Falco out to the airport. Conceivably, we could have five new Falcos flying in the next three months.

Francis Dahlman always said he felt sorry for whoever takes over the Falco wood kits. I've thought of this comment many times as I've worked on the jigs for the fuselage frames. It's a big job, and we're now finally starting the laminating process for the frames, and it is going well. We have about seven of the laminating jigs finished, and four more are only a couple of days from being finished.

Lemme tell you something: you know you've reached The Big Time when a partial order of laminating strips is $11,000 and when you have to order $3,000 of resorcinol glue. What we'll be doing is laying up all of the laminations and gluing these up into huge C-shaped slabs that we can cut into five, six, or sometimes ten aircraft parts. The real work is in spreading the glue.





Top: The first of the fuselage frame laminations.
Above: The flap control system test rig.

We're also starting work on another batch of tail group ribs and should have a student on summer vacation in here shortly banging out those parts.

Again, I apologize for the delay on the fuselage frames. I want to make sure the jigs are properly made and designed, and this always takes time. When will the first frames be ready? I don't know yet, and I'm always reluctant to even make a guess. I've learned that in the past, whenever I attempted to guess at a delivery date, I have never *once* been right, so I have given up estimating things.

In May, Steve Bachnak became the latest to take the Big Slide. He's not sure exactly what happened, but he thinks the circuit breaker popped on gear extension. He landed the plane with the gear half-way down. Normally he checks the gear on landing, but says on this occasion he had a "brain cramp" and forgot.

The Falco first flew in 1955, so in 1995 the Falco will officially be 40 years old. We're planning a big blowout at Oshkosh that year. We'll have a booth that year, and we hope to have Stelio Frati, Dave Thurston and all Falcos in the U.S. there. West Coast Falco Fly-In organizers are requested—Brenda says "ordered"—to skip it for one year and to show up at Oshkosh instead.

By that time, we ought to have about sixty Falcos flying, and I hope to get many of the SF.260 pilots there as well—if only so we can ogle their women. So, if you're one of those who makes plans well in advance, put down Oshkosh '95 and the Falco Fortieth Celebration on your calendar.

—*Alfred Scott*

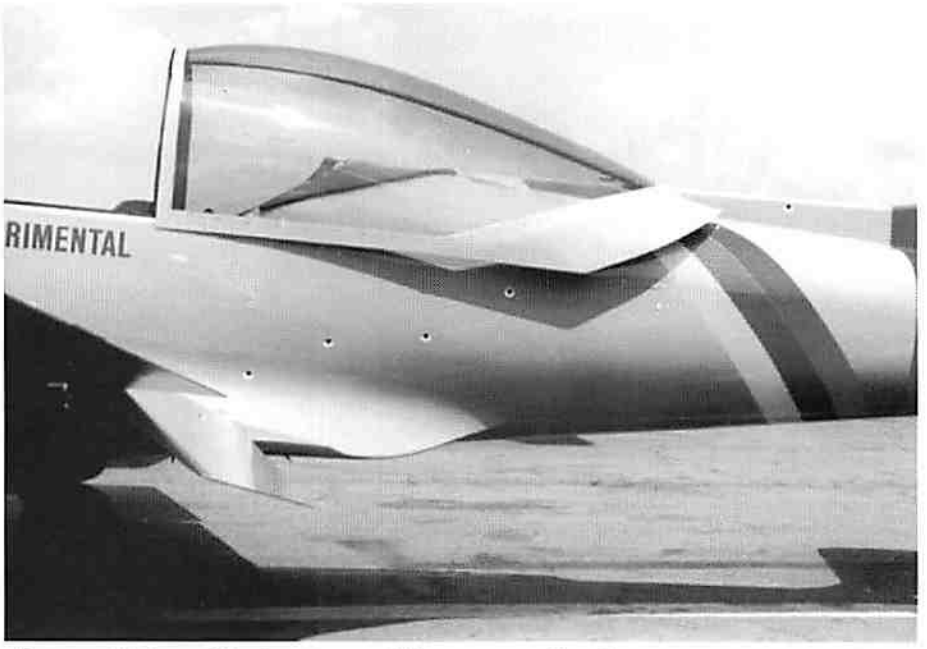
Sawdust

• Kas is Back. Kas Thomas began life playing with roller tappets and nursing the sparkplug of a radial engine jug so he thinks his mother is a Pratt & Whitney R-985. He subsequently became aviation's funniest, most outrageous and most capable hardware technophile, started *Light Plane Maintenance* and edited it for years. Burned out, he took a sabbatical but now he's back in town with his keyboard a-blazing. First there's a book, *Fly the Engine* is a 224-page book on the who-what-when-where-and-how's of operating aircraft engines. He's also got a newsletter, *TBO Advisor*, which is entirely devoted to engines and their care and feeding. *Fly the Engine* is $29.95 plus shipping and *TBO Advisor* is $45 a year for six issues. You might as well order both from TBO Advisor, Box 625, Old Greenwich, CT 06870—telephone (203) 967-8260 or (800) 484-1027, ext 3752.

