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Dear Falco Builders:

Oshkosh 83 has now come and gone. We had an instrument panel display in our booth, and it was the first time any of our builders had been able to see the completed panel. The panel display was clearly the star of our booth, and we had people poking at it almost continuously. I was interested in the comments of our builders and of the many spectators who wander through the booth. The typical reaction was that it was one of the best instrument panels anyone had seen in a light aircraft. Prehaps I'm prejudiced, but I took a look at the mockup of the $260,000.00 Piper Malibu, and I didn't think its instrument panel came close to the quality and design of our panel. It is particularly instructive to look at the back of our panel to see the placement of hoses, fittings, wires and all of the things that must be installed. We have enclosed a photo of the instrument panel at the end of this builders letter.

I only received one criticism of the instrument panel, and this was expected. Military pilots and airline pilots are not used to indicator lights used with switches. On military aircraft, a yellow light means that you have a serious problem, and a red light means that you should eject immediately. When we decided to use the indicator lights, we realized that this would be questioned by such pilots, but I feel the use of the lights is preferable. For one thing, all of the warning lights are located in the upper center of the instrument panel, in what we call our annunciator panel. Secondly, we see a virtue in having indicator lights to tell you that various switches are on. I have always flown in an airplane which had such indicator lights, and I have found them very helpful. The indicator lights show up nicely in daylight, but at night they are a little too bright. We looked into the possibility of putting them all on dimmers and decided against it. This is a very complicated thing to accomplish. The solution that I propose is to use what I am calling "nightcaps". These would be a plastic cap that would be pushed over the lights. The simplest thing I can think of is to cut short lengths of 3/8" nylon tubing, dye them black with "Rit" fabric dye and slip them over the lights when the sun goes down. These are easy to make, and you can easily keep a bunch of them in the side pocket. I am sure that there is some common every-day plastic thing (pencil eraser, bottle cap, or the like) that we routinely throw in the trash that would be ideal for the nightcaps. I keep hoping that someone will stumble over the simplest thing. It should be black, with a 1/4" ID and about 3/8" long.

We also had some airbrush renderings of our paint schemes in the booth, which were also well-received. Many builders asked if we would have copies of these renderings available. We don't plan to do this, but we are thinking of changing our advertisements to include the instrument panel and one of the paint schemes. We will also be including the paint schemes in future versions of our Falco brochure. This may be six to nine months away.

Dave Aronson had a number of photographs of his Falco project. At this time the airplane is completely painted with our "Venezia" paint scheme. The upholstery is installed, and it is spectacular. The instrument panel, left hand throttle, center console and throttle quadrant are installed. Of course, the fuel tanks, windshield and canopy are all installed. The engine is hung, and the aircraft is sitting on the gear. The exhaust system is installed. Dave is now installing the electrical system. It was particularly interesting to see how crisp and sharp the airplane looked with its paint scheme, Nustrini canopy and interior. During the construction process you become used to the appearance of the spruce and birch plywood, and it is quite a shock to see it gleaming. It is quite evident that this is going to be a spectacular aircraft, and it fully lives up the the Ferrari image we are striving for. So far I have only seen photographs of the Falco, but John Holm, a friend and helper of Dave's, had a number of interesting comments. John is one of the judges at Oshkosh who selects the various grand champions. John commented that Dave's Falco would have been Oshkosh grand champion this year and would have beaten the yellow Mustang II of two years ago, but would not have beaten the Marquart Charger that won last year. Dave is not actually trying to build a show plane -- he certainly would not mind the honor -- but he is just trying to build a nice airplane for himself.

I have only two minor criticisms of Dave's Falco, which I'll pass on in the hope that other builders will avoid this same thing. The upholstery shop made some changes in the seat back cushion, bringing it all the way down to the bottom cushion. The shape of the cushion was changed slightly. While the seat is very comfortable to sit in, the lumbar support of the original cushion is no longer provided. What you want is for the cushion to support you in the small of your back, maintaining the curvature of the spine just above the pelvic bone. If this support is not provided, you can expect to have a sore back after several hours in the airplane.

The second point is entirely one of styling, but one that I think will make a real difference. Without the airbrush renderings of the paint schemes, it is difficult to understand the point of my argument. When you install the skirt fairing and paint around the windshield and canopy -- particularly with the Nustrini canopy -- it is important to follow the lines that are shown on the paint scheme drawing. At Oshkosh 82, we had some preliminary paint schemes displayed, and the trim line between the canopy and the skirt fairing was curved. Dave used this as a guide, and he also has a radius at the bottom sides of the windshield; that is, at the intersection of the front of the windshield bow and the combing. These things might sound like small things to be worrying about, but the difference in the

appearance is substantial. It is not the sort of detail you would ever notice, but one looks just right, and the other doesn't quite click. From a stylist's point of view, the Falco has a lot of "hard" lines -- the profile of the wing and tail surfaces and those formed by the windshield and canopy. The hard lines in the windshield and canopy are what give the airplane that "Frati" look, and if anything, the Falco with our Nustrini canopy has more of a "Frati" look than anything Mr. Frati designed. Dumb luck -- but it works!

Falco builder Nick Tramontano flew a Flying Tigers DC8 to Oshkosh. This made for a rather unusual display, and Nick gave everyone a spectacular departure. Don't look for a repeat of this performance since Nick said he ended up having to spend most of his time giving people a tour of his airplane and couldn't find the time to see the show.

The Italian SF.260 team put on a very exciting airshow. Unfortunately, they only performed on the last two days. They like to do their show right down on the deck, but the FAA had told them to stay above 200 feet. At a previous show in Chicago, the team apparently did as they pleased. As I understand it, the FAA grounded them and finally let them fly again after the intercession of the Italian ambassador. The show consisted of a solo routine by one SF.260 and then a formation show with six aircraft. On the last day of the show, the solo pilot crashed and has since died. The pilot, Floro Finistauri, was a 4500 hour SIAI Marchetti test pilot. It will probably never be known what went wrong. It appears that he started the entire routine low and just ran out of altitude. Toward the end of the routine, he performed a two turn spin, recovered nicely, and was picking up airspeed in a 30 degree dive when he hit the ground. Just before hitting, he picked the nose up, but it was too late, and he hit the ground violently in a level attitude. The impact shattered his spine, and he received massive brain damage. He never regained conciousness. Had he lived, he would have been completely paralized, and there is some question what sort of mental facilities he would have had, so in some ways his death was the lesser of two evils.

