



**Sequoia** 900 West Franklin Street  
**Aircraft** Richmond, Virginia 23220  
**Corporation** 804/353-1713

June 10, 1983

Dear Falco Builders:

Another Stelio Frati design is now flying. The F.20 Condor was flown on May 7 for the first time. This is a version of the Pegaso but with a bubble canopy, twin Allison turboprops, and hardpoints on the wing. Mr. Frati has also fitted the SF.600 TP with retractable gear. Both of these aircraft will be displayed at the Paris Air Show.

Mr. Frati also sent word that a team of six SF.260's will be at Oshkosh this year and will be performing in the air show each day. In all, nine SF.260's will be ferried in a formation flight organized to commemorate the 50th anniversary of the second mass Atlantic crossing which was made by 24 Siai-Marchetti S.55 flying boats.

During the past few months we have completed the design of the electrical system. At this time we are assembling the kits, which involves sorting through a total of over 80,000 parts including over 16 miles of wire. The kit will include everything required for the electrical system except for the alternator, landing light and battery. We decided to use color-coded wires instead of stamping numbers on the wire. This is much cheaper and should be equally easy to work with.

The electrical kit consists of twenty sub-kits with a total of 1674 parts. Eight of these kits are wiring kits. Six are related to the plugs and receptacles, so that in order to install the correct wires into a certain plug you simply open the wiring kit for that plug. The wires are supplied with the pins installed. The other two wiring kits are for the instrument panel and airframe. The other sub-kits include the circuit breakers & fuses, switches, relays, lamps, post lights, transistors, diodes & resistors, miscellaneous equipment (bus bars, senders, voltage regulator, etc.), terminals, terminal blocks, plugs & receptacles, hardware and battery installation hardware. There is also a 4 cylinder CHT sender kit (more about this later). The kit will include the electrical system drawings, wire tabulation sheets, wire color code chart and installation instructions. Initially, the installation instructions will be brief, but we will improve on them as we have the time.

As I have worked on the electrical kit, I have kept an eye on the prices of the parts going into the kit comparing them to the retail prices charged by the normal homebuilder or aircraft supply outlets. This is not always possible, since in many cases the parts are highly specialized, but our prices are consistantly below the normal retail

prices you would pay. This is not to say that this is an inexpensive kit -- electrical equipment is expensive -- but the kit is reasonably priced. The kit does not include any charges for the year and a half of design work, engineering consulting fees, or any charges for the packaging of the kits and assembly of pins on wires.

By the time you get to the electrical kit, you will have a good idea from our other kits what sort of thing you will be getting. Once the system is designed around our removable instrument panel, there are relatively few choices that can be made which affect cost. One of these areas is switches. Our kits use high quality switches (MIL-S-8834 & MIL-S-83731). This type of switch is typically used in the better quality aircraft. You can buy cheaper switches but they are poor bargains. A friend of mine recently had a gear-up landing in an airplane as a result of an inferior grade switch. Only when you realize the consequences of a failure of such a switch does it come home to you what a poor bargain you had. Our main power connectors on the back of the panel are the AMP CPC type as are used widely by Beech and Mooney. The standard pins are gold plated for better conductivity and reliability. The gold is very thin and does not add much to the cost, in fact, you have no choice since the standard pins are gold plated. Only with the larger main power plug is there an option, and we went with the gold plating which adds about \$3.00 to the cost of the kit. We are using Tefzel wiring only (MIL-W-22759/16 & MIL-C-27500). This wire has largely replaced the older MIL-W-5086 wire which is now no longer accepted by the FAA since there is a better grade of insulation available. Tefzel was more expensive a few years ago, but its wide use has now brought the price down to match the older wire. Tefzel is much easier to work with than the older style wire, which was very difficult to strip, and it is available in colors and can be color-striped. Generally, I find that our prices for the Tefzel wire in our kits matches the price in the 1981 Aircraft Spruce & Speciality catalogue for MIL-W-5086 wire. I don't know what their current price is, but you should remember that our wire is color-striped, which costs a little more (\$10.00 per spool that we buy). Most of our other prices run about 20% less than the 1981 Aircraft Spruce prices. This is the case for ring terminals, circuit breakers, comparable switches and the like. Post lights are about 10% off normal list. The Bendix ignition switch goes into the kit at \$37.92 as compared to the normal list of \$56.78. I think this summary should give you a good idea of the kit. In short, the components are all of high quality, and they are fairly priced. Electrical components are not cheap, and there are a lot of parts here.

I sometimes wonder if we do builders a service by sending out drawings for all of the components in the Falco. Only one or two builders have actually made the oleo shock absorbers, and many of the parts in the Falco are beyond the ability of all but a very few. As you progress to the final assembly of the aircraft and the installation of the instrument panel, instrumentation, electrical system, engine controls, induction system, etc. the problem is one of procurement as opposed to fabrication. The simple fact of life is that it would be impossible for any of you to install our electrical system without our kit. Up to a point, you could follow the design, but there are a few

parts which are not available except to airframe manufacturers. Even with our order for fifty aircraft, we are still a small customer for many of the manufacturers and without exception they have plainly stated that they do not want to sell to homebuilders direct. The plugs and receptacles required for our removable instrument panel require about \$1,500.00 in tooling to swage on the pins and sockets, and we do this for you in the kits so that you will not have to purchase these tools. There is also the problem of purchasing the individual parts. There are many items which are required in small quantities and the search for one-of-this and two-of-that will be extremely frustrating for you.