• Sacramento Sky Ranch's John Schwaner was separated at birth from Kas (an overhauler 'parted out' the engine and babies) and he too continues to pump out books on engines. Many of you have already read his *Sky Ranch Engineering Manual* which is still available for $19.95. Now there's a new book *The Magneto Ignition System*, which just possibly may tell you more than you wanted to know, but it's only $10.95. Order either or both from Sacramento Sky Ranch, Box 22610, Sacramento, CA 95822—telephone (916) 421-7672 or (800) 433-3564.

• Hedge Darter. If God had meant milking stools to fly, after flying a Venture God would change His mind. A friend of mine recently took a ride in a Questair Venture and the owner reported that of 21 flying, 20 have encountered difficulties on the runway and have suffered sheet metal damage.

• Truth in Advertising. The recent brouhaha on kitplane stability problems got some of us a-thinking of advertising headlines for the kitplanes of the future that might have just a few design problems. Here are a few samples: "Instability by Design", "The Relentless Pursuit of Mediocrity", "We Never Said It Would Fly", "Cheap Airplanes for Cheap Lives", "Bite the Dust in Our New CloudDuster", "More than 98% of Our Kits Sold in the Last 10 Years Are Still in the Shop", "It Just Feels Wrong", "Just for the Kill of It", "We Bring Bad Things to Flight", "Quality is Job 15", "The Other White Airplane", "This Dud's for You", "The Great White Dope", and "We Fly Harder".



Above and below: It's always a good idea to remember that not everyone appreciates low-flying aircraft.

• The GPS revolution continues to roll at an astonishing rate. It was only two years ago that Sony introduced their portable no-database GPS. A year later, three companies were selling portables with full airport and VOR databases. Now Garmin is introducing their GPS 55 AVD, which has both a Jeppesen database and a moving map display—all in a single calculator-like portable.

• CAD/CAM Cam Fandango. Pity the owners of freshly overhauled parallel-valve Lycomings (320 and 180 hp 360 series) who are flying with Superior P/N SL18840 cams. They're flying with cams that open and close all valves six degrees late, which isn't going to help the power. Superior admits the mistake but hasn't recalled them because the engine power is still within the factory tolerance. How did it happen? Best guess is that it's a drafting error on the CAD system. Because the cam turns at twice crankshaft speed, it's only a three-degree error at the lobe. The first lobe is at 1-1/2 degrees and then all other lobes are dimensioned from it. Thus, it looks like the CAD operator entered the first lobe in the wrong direction, thus creating a three-degree lobe error. Appropriately, it was Lycoming's redfaced Mr. Boob who reported the lobe error.

• It can happen to anybody. Considering doing your own first flight, despite warnings and advice to get an experienced pilot? Wolfgang Herbst was the director of advanced design and technology of the Military Aircraft Division of MBB in Munich. Prior to that, he was a senior group engineer on the F-15 program for McDonnell Douglas, and also manager of V/STOL programs with VFW Co. in Bremen, Germany. The author of numerous technical articles and papers dealing with preliminary aircraft design, aerodynamics and maneuverability, Herbst died while flight testing his homebuilt replica of the FW-190 WWII fighter.

• Leaving on good terms. Michael Maya Charles, longtime contributing writer to *Flying*, recently put out a *press release* that he was resigning from the magazine.

• Is nothing sacred? Fie upon Robert Hughes, reed and bagpiper maker in Newry, Northern Ireland, and his helper Roy Crawford, an engineer at Queen's University in Belfast. Lignocellulosiphiles will be distraut to hear that Hughes and Crawford are developing a bagpipe reed made of polycarbonate. "Reed making hasn't changed at all in the last 500 years", says Hughes, who's also working on plastic reeds for the Irish uilleann pipes and other woodwind instruments such as the saxophone. What's next—composite cellos, fiberglass banjos, ceramic violins, and acrylic pianos?

Mailbox

It has been a while since many of you have heard from me so I thought I'd send a note to get everyone up-to-date on my pretty little lady. For those of you who were at Coeur d'Alene last September and (quite appropriately) gave me a real ration of doo-doo for flying in on Delta instead of N132FL, I have some news.