The Falco builders dinner was held in the usual place. Joachim Ramthun, from Germany, was there. For those that do not know him, Joachim likes Falcos! He now owns his third Falco in addition to the one he is building, and he has owned an SF.260. Joachim colorfully described what would happen to him when he sold a Falco. Within a month, he would start to feel "bad in the stomach", then after months of flying Cessnas and Pipers, he said he felt "like dying" and would finally buy another Falco. Interestingly, Joachim says he prefers the Falco to the SF.260, particularly for acrobatics, since the Falco is lighter on the stick and has a faster rate of roll.

Enzo Marucci, from Rome, was also at the builders dinner. Enzo is secretary of the Falco Club in Italy, and he owns a Falco, a Rondone, a Partenavia twin and two other aircraft. Last summer, Enzo came through Richmond, and I took him for a ride in my Falco. After the flight, Enzo told me that "your Falco is the most ugly Falco I have ever seen"! We were also honored to have Dave Thurston come to our dinner.

While at Oshkosh, I had a chance to talk to Jim Weir of RST. A number of builders continue to ask me about the effect of silver dope on the internal antennas. This is discussed in the installation instructions, but builders continue to question the statement that the silver dope has no effect. I mentioned this to Jim and asked him if he was sure of this, and he said he was. The antennas have been used under silver dope on the Bellanca Viking and on a Beech Staggerwing. Larry Wohlers had reported that the metallic enamel used on his Falco hurt the performance of the antenna, and Jim said that may well be the case. His experience has only been with the silver dope commonly used as a filler and ultraviolet barrier. If you don't care to believe this, then we suggest you do not use silver dope at all and cover the airplane with a light weight fiberglass cloth (2 oz) and use the UV barrier paints being used on composite homebuilts.

I also mentioned to Jim that some of our builders had indicated an interest in installing a Loran C navigation radio and were wondering on how to install the antennas internally. Jim said that he is working on this and expects to have the answer in about a year. He already has an antenna designed and installed in an airplane, and it has problems which he does not yet understand. The good news for all of you is that the antenna will be nothing more than a length of wire installed in the bottom of the fuselage, so it can be installed into a finished airplane without any difficulty. Its placement near other metal objects is not critical, and the primary problems appear to be working out the correct length of the wire.

For those of you who have not seen it, there is an excellent article in the September issue of the AOPA Pilot on the SF.260. The SF.260 has the same wing design as the Falco, and the handling is nearly identical as a result. The internal structure is, of course, quite different, and the ailerons on the Falco are one station longer than those of the SF.260. The SF.260 also has fuel tanks in wing tanks as well as tip tanks. It is this extra weight in the wings plus the smaller ailerons of the SF.260 that gives the Falco the edge in the rate of roll. The controls of the SF.260 have a slightly heavier feel than the Falco, but otherwise the aircraft are nearly identical to fly. The heavier wing loading of the SF.260 gives it a smoother ride in turbulence, but the stall has a bigger bite to it. This said, the Falco and the SF.260 are still the two best handling light aircraft ever built, and the differences between them are very minor.

The U.S. representative for the SF.260 is Frank Strickler, and Frank and I are working together to form a loose association of the owners of the Falco and SF.260. The idea of this "International Frati Association", "Frati Fliers", or what-have-you is to get the owners of these aircraft together, if only to look down our noses at other aircraft! The first of these gatherings will be at the annual "World's Only Oyster Fly-in" that we have in November. We have included an invitation with this builder letter, and you are all welcome at this "event". We have about 30 aircraft each year, and I hope that we can get a few SF.260s there as well. Eventually, I hope that we might have a few races as well. Both the Falco and the SF.260 qualify in the FAI recognized "Falco Class" and the aircraft are handicapped according to

engine size, propellers, wheel well doors, etc. It is a small beginning, but it should lead to some fun and fellowship over time.

Weather permitting, I plan to take the Falco to the EAA Mid Eastern Regional Fly In at the Martin Airport in Baltimore, Maryland, on September 17. I am scheduled for a forum at 3:00 PM and plan to spend the rest of the day with the Falco. If you have never seen our "most ugly Falco", please plan to come to the show. I will be giving rides, so let me know if I can expect you. Note, I will only be there on Saturday.

Now for some construction details. We now have the plexiglass wing tip lights in stock. These are $32.00 each, and we would suggest that you get them when you are making your wing tip for the best fit. The enclosed revision supplement shows the installation of the tip lights. Eventually, we plan to have a kit which will include the tip lights, wing root fairings, hinge fairings, and gear doors. This kit will take some time to put together as we are working on more important engine installation details at this time.

Dave Aronson is now installing the electrical system in his Falco. Dave is working very slowly and double-checking our installation manual for errors (which have been only a few minor ones). This is the first electrical work Dave has done, and he says that the job is going reasonably smoothly. Dave does have a few observations to pass on. His rudder pedals are installed as are his fuel tanks, and he would prefer to install the heavy battery wires very early in construction. He has found it no particular fun to be climbing down under the front tank and installing clamps for the larger wires behind the rudder pedals. He also offers the observation that it would be ideal if you had larger openings in the main wing spar for the wiring (Dave suggests 1½" dia) and if a short length of plastic tubing were installed through the spar so that you could push wires through and know that they were protected from abrasion. The installation of the heavy wires has been the only unpleasant and difficult task, and he has found the wiring of the instrument panel to be a very pleasant and interesting job. Before we shipped the electrical system kit, I spent two weeks to write an 80 page installation manual. The manual leads you through the installation of each and every wire, telling you when to hook up everything. This is very important and greatly simplifies the task. Included in the manual is a 12 page wire tabulation, which is an index to the electrical drawings. This gives you the details for each wire, where each end is terminated, the terminal number, the length, the color, specification, gauge, etc.

A number of builders have questioned the bolt lengths used in the tail group kit. Recently, on the prompting of a builder, I re-checked the bolt lengths for the tail group. I found that only one bolt was too long (see enclosed revision supplement), and we will be correcting this in the kits. I find that many builders are not aware of how the bolt lengths should be selected. Aircraft bolts are made in 1/8" increments, and it is important that the shank (unthreaded portion) of the bolt extend to the upper surface of the fitting. Said another way, you do not want threads in bearing. For most installations, you

have a choice of a bolt that will be slightly too short and one that will be slightly too long. A decision must be made as to which bolt is the best solution. If a bolt is slightly too long, then you have two choices: add a shim under the bolt head (or channel-nut) or add washers. We prefer to see a plywood shim added under the channel-nut, and the enclosed revisions for A11 and A13 are to clear up some of the confusion and to make the bolts come out right.