Basically you will find that when you come to tackle the instrument panel, engine controls, electrical system, induction system, etc, you will have two choices: our kits or do your own design. There is no point in trying to do what we do if you do not go with the kits.

The exhaust system design is now finished. The prices for these systems are now listed in our kit price list. Dave Aronson has installed the system on his engine and reports that our new design for the injected engine fits nicely. The first of these systems are made up entirely of pieced-together bends using standard saddles. This is necessary to determine the exact bends required in the system and the systems that will be shipped after the first two will have most of the bends done on a tube bending machine. We have designed a tailpipe support bracket which will be included in our Kit No. 817. The design of the heating muffs will have to come later.

Most of my time is now taken with the engine installation work. Before the cowling can be finalized, there are a number of design features that must be finalized. These include the induction system, oil cooler installation, baffling, landing light installation, propeller and spinner installation and a few other minor details.

The induction system is a critical item to the cowling design. For the aft-mounted injectors and carburetors, we will be using a NACA submerged inlet on the right side of the cowling and the carburetor scoop below will be eliminated. This will be the best system and will result in the fastest aircraft. On some of the Piper aircraft this system has been installed and has resulted in speed increases of 10 knots over the type of system that brought the air into the filter from the aft baffle. For those engines with the carburetor or injector on the bottom of the engine, the situation is less desirable. The carburetors and injectors are not installed in the same position on the various engines. On the O-320-A & B, the carburetor is on the centerline of the engine. On later series, the carburetor and injector is mounted slightly to the left of centerline and forward, and the injector flange is lower than that of the carburetor. The carburetor air box used on the original production Falcos did not have a filter. This is essential, and the use of a filter requires that the filter area be greater than the scoop originally used. The result is that the scoop on the bottom of the cowling must be larger than that used on the original production Falcos. My plan is to design the cowling without the scoop on the bottom. For builders using the bottom-mounted carburetors or injectors, we will have a scoop which is attached to the

cowling. The scoop will fit all of the engines, and the air box will be different for each design. For the aft-mounted injectors and carburetors, a separate piece will be attached on the inside of the cowling to house the filter and form the inlet.

Earlier we had indicated that you should use a Hartzell governor for the constant-speed propeller. While this governor may be used, we are planning to use a Woodward governor. There are two reasons. First, the Woodward governor is about two pounds lighter. Secondly, the design and attachment of the control cable support bracket is much simpler, and the bracket will be much cheaper. The Hartzell governor may still be used, but you will have to make your own bracket. We are working with Woodward now on the governor and will have the final model number shortly. We should have the governor model numbers in our next builder letter, but those of you who need them sooner should write us. Some Lycoming engines have the governor mounted on the left front of the engine (instead of on the accessory case at the aft end, as is the normal case), and our governor cable bracket will be designed to fit either installation. We will also endeavor to design and route the various engine control cables so that we will not have to make up a special set of cables for each engine model.

If I could start all over with the Falco project, knowing what I now know, I would specify only one series of engines. This is the Lycoming IO-320-A1A (150 hp) or IO-320-B1A (160 hp) series as used in the Twin Comanche. The installation is easily the best and will result in the fastest aircraft. Used engines are widely available at reasonable prices, and it is clear that this will be the engine of choice by almost all of our Falco builders. If you have not yet decided on an engine, I would steer you in this direction.

I have made two optional additions to the instrumentation of the Falco. Neither are terribly expensive and both will add to the safe operation of the aircraft. In my Falco, I have a combination 4 cylinder EGT & CHT. I like this arrangement as it allows you to know precisely how the engine is cooling and also allows you to do a lot of in-flight trouble-shooting. A 4 cylinder EGT is provided for in our panel design. Not all builders will be using an EGT, and I did not want to design a panel that did not include a single CHT with the ranges marked. To convert our design to a 4 cylinder CHT, you must have a 4 cylinder EGT with more than two banks on the rotary switch (this is specified in our revision for the instrumentation drawing) and you need three additional senders. The additional cost of this is only about \$90.00 for the senders. The wire and terminals required are included in the basic electrical kit.

The other addition is an alternator analyzer. I need not tell you of the importance of the electrical system, particularly if you are going to do any IFR work. We already have complete monitoring of the electrical system in an ammeter, load-reading ammeter, voltmeter, high voltage warning light and low voltage warning light. With these instruments you can know a great deal about the operation of the electrical system. There are, however, several common failure modes of the alternator that will not be revealed. A loose belt can only be

detected by physical pre-flight inspection. This also applies to the alternator wires, which are normally checked at annual inspections. Alternators fail internally, usually due to a shorted stator winding or blown diode. The nature of this failure is necessarily technical, but I'll give you a brief discription. The alternator puts out alternating current, which is converted to direct current by three sets of diodes, one set for each of the three stator windings. A shorted stator winding or a blown diode effectively eliminates that part of the alternator from the system. The failure of