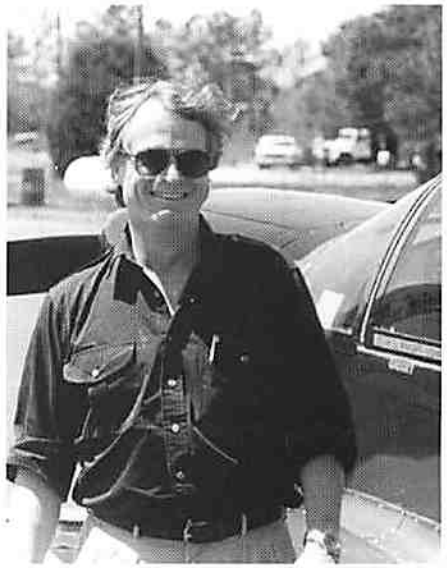
For those of you who are fairly new to the Falco (that is, less than 7 years or so), I guess some introductions are in order. My plane was the third to fly and is a plans/kit hybrid. It has some of the earlier kits that Sequoia produced, but because many of the kits were not available at the time, I did a fair amount of now-how-in-the-heck-am-I-going-to-do-this scratching of my head. Sequoia and Dave Aronson collaborated on developing most of the kits while I kind of chugged along on my own.

Because of my pending Air Force transfer, I had to get the girl in the air as soon as possible. When I first flew it, my bird was perhaps only 80% complete. And after it was flying, I found it difficult to ever sit down and finish it. My wife and I had three production runs of our own to take up my time, not to mention the fact that the Air Force and now Delta had their turns at shipping me all across the country. To make a long story short, eight years after my first flight, I'm finally going to finish this hummer.

I've been planning this for a couple of years and started the rework about six months ago with the hope that I would get done by the next west coast get-together. The list seems endless. Among the things I had to look forward to was building seat tracks, installing interior and exterior lights, gear doors, fairings, carb and cabin heat, the gear electrical system, fixing the vexing brake line problem (which also caused me to have to repair a ding in the leading edge of my wing), fabricating and installing the nose gear bay cover and all the center console items, installing a transponder and several new instruments, repainting the instrument panel, replacing the flooring forward of frame 4 due to avgas damage, gap seals everywhere, repainting the old girl, and probably a dozen other things that slip my mind at the time. (How was that for a run-on sentence?)

So what did I find when I tore this rascal apart? There were only three surprises that I was not happy to have, but I guess I should be thankful that I discovered these problems. The first surprise was not a surprise in the sense that I knew it was a problem before I started the rework. It was a surprise in that I never expected or considered it to be a problem when I built her.

Lu Matthews, the designer of the Falco paint schemes has struck again. Here's a unabashed copy of a Mk 24 Spitfire paint scheme applied to Bill Knight's SF.260. Below: The crazyman himself, Bill Knight.



It started during construction. Like most of you, I used staples for applying gluing pressure, which is what you are supposed to do. However, when I sealed the wood with an epoxy sheathing resin (L-26), I assumed the structure was now impervious to all forms of attack from bugs, weather, oil and grease.

What happened later was that I had a very slight weeping leak from the gas line fitting that went into the forward tank. This leak ate up my unpainted epoxy fiberglass nose gear bay cover and then migrated down to

Two German Falcos. Top: Klaus Lässing and his Series III Falco. Above: Herbert Müller and friends rebuilt this production Falco from a total wreck. The canopy is from a German motorglider.

the floor between frame 2 and 4, where it got into the wood via the end grain of the plywood, via staple holes which I thought were sealed, and via the screw holes that resulted from the installation of the various center console items. I have since replaced all this flooring. One soothing fact was that the wood and glue joints still seemed relatively strong.

So what can you do to avoid this happening? Fill all nail or staple holes with a filler before sealing. This will give you less end grain that might be exposed to something like a fuel leak. Possibly use a light hobby-type fiberglass with your sealer to insure proper coverage. Make sure all epoxy fiberglass parts are primed and painted before exposure to hydrocarbons.

My other two surprises were major, but easy to fix. Upon removing my prop and checking it for cracks, I turned my attention to the spinner and found numerous cracks in the bulkhead. I hate to even consider what would have happened if it would have separated during flight. I bought this spinner about 10 years ago from Wag Aero. It is not the type most of you have installed on your Falcos. During my flight test program, I did numerous spins and tested the airframe out to 6.5 g's. The airframe handles the stress great, but the spinner did not. It was probably a utility-type spinner and not designed for acro. Regardless, it is now no longer in service.