A number of builders have asked whether it is better to build the Falco wing first, or to build the wing and fuselage together. In production, the wing and fuselage were always built together. A number of builders have built the wing first, and I am coming to the conclusion that this is the quickest way to go. John Harns, Joel Shankle and Jim DeAngelo have all done this with success.

With the tail surfaces, it is quite easy to mark the centerlines of the ribs and spars. Then, when the ribs are glued to the spars, it is a simple matter to align the ribs, and a string may be used to align the leading edges. A similar method is used to align the fuselage frames, using the aircraft centerline and water line 0.

A more difficult situation is presented by the wing, which is twisted, and each rib has a different angle of incidence. It is also important to be able to locate a rib accurately on the spar. The method used by most builders is to use the chord line of each rib. Take a look at sheet B17. The chord line for station 1 and 14 are shown. Below the rib contours are horizontal lines for the wing reference plane. The wing reference plane is parallel with the water line of the aircraft. Thus, if the wing is to be built so that the leading edge is up or down, then the wing reference plane will be exactly vertical, and it can be accurately determined with a plumb line. Before the wing is assembled you should mark the twisted chordal plane on the forward and aft faces of the main wing spar. The first step is to locate the chordal plane at station 1 and 14. The spar is rectangular in cross section when it is first made, and it will be shaped to match the airfoil shape. The starting place should be the upper aft edge of the spar (which is the only edge which is not trimmed.) Measure down to the chord line on the aft face at station 1 and 14. Use a long straight edge to connect these two points. You now have the chordal plane marked on the aft face. Now, use a square and locate the chordal plane on the forward face of the spar at station 1 and 14. (To do this you will have to take the measurements off of sheet B17, but note that you are measuring down from the same elevation as the upper aft face, which is higher than the airfoil contour at the forward face of the spar.) Use a long straight edge to locate the chordal plane on the forward face of the spar.

Place the ribs on the drawing and mark the chord line of each rib. Note that only the chord lines of station 1 and 14 are shown on the drawing. If your ribs are all made in one piece, an easier method is to place the ribs on sheet B17 and locate the exact position of the chord at the leading and trailing edge, and then connect these points with a straight edge.

Now, you may place the ribs on the spar and mark off the dimensions of the spar for final shaping. Most builders will not have the courage initially to start planing on their spar, but you can double check the dimensions against sheet B17 and then rough-trim the spar to within 2mm or so.

Next, you should make a template of the airfoil contour at station 1 and 14. This template should be a rectangular piece of plywood, with the rectangle's sides parallel to the wing reference plane. This is very important, since you will be aligning these sides with a plumb line to get the correct angle of incidence.

The wing is assembled vertically, with the leading edge up and later with the trailing edge up. The spar is levelled, and a string is used to determine the leading and trailing edge of the wing. First, some work has to be done to the spars.

The landing gear fittings and aileron bellcrank supports should be installed on the main wing spar. Next, the landing gear fittings should be installed on the forward wing spar. This can be done by fitting the forward fitting inside the aft fitting, as was discussed in a previous builders letter. Note that the top of the main wing spar (in the center of the aircraft) is at W.L. -355, the same water line as the top of the cross member of fuselage frame No. 4. Also, the top of the forward wing spar (in the center of the aircraft) is at W.L. -420, the same as the top of the cross member of fuselage frame No. 3. By locating W.L. -420 on the face of the main wing spar, it is quite easy to accurately position the forward wing spar with it.

Now we come to a difficult decision. It is best to glue frame No. 3 to the forward wing spar and frame No. 4 to the main wing spar at this point. These important glue joints can best be done with all of the parts loose. Also, it is much easier to build the aircraft if you can pre-drill the spars and frames for the various fittings to be installed on them. If you wait until later, you will find yourself trying to drill accurate holes in impossible places where you will require six fingers and an eyeball-on-a-string! The reasons usually given for not doing this at this point in the construction is that the wing assembly will be more difficult to turn over, and that the builder is afraid of getting the fuselage frames out of alignment. I think such fears are unfounded. After the longeron cutouts are made in the two fuselage frames, I would begin by gluing fuselage frame No. 3 to the forward wing spar. Then, glue frame No. 4 to the main wing spar. As you have already marked W.L. -420 on the main wing spar, you will be able to clamp the forward spar and its frame to the main spar. This will allow you to match the centerline and water line of the two frames. Note that you will have to shape the bottom of the main wing spar to the airfoil shape so that it will match the bottom center fuselage longeron (see sheet A8 for a good view).

Next, install the blocks for the control stick supports on the forward wing spars, and drill for these supports and for the pulley brackets. You may also want to install some of the additional wood required for the flooring and fuselage skins at this point (see sheets A28 and C9).

If you have the retraction system equipment, we would suggest you install P/N 520 on the aft face of the main wing spar and complete the installation of the landing gear screwjacks. Also, you may want to install the various pieces of wood needed for the flooring.

Now, level the wing spar, with the forward face up. Install the main landing gear legs and place the forward wing spar in position. The landing gear will actually be part of the wing jig, and this will insure you the best possible landing gear installation. Install the leading edge portions of wing rib No. 4 in place to hold the spars together. You have the choice on rib No. 4 of notching the forward spar into rib No. 4 or of separating this leading edge rib into two pieces.

(This method is the one used by Joel Shankle. The problem here is that you have not yet got your leading edge string in place. The best method would be to use the template for rib No. 14 to locate the leading edge of that rib, then use the template for rib No. 1 to locate the point at which the strings will meet in the center of the aircraft. Prehaps this point can be calculated and located in an additional part of the jig, but I haven't done the work at this point to come up with the correct location.)

Use the template for rib No. 14, and install the No. 14 leading edge rib. Use the template for rib No. 1 and install the No. 1 leading edge rib. Install a string between these two ribs.

Now, the rest of the leading edge ribs may be installed. They should be glued to the spars. You will now have to sand the ribs for the nose capstrip. You will have to clamp a board or sheet of plywood across the ribs to stiffen them and to keep them from racking when you sand. Once they are properly stiffened, the leading edge can be fitted to the ribs and glued in place.

At this point the assembly is turned over so that the trailing edge is up. Level the spar and use the template to install rib No. 14 between the main wing spar and the aft wing spar. Use the template for rib No. 1 to locate the point at the center of the aircraft where the trailing edge of the wing would meet, if extended. This will require that the template for rib No. 14 be clamped in place.

Once this string is installed, the rest of the ribs may be glued to the main wing spar. Begin with rib No. 3 and then install ribs No. 4 through 13, and No. 2½. The ribs for station 1 and 2 cannot be easily installed at this point since they have the cutout for the landing gear and will not support themselves. As with the leading edge ribs, clamp the ribs to keep them from racking, and fit the aft wing spar to the ribs.

Prior to installing the aft wing spar, you should install the hinges on the aft wing spar and the aileron and flap spars, and you should also start the holes for the aileron and flap pushrod. The hole for the aileron pushrod may be cut exactly in accordance with sheet A3, while the hole for the flap pushrod is not yet clearly specified in the drawings, but sheet A4 gives a close approximation of the necessary

hole, which may be opened as necessary with a round file at a later time.

Also before installing the aft wing spar, you will have to make the angled cut on the end for gluing to fuselage frame No. 6. This can be marked with a straight edge or by scribing from frame No. 6. Final fitting can be achieved by sanding the surface after the spars are glued to the ribs.

Install the aft spars in place. True up the surface to be glued to frame No. 6. Install the intermediate rib No. 2. When you do this, it is best to have the flap torque tube to assure a good fit.

Clamp frame No. 6 in place and locate the trailing edge portion of rib No. 1. Install this rib. Install the trailing edge portion of rib No. 2 and 14.

In this sequence, we have glossed over the subject of the ailerons and flaps. It is important that they be constructed at the same time as the wing so that a good fit will result. A number of builder have built the ailerons and flaps on the wing in one piece. This is a good idea up to a point, but we do not think it is a good idea to skin the ailerons and flaps on the wing. All of the builders that have done this have had problems with the trailing edge alignment of the control surfaces. No matter how carefully you clamp the trailing edge in place, the flaps and ailerons seem to get twisted when you glue on the skins. It is far better to glue the bottom skin on the ailerons and flaps, and then place them in a jig as shown in a previous builder letter and glue on the upper skin.

(If you do not believe this, you should talk to Dave Aronson, who curses the ailerons and flaps. He spent a year fooling with them, trying to get them straight. Dave said the elevator and rudder were a snap and that the ailerons and flaps were an absolute horror. On the other hand, Jim DeAngelo used a good jig to hold the ailerons and flaps in proper alignment and said he found the ailerons and flaps to be as easy as the elevator and rudder.)

I should also mention that in an earlier revision, we pointed out that station No. 1 should indicate the centerline of the rib. This is required so that the rib will clear the side load fittings for the main landing gear. Joel Shankle thinks that this should apply only to the leading edge ribs, and that rib No. 1 aft of the main wing spar should be positioned with the inboard face of the rib at station 1. The reason for this is that if the aft portion of the rib is installed so that the centerline of the rib falls at station 1, then the outer ends of fuselage frames No. 5 and 6 must be shortened. I don't know for sure about this, but just fit this rib against the outer ends of fuselage frames No. 5 and 6 and don't worry about it.

Joel plans to fit the upper wing skin, mask and varnish it. Then he plans to skin the bottom of the wing, at least on the outer portions and then mate the wing to the fuselage. He is feeling his way as he goes, but I think this account should give you some ideas. Prior

to doing all of this, Joel had his fuselage in the jig. Joel did not glue frames No. 3 or 4 in place, but he did clamp them to the spars and drilled the holes for the fittings which must be installed.

Since talking to Joel, I've done some thinking about how this idea could be extended further. I think it might be possible to use a sheet of heavy plywood at the centerline of the aircraft. Plywood normally comes in four by eight foot sheets. My idea is to lay out the water line 0, and the fuselage stations No. 3, 4, 5 and 6 on the sheet. I would also draw the chord lines for wing ribs No. 1 and 14 on this sheet. The sheet would have to be cut to allow the various frames and spars to be put in position, and additional braces would have to be installed to hold the frames square to the aircraft centerline. The center sheet would also have a hole for the leading edge and trailing edge string. The wing would be constructed nose up, and it might be possible to do the entire job that way, but if necessary the whole thing could be turned over to put the nose down. Templates for wing station No. 14 would be critical, as they would be attached to the shop floor. This way they would serve to brace the spar in a level postion and would hold the leading and trailing edge string. As fuselage frame No. 6 could be slipped into the center sheet, the aft wing spar could be fitted to it, and the outer end of the aft wing spar could be clamped in place at wing station No. 14 by using a board across the template. A template for wing station No. 1 might still be a good idea for checking, but it might not be absolutely necessary. A great deal of thought is needed for the layout of the center sheet, since you will have to make a number of awkward cutouts to be able to install the frames and spars. This would weaken the center sheet, and it would be necessary to use bolted-on patches over the slots that you must make. I think it might be possible to skin the entire wing in this jig. An additional clever move would be to change the fuselage box-beam jig so that it would slip over the center sheet and be bolted to it. This should be worked out early. Once this is done, then the completed wing and its center sheet could be rotated to a horizontal position and attached to the regular fuselage jig. The center sheet, like the fuselage jig, would have to be sawn apart to remove it from the airframe.

All this will require further thought, but I imagine there are a number of builders who are clever enough to take this idea and run with it. Please let me know if any of you try this, and what improvements you make on it.

If you would like a few additional spacy thoughts to exercise your brain on, you might be interested to know that one of the basic techniques of building a wood aircraft in production is to eliminate the varnishing of the inside of the aircraft. Only after the entire structure is completed is the protective coating applied. The techniques used in production aircraft cannot be directly applied to homebuilt aircraft, but you might get some ideas from knowing how it is done. Bellanca used to dip the entire Viking wing in a vat with a thinned sealer. In looking inside the CAP-10 wing, I would have to say that the entire inside of the wing was spray painted after it was completed. It's easy to see how you can do the fuselage this way, but the wing and tail surfaces don't provide the room. How you can improve

on the method normally used. I can't say, but I do know that if Detroit was building a Falco in automotive-like production lines, they would have the internal sealing operation down to a ten minute automatic procedure.

I don't think that there is any one correct way to build a Falco. The aircraft can be assembled in a number of different sequences. George Neumann built his entire fuselage and then installed the wing into it, and others have done the same thing. It does appear to me that the builders who are doing the wing first and then mating it with the fuselage are making quicker progress. In any case, you should remember that proper alignment and jigging is more important than the sequence in which things are done.