The last surprise was in the form of a small hole that had nearly worn through my front fuel tank caused by a bolt on the firewall that was rubbing the tank during flight. What caused this problem? The tank wall protruded out about 3mm and my front wood spacers that keep the tank separated from the firewall were, by necessity, a couple of millimeters thinner than designed. The solution was to shorten the bolt, and I also switched to screws where feasible.

So what have I got left to do? The gear doors are the biggest item. I would also like to redo my wing fairings and then repaint the little lady. Oh, and let's not forget redoing the interior. Am I going to make the fly-in? Who knows but, if I don't, it won't be for lack of effort.

Jim Shaw
Flower Mound, Texas

For anyone considering—as I was—installing a Stormscope in a Falco, it probably can't be done. I had the airplane skin-mapped, and there's far too much noise—electrical energy—for the Stormscope antenna to be installed anywhere in or on the fuselage, even at the extreme tail. This is not surprising, for Stormscope dealers are warned that trying to install a Stormscope in anything like a Bellanca probably will be impossible.

The problem seems to be that the Falco's relatively long battery cable radiates a lot of electrical noise, particularly when the engine is running. It's an excellent transmission antenna.

The one place we found that *might* accept installation of a Stormscope antenna was the wingtips, which seem electrically quite quiet. (I should point out, though, that we tested it only with the engine at idle. It's possible that there is noise with the engine running at cruise power.) Naturally, a wingtip installation—or any other installation—would require that the strobes be off if you're using the Stormscope, but that shouldn't be a problem: if you're IFR and worried about embedded cells, you wouldn't need the strobes anyway.

Therefore, anybody who is considering even attempting a Stormscope installation should at least string a Stormscope antenna cable inside the wing during the building process. It could turn out to be pointless, at which time you can pull it out and throw it away. But there's no way to fish that cable through the same neoprene tubing, post-building, that the strobe and nav light wires run through; the Stormscope cable is pretty fat—somewhat fatter than the strobe cable.

For sale: Electric Gyro Corp. electric turn coordinator, complete with the necessary Cannon-type plug for installation. I bought it a year ago for $298 plus shipping from Aircraft Spruce, overhauled and yellow-tagged, and will sell it for $200, UPS prepaid shipping with the paperwork. It has maybe 75 hours on it, works just fine, and was removed only because I've installed a Century I autopilot, which of course has its own turn-and-bank. If you're interested, call me at (914) 534-7601 or fax (914) 534-5101.

I'm trying to get the airplane IFR-legal, rather than continuing to simply *fly* IFR, and I've having a terrible time getting the static system tight enough to pass the 24-month pitot-static check. The pitot system seems fine—leakage is within limits—but the static-system plumbing is way out of limits. Could you mention in the Builder Letter that I'm having this problem and would love to hear from anyone who has gone through the same procedure and found a weak point?

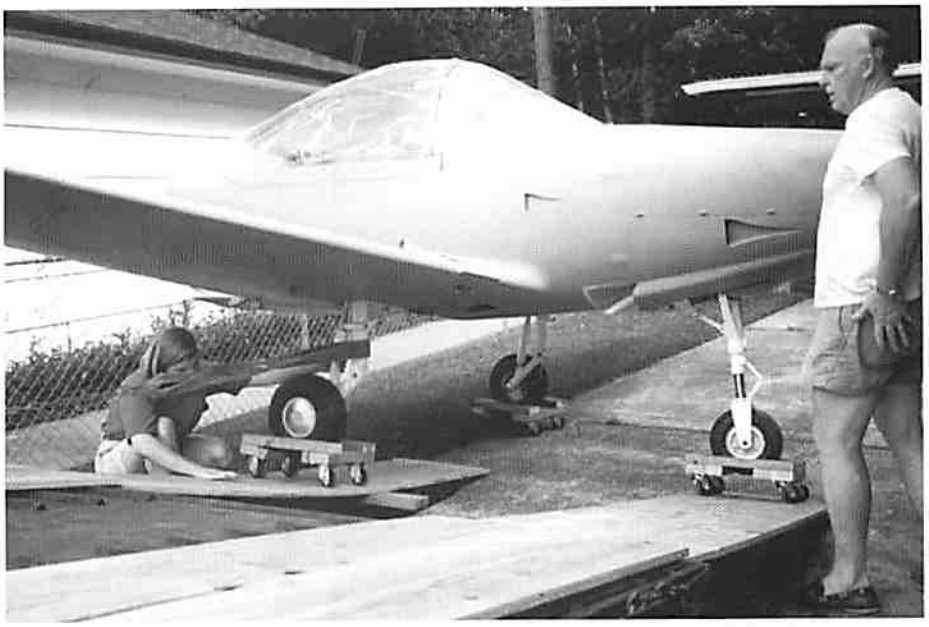
Steve Wilkinson
Cornwall-on-Hudson, New York

Stuart Gane and Charles Wagner had their airspeed indicators checked recently and found that in addition to both reading low, they also had a leak in the case (which may have accounted for the low reading). The leaks were in the seal with the glass, possibly created when the custom-screened dial was put in.—Alfred Scott

Time is running fast, and it is logical that I have to think about the new destination of my beautiful ERNA. As I explained to you some time ago, I don't fly ERNA too much, but enough to give me the joy of flying the fastest Falco in the world (this is my convinced opinion!). New Zealand is not the right country to sell an aircraft like the Falco, and I want to give ERNA to people who can fly, race and enjoy the use of this little jewel.

I am not in a hurry for a sale; plenty of time, but I have to think about the day in which I have to say goodbye to ERNA. I think that the States is the best place in the world for ERNA, now that in Italy it is not easy to have a plane, for the very hard restrictions that are applied to general aviation.

If you hear of somebody interested to buy ERNA, give me a call. ERNA is 37 years old, has 1300 hours overall, and only 300 hours after the major inspection. ERNA is really in very good condition. It flies very well, and is very fast, but ERNA is a very loud aircraft and somewhat spartan. I



Cecil Rives moves his Falco to the airport. Soon Houston will no longer be a safe place to live.

know that I have to consider that a new owner has to plan some little jobs to update it and give to it new interiors.

I appreciate very much the idea of the translation of Frati's *L'Aliante*; this book was my first manual to understand the theory of flight. It is so simple and clear that everything is easy to learn.

Luciano Nustrini
Auckland
New Zealand

I thought your piece about the so-called simplified certification scheme and the real costs of producing a fully engineered design was excellent. I am constantly pushing budding homebuilt designers towards designing in accordance with a design code (usually JAR-VLA) not because we need to certify a homebuilt to fly it, but because the design code represents our accumulated knowledge about what is necessary to produce a safe aeroplane.

F. R. Donaldson
Chief Engineer
Popular Flying Association
Shoreham-by-Sea
England

Al Aitken's "Technical Report" on the Sequoia 300 is valuable in a number of ways. You are brave to share it so widely, since some of the critical comments obviously can be misconstrued and misused. (Is it all just an Alfred Scott plot to position heads of homebuilt boutiques for your scathing responses?) It should serve as a format for third-part evaluation and reporting. A good gauntlet, it is.

Interesting that EAA is working with Brien Seeley to a similar end (one hopes). Would successful pursuit of standards and standardization of evaluation mean an end to *Sport Aviation* running breathless reports on designs and revivals conducted and written by people with a vested interest—or their PR/advertising counsel?

Keep up the good work and continue to stir the pot. Few seem committed to search for truth these days. Hope to see you at OSH.

Edward G. Tripp
Cedar Rapids, Iowa

No plot or hidden agenda. I had planned to publish Al Aitken's report even before I saw it. In fact, until I saw the size of the report, I had planned to publish it in the Falco Builders Letter.—Scott

This will be a preliminary report on the 1993 Falco West Coast Fly-In scheduled for September 10-12. Ray and Sherry Purkiser came down earlier this year, and we bounced around some ideas. Mainly Shirley and I have been researching ideas and things to do for the guys and gals in case that there is a difference in what they want to to.

We finally picked Auburn Airport, just east of Sacramento, for many reasons that I won't go into now, but they are very cooperative and have two restaurants on the field that would like some action. The airport manager says that they will move airplanes so we can all be together. Auburn is in the heart of the gold country, and there are lots of interesting things to do. I brought up the Fly-In at an EAA meeting, and they indicated an interest in helping us out. They just finished a new hangar, and I expect we'll have our informal activities there Friday night.

We have picked the Auburn Inn for a staying place. It is close, quite nice, has a pool and Jacuzzi, and an adequate meeting room. We have reserved a block of 30 rooms in the name of "Falco Experimental Aircraft Builders Group". When you call in for a reservation, mention that you are with the Falco Group. I am sure that we can get more rooms if needed at that time of the year.

I will be communicating with John, Jim, Ray and others to firm up an activities schedule. We have a confirmation from Tim Shaw, an SR-71 Blackbird pilot, for a slide show presentation for the banquet evening.

Karl Hansen
Roseville
California