One thing is clear about the Falco. It is getting to be easier to build as time goes on, if only because of the things we have all learned. I find it interesting to compare the progress of Dave Aronson with that of Jim DeAngelo. Dave is one of our early builders, and he has made all of his own wood parts (something he said he would never do again -- he would buy them) except for the wing ribs. Dave has built the entire airplane breathing down my neck for parts. This has created a lot of problems. For example, he had most of the fuselage and wing finished when the flap controls kit arrived, and he found he had to cut part of the wood out to get the thing in. Jim DeAngelo, on the other hand, has built entirely from kits, both for the wood components and for the rest. Jim has had all of the kits in hand early enough in the game so that he can install things when they are most convenient. Even little things like drilling for the fittings early in the construction process and installing the pieces of wood needed for the cockpit flooring and side walls before the fuselage is skinned can make a huge difference in the ease with which the airplane is assembled. None of this in meant to criticize Dave, but rather to point out the importance of building this airplane in a certain way. Dave, for example, used the Christen Eagle method of painting his Falco, following every step to the letter. A good friend of Dave's built an Eagle, and it took 1300 hours to paint the airplane. It took Dave the same 1300 hours to paint the Falco with this method. Dave says he would never use that method again. Jim DeAngelo is nearly as complete as Dave, and he has reached this stage with less than 30% of the time that Dave spent. I'm seeing other builders making the same progress, and I think that in time we will get the time to build the Falco down significantly. In talking to Joel Shankle, Jim DeAngelo, Dave Aronson and many other builders, it is evident that building the Falco is rather simple and straightforward, but that they have also spent a lot of time working out the order in which to do things and how to locate and jig things like the wing. Everyone always says that once they figured out how to do something that they could do the same step over in a fraction of the time, and it will be up to me to get it all down on paper when I'm finished at the drawing board. I am astounded at the progress that John Shipler is making. John has made all of his wood components and now with about 1400 to 1800 hours he has the basic wood structure nearly complete, with the gear, flaps, retraction system, trim tab control and main control system kits installed. What you have to consider is that a lot of builders have spent that much time just to make the basic wood

components. Like other builders, I'd bet that John could do it all again in a fraction of the time.

When someone buys a set of plans for the Falco, the first decision that the builder must make is what to buy and what to build. For years homebuilders have worked alone in their shops building everything. Those who finish airplanes are justly lauded for their efforts, which are more difficult than most understand. For every homebuilt that is finished, there are also somewhere between 6 and 9 that are abandoned. The reasons for this are many. In many cases the builders realize that the aircraft has some design problems, and only learn late in the process that the designer of the airplane is an electrician, dentist, or high school art teacher. I remember getting a call once from a builder who had been working on a fast metal airplane for a year and a half. The original airplane was flying, and he was working to very close tolerances to get his fuselage frames as accurate as possible. Only after lining them all up did he realize that the dimensions were 1½" off. He beat the entire thing to scrap with a monkey wrench.

Another factor is the amount of work involved in building all of the pieces. Most homebuilt aircraft are fairly simple designs, so simple that I can never understand why a grown man would build half the things I see at Oshkosh. Even so, builders have problems making all of the parts and burn out. Think for a minute about how many airplanes you see advertised as "80% complete -- on the gear". The builder is completely burned out and cannot figure out how to do the nickle dime things to finish the plane, such as wiring, engine controls, baffling, exhaust system, induction system, etc.

Of all of the builders that we have (there are now over 300), there are two that I wish that every potential Falco builder would talk to. These are Jim DeAngelo and John Shipler. Jim built an Acroduster II in 18 months working largely from kits. He had to make his own cowling, and said he spent almost as much making that as he did on the rest of the airplane. John Shipler built a Steen Skybolt making all of his own parts. John is the shop foreman at a Datsun dealership in southern California, and he will tell you with a smile on his face that he will be broke when he finishes the Falco, but he is buying all of the kits. When I talk to a builder or potential builder, what I say is always under suspicion since people tend to think I am just trying to sell them something. I asked Jim DeAngelo and John Shipler to write a few notes on their thoughts on the subject of kits versus building everything yourself. Jim is not much of a writer, but John Shipler's letter is in our "Mailbox" section, and I urge you to read it.

I am sometimes amazed to hear seemingly intelligent builders discussing whether they are going to build something according to the plans or whether to build their fuel tanks, canopy frames, or whatever of some different material than that shown on the plans. (Believe it or not, I once had a builder tell me he wanted to use integral fuel tanks in the wings of the Falco, just sealing the wood!) The justification usually is that our parts are either too hard to build or too expensive.

As a case in point, an SF.260 recently had to have the entire canopy replaced. Except for the different latching/lock mechanism, the canopy is nearly identical to that of the Falco. The SF.260 has a jettisonable canopy, and during some maintenance work, the canopy was removed. It was replaced, but the mechanics forgot the replace the pins. The owner was in the process of taking off at night when the canopy departed the airplane. Even though the airplane was only going about 65 knots, the lift generated by the canopy was sufficient to pop the thing clear of the vertical tail. If such lift is generated at that low speed, it may interest you to know that at the Falcos design dive speed, the lift is nearly 13 times greater. Following the flood in the which his Falco was completely under water, Luciano Nustrini test flew his Falco to the design speed (about 10% over red line, or 266 mph). The top of his canopy plexiglass broke in a "U" shaped crack originating at a poorly installed screw (see the photo on the back of our Falco brochure with all the kiddies in the plane).

Now as for cost, it may interest you to know that the replacement of the SF.260 canopy assembly was about $6,000.00. The clear windshield, which is nearly identical to our Nustrini windshield, is a $700.00 item. The canopy plexiglass alone is $3,586.00. Even though the SF.260 is reported to be the most expensive airplane of its class, it is still cheaper than a comparably equipped Bonanza. Prices like this are commonplace in the aircraft industry -- a heated windshield for a Baron is $3,000.00. I know that the Falco kits add up to a fair piece of change -- and I don't defend the prices charged by the industry -- but by comparison our kits are very reasonably priced.

I have been concerned about the modifications that builders keep coming up with, and I have come to the opinion that this is encouraged by our practice of selling parts individually. Also, I have been concerned about the quality of the workmanship in some of the metal parts being produced by some of our builders. The builder's intent is always to make a good part, but from the questions I get I realize that many builders lack the most basic knowledge of the processes involved in machining, welding, plating, heat treating, or the like. All these things have caused me to re-think the way we sell our parts. We originally began by selling only complete kits. I intend to go back to complete kits only. Replacement parts will always be available to kit purchasers, of course, and there will be exceptions made on a case-by-case basis.

I would also like to put in a word for the complete wood kits offered by Trimcraft Aero. When people tell me that they are trying to decide whether to make all of their own wood parts or to buy them complete, I offer the advice that there are only two legitimate reasons for making all of your own wood parts: (1) you don't have the money and (2) you just want to make the parts for the experience. I have a lot of potential builders who tell me they think the wood parts are too much money for the parts, but I have yet to hear that from someone who has actually made the parts, in fact, they always agree with the two reasons listed above. For the record, the builders who are making their own wood parts are averaging between one and two years to make the wood components that they could have purchased from Trimcraft. It appears

that when you make your own wood parts, you are saving about $1.00 for every hour you spend making the parts. Tony Bingelis spent about 550 hours making his wing ribs working from planks of wood. Other builders have reported that it took between 250 to 300 hours to make the wing ribs working from wood-to-size kits. None of these parts are difficult to make, but they involve a lot of tools, time and jigging. The Trimcraft kits are the way to go if you want to build a Falco in a reasonable length of time.

From the beginning of the Falco project, I have been steering builders toward resorcinol and Aerolite glues. Aerolite has been very popular with Falco builders, but it sets up quickly, and for large assemblies it requires planning and some helpers when you are putting on wing skins. Resorcinol glue has the reputation of being a professional's glue, and some builders claim that they have had trouble getting a good glue joint with it. Bob Bready ran into this problem with Weldwood resorcinol and finally called the company which sent him complete instructions on using the glue. His mistake was that he was measuring the glue by volume and not weight. You measure out one part of powder to five parts of the liquid resin, stir in the powder, spread the glue on both surfaces, put the two parts together and slide them back an forth a couple of times and clamp. Resorcinol glue is without any question the best glue for wood aircraft. It is the strongest glue, and it is completely unaffected by moisture, age and the temperatures normally encountered. Bellanca used a resorcinol glue called Penacolite G-1131 on their Viking and Champion series aircraft. While resorcinol glues are normally reported to be somewhat difficult to use, Bellanca said that they found this resorcinol very forgiving and easy to use. Every glue batch mixed was used on a test block in addition to their aircraft. They never had a glue failure in the test blocks. While some Viking wings broke in crashes, the failure was always in the wood and never in the glue joint. The French company, Avions Robin, is famed for its wood aircraft. Guess what glue they use? With over 1000 aircraft built with Penacolite G-1131, they have never had a glue failure. Clamping pressures are critical with some resorcinols, but the glue pressures for Penacolite may be between 25 and 250 psi, but the object is to reduce the glue line to the specified thickness. I have been unsuccessful in getting builders to use this glue, and now I know why. The glue is not available in stores or through distributors. To get the glue you have to order it direct from Koppers Co.

Penacolite G-1131 adhesive is sold in quarts, gallons and five gallon kits. The minimum order is $50.00, and at $25.00 a quart, the quart kits are twice as expensive as the one gallon kit. The kits include the proper proportion of resin and hardener. Request their "Technical Bulletin" and "Material Safety Data Sheet" with first order. If you are starting a Falco, we would suggest a 5 gallon kit. A 1 gallon kit is $50.00 and a 5 gallon kit (50 lb pail of resin & 10 lb drum of hardener) is $130.80. Orders should be accompanied with a certified check or money order for prompt delivery, otherwise a delay for the check to clear will result. The shipment will be sent freight collect. To order, send your check to Koppers Co., Attn: Bob Datig, 1328 Koppers Building, Pittsburg, Pennsylvania 15219. International orders should be directed to International Department, Koppers Co., 1350 Koppers Building, Pittsburg, Pennsylvania 15219.

At this time, I am still working on engine installation details. This includes the final cowling details, induction system, cabin heat, hoses, baffling, oil cooler installation, landing light installation, engine control cables, exhaust hangars, and the like. Things have not worked out as quickly as I had hoped. I found that it was impossible to finalize the design of one thing without considering some other part of the engine compartment. These things are hopelessly inter-related. At this time, I have all of the problems worked out, and I am about 85% done on all of the parts. Most of the remaining work is on the final detailing.

Some builders are installing 180 hp engines, and I have looked at the possibility of changing the cowling to accomodate this engine. As designed, the cowling will enclose the 180, the only question is whether the engine will hit the cowling when it shakes about. I'm inclined to think that the 180 will work in the cowling without any change, but it may turn out that a small blister will be required on the doors for the two front cylinders. I decided against changing the cowling to accomodate the 180 as most builders will be using the 160 hp engine.

There are a number of subtle but important changes in the cowling. First, I plan to eliminate the nose bowl as a separate piece. The cowling will consist of four main parts, with a door on each side and with a top and bottom piece split horizontally through the propeller hole. This is so the cowling may be removed without removing the propeller. The nose gear will have an integral door; that is, the door will be fixed to the trunnion. For the IO-320-B and A series engines, the induction air will be taken in through a submerged NACA scoop on the right side of the aircraft, and the scoop on the bottom of the cowling will be eliminated. For other engine installations, a separate scoop will be available which will be bonded to the cowling. Since we will be using an induction filter, the scoop is somewhat larger and forward of its original location. I am doing my best to make it as attractive as possible, but I can assure you that the appearance and speed of the engines with aft injectors will be far superior.

I have tried to discourage the use of 180 hp engines, but there are always people who want to do this. It is difficult enough to get things to work out for an entire series of 150-160 hp engines without further complicating the matter with 180 hp engines. For every airplane there is an optimum size engine, and it is quite common to put too much power in an airplane. More power does not automatically make for a better airplane. Falcos with a 180 hp engine will have about 4 percent more speed than a 160 hp Falco. The rate of climb and take-off performance with the 180 will be much better, but the aircraft will have less range. There are rpm restrictions on these engines, and I don't have the propeller, spinner and the fit with the cowling worked out. Baffling and engine control cables should be similar, but I have learned from experience to be very wary of little changes. That said, it does appear from what I know now, that if you must have a 180 hp engine, the best engine is the IO-360-B1E. This engine was used on the Piper Arrow and is readily available on the used market. The injector is on the aft end of the engine, just like the IO-320-B1A, except that it points

straight aft instead of being angled to the right side of the airplane. As such, it will hit the cabin heat valve, and the induction system is a mess. The solution is to use a 45 degree elbow fitting off a IO-320-B1A. Thus modified, the engine installation becomes very similar to that of the IO-320-B1A.

We have been working on a Kit No. 817 which we have been calling the Engine Controls Equipment. This kit is in a state of flux, and it will probably include much more than the current title suggests. My plan is to include the engine control cables, engine baffling, induction manifold, governor control bracket, cabin heat valve and fitting, exhaust pipe supports, and probably many of the hoses, fittings and hardware items required to hook up the engine. The engine installation is ordinarily a nightmare for a builder, and I expect that when we get everything finally done, the process will be one of the simplest steps in building the airplane.

Speaking of engine installations, Tony Bingelis has now published his Firewall Forward, Engine Installation Methods. I think all of you will find this book a worthwhile addition to your bookshelf. Firewall Foreward is $19.95 plus postage. Add $2.00 postage per order (airmail U.S. $5.00, overseas $10.00). Texas residents add 5% sales tax. The Sportplane Builder is still $17.95, and the two books may be ordered for $35.00 plus the same postage fee as for a single book. Send orders to: Tony Bingelis, 8509 Greenflint Lane, Austin, Texas 78759.

We have not enclosed a price list with this builder letter since there are no changes. I should remind you that the exhaust system is now available. Dave Aronson has his system in now, and he was very pleased with the quality of the system.

All of us are interested in performance, and it might be well to review some of the things we have going for us. We have always advertised the speeds produced by the production Falcos. The Falcos would actually produce the speeds advertised and while they are substantial, I am very hopeful that we will exceed them by a significant margin. The finish of the wing and tail surfaces is likely to be the greatest factor, and this is up to you. The cross-over exhaust system might add between 4 to 6 mph. I think main gear wheel well doors could add 1 or 2 mph, and hinge fairings on the bottom of the wing could add slightly more. The internal antennas and lack of a rotating beacon will also help. The Nustrini canopy will add some speed. I think our cooling drag is going to be lower than that of the production Falcos -- in fact, I know that it will. The submerged induction inlet could make a 6 to 10 mph difference. In time, we may be able to reduce the cowling air inlet and exit areas. Sealing up the gaps in the control surfaces will add a little, but all these things count. Even our cabin air intake is a small improvement. If you really wanted to go flat out you could destroy the usefulness of the airplane by removing equipment and power-using engine accessories. Add in a dose of Teflon oil additive (Kent Paser claims Microlon gave him 6 knots), nose gear well doors, and other little touches, and it all adds up to a faster airplane. How fast? I really don't know, but I would not be surprised to see speeds near those of Nustrini's Falco by some Falcos, and I think we will all

see the day when a Falco is clocked at a top speed between 240 and 250 mph. This may seem crazy, but Kent Paser's Mustang II with fixed gear and a 150 hp engine is already doing this today with a fixed pitch prop and a wing area and airfoil nearly identical to ours. My goal is simply to make all of the improvements that are practical and hope for the best. Personally, I would be delighted with cruise speeds above 210, and I think we'll see this with many of our homebuilt Falcos. Fired up? Back to your shop!

Sincerely,
SEQUOIA AIRCRAFT CORPORATION

Alfred P. Scott
President

ROLL CALL
Please send in your progress report on a separate piece of paper and not a part of a letter as these entries go into a separate file. Please give your name and builder number.

503. Don Robertson. All spars, ribs, fuselage rings, fuel tanks, engine mount and a lot of hardware done. Getting ready to make room for fuselage jig.

507. Edward Gooch. I have been slowed because of illness in the family. Things are looking up. Have vertical and horizontal tail complete except cover. Have all fuselage rings and wing ribs. Starting on wing spars.

513. John Shipler. At this point of construction, I have the fuselage completed and skinned. The wings are completed and signed off but not covered as yet. The control surfaces are completed and signed off, and I have the flap system, trim tab control and the main control system installed in the Falco. The next project will be installing the landing gear, which is now on order, and then to finish covering the wing. The construction is going smoothly, and I'm continually amazed at the expertise of Mr. Frati in the original Falco design. I am also equally impressed by the design changes and modifications, incorporated by you and your associates to achieve a current and sophisticated aircraft. I am in agreement with you 100% in your policing of homebuilders who attempt to improve upon perfection.

523. D. C. Franklin. Fuselage frames finished and ready to go in the jig, but the jig is not built.

532. Ed Brown. Tail group completed, fuselage nearly complete. In the interest of economy, building the "hard way". Will fly Falco to Oshkosh '88.

534. Ron Tidy. Tail ribs complete, fuselage frames jig and fuselage jig complete, wing rib jig complete. Awaiting better economic times before purchase of equipment kits.

540. Michael Reilly. Project has been on hold for the past year. Prior to that the wood structure was complete and 60% skinned, the hardware and gear made and 40% installed. Fuel systems, electrical, instruments and antenna systems started. Hopefully the project can get under way again this fall.

541. Raymon Purkiser. Structure complete. Skins applied all but one access space between 7 & 8 left side and wing top. All inspected and ok'd to close. All electrical except landing gear motor and lines to the engine complete.

572. Larry Black. Just finishing wood work.

589. Thorston Klingstrom. I have not yet started the project but hope to be able to in 1984. In the meantime I want to thank you for all the time you devote in order to make everything clear. I agree entirely with your standpoint as regards the safety factor. I am with you all the way.

605. John Oliver. Have completed all wood parts including internal sealing (varnish) as follows: fuselage frames including notches for longerons and stringers, modified frame No. 1 at nose wheel well, ailerons and flaps ready for dacron cover, horizontal stabilizer, rudder including mount for tail light, main wing spar and front wing spar including drilling, aft wing spars including tapered plywood shims for hinges. Have assembled gear operator and trim tab equipment. Now waiting rental of hangar scheduled for August 1 to see if everything fits together.

624. Robert Peiter. All spars complete.

637. Ernest S. Lanyi. All wing ribs built. All fuselage rings built from scratch. Added 20 feet of width to my attached garage to build spar and prepare for assembly. Spar wood cut and milled. 28 ft bench built and ready to start building wing spar.

648. Jim Kennedy. Keep up the good work. I love the design work you are doing to keep this a first class homebuilt. Just finished all the fuselage rings and ribs, some spars, etc. I'm doing all the wood work. Takes a lot of time, but I love it!. Plan to purchase all other kits.

651. Russell Woods. My project has wing ribs, main spars, rudder, tail planes, elevator complete and am working on the fuselage rings.

660. Rex Hume. Fuselage to tail 95% skinned. Forward fuel tank complete and fitted except for gauge unit and filler neck and cap. Aft tank ready for welding. All wing spars complete except main spar -- wood ordered for it. I am proceeding as time and finances permit. Expect to order kits soon.

668. B. van Steyn. Horizontal and vertical tailplane finished exclusive of skinning. All wing ribs finished. Fuselage frames 13 through 8 inclusive finished. Lots of hinges finished.

673. Robert Duncan. I am fabricating the metal parts first. I do not plan to start the airframe for about 3 years.

694. Ronald Sorensen. All tail ribs and beams finished. Fuselage frames 5 through 13 completed. Sufficient spruce on hand to complete rest of skeleton.

725. J. W. Hofler. All ribs and frames complete. Frames are in Jig. Stabilizer beam complete. Main wing spar will be complete and ready for inspection in about two weeks.

777. Edward G. Drowley. Workshop inspected and approved. Also text sample constructed and approved by Dept. of Aviation. Construction started on tail ribs.

MAILBOX

I couldn't agree more strongly in reference to modifications. We have two prime examples on our local airport. One is dead and the other is still learning: four of his last five flights resulted in in-flight engine failure and earlier modifications to ailerons resulted in flutter -- close but no disaster.

Upholstery is almost completed. You'll never believe it until you see it.

Dave Aronson

I would like to comment on your excellent program which you developed for the Falco. It has to be the best in the world. Sometimes I wonder where you find the time to do all this. My hat's off to you.

Thank you for all the effort you have put into the Falco project and please keep up the good work.

Klaus Pinsch

I have not really started building the Falco (only tried to do some parts). I had to travel and was far from home in 1982-83. I think I will start building yet.

I have bought a Picchio (F15A, No. 10), F-BLGO with yellow scheme. Cruising speed is 150 knots at 24/2450. It is a very good airplane, very easy to fly.

Thanks for the great work you have done on the Falco.

Laurent Ayoub

I am trying to interest a couple of friends here to go into a team-up for Falco building. The Swiss Federal Air Office has reviewed the plans set and said it's the best they'd ever seen for amateur construction.

Leland Johnson

Kits 810-1 and 812 arrived a couple of weeks ago. I already have the main gear and the retraction mechanism installed on the airplane, and I am very happy with the quality of the components, the ease of installation and the operation of the mechanism as a completed assembly. The entire installation took about 12 hours, and everything bolted on without a hitch.

In your last letter you asked for my observations, or thoughts, as to the use of kits in the construction of homebuilt airplanes as opposed to making everything yourself. As you know, the Falco is my second homebuilt airplane. The first project was a Steen Skybolt which I built entirely by myself without the use of any purchased kits or prefabricated parts. This approach to the construction of a basically simple, uncomplicated airplane took a total of six years or approximately 5000 to 6000 hours of labor to reach completion.

The last two years of construction consisted of long strenuous hours of determined labor to complete the project, rather than the enjoyment and satisfaction one should have experienced during the final stages of one's creation. Most of this "state of fatigue", both mental and physical, was due largely to my original decision to make everything from scratch. Due to the long construction time of the airplane, building had just ceased to be fun.

The Skybolt was completed and flown in 1977, but I was very aware that my choice to "do it all myself" had created such a work-load that the project came very close to being abandoned before it was ever completed. After studying the Falco plans, before the time that kits became available for it, I reluctantly decided not to build the airplane because of the extreme expense of both time and money to build the "hardware parts". The Falco, for me, became a reality only after kits were made available to the homebuilder.

I am now nearly two years into the project, and I have used kits for all the hardware parts installed thus far. At this point the basic airframe is completed, and most of it has been skinned. All of the controls, control hinges, flap mechanism, landing gear and retraction mechanism kits have been installed. All of this in only 23 months and working approximately 15 to 20 hours a week. The luxury of using the pre-made kits has allowed me the opportunity of spending more time in the construction of the airframe itself, instead of the many hours demanded in manufacturing hardware parts yourself. This more leisurely approach to the building, is resulting in a more precisely detailed, higher quality airframe than can be accomplished when attempting to build everything yourself. This airplane should be completed in approximately two more years, and I'm sure, by that time, I will feel as if I had been "rode hard and put in the barn wet" -- even without the additional work-load of making every part myself.

In looking back over the experience of building the Skybolt, piece by piece, and building the Falco using available hardware kits, I would adamantly recommend using kits when building full sized, sophisticated aircraft.

At this point in my "education" of building airplanes, I compare hardware kits in the same catagory as the factory built engine that you install up front or the AN nuts, bolts and washers that you use to hold it all together. Any of the above can be hand built at home, but its extremely doubtful if the quality or the over the counter costs will be improved upon. And I have no reservation of displaying my aircraft containing "store bought parts" as long as the quality of those parts is as good, or better, than I can produce myself.

John Shipler

QUESTIONS & ANSWERS

Q: Can one of the station 8 fuselage frames be eliminated if there is no requirement to remove the aft fuselage. It would seem that with no break in the longerons and skin, the structural integrity of the fuselage would be as good or better than transmitting the loads through the bolts that attach the aft fuselage to the forward section. In addition, a weight saving of approximately 2 lbs could be realized.

A: We have no structural problem with doing as you suggest, but we feel that it is far better to do it according to the plans. In the later stages of construction you will find that the ability to reach into the luggage compartment from the rear a great help. Also, if you ever have to get back into the tail cone, it is quite easy to stand the tail section on some sawhorses and stand up in the thing. Moving the airplane to the airport is much simpler with the removable tail cone. Also, when you skin the wing you will be turning the airplane over several times and if you don't have the tail cone to contend with, things will be much easier. All in all, we would advise against making the airplane in one piece.

Q: What do we need to do to prepare for the installation of the electrical system?

A: The only problems will be in getting the wires to the navigation and strobe lights in the wings and tail, and to the heated pitot tube in the left wing. Install a 3/8" plastic tubing in the wings and tail so that you can pull these wires. All of the other wires can be installed from within the cockpit, although you might find it easier to start pulling the heavy wires early in the construction.

Q: Should rib stitching be used on the control surfaces.

A: We're embarrassed to say that we don't know. All builders so far are installing three or four stitches at each rib, and we think that is the best course to take. Certainly it is better to have them than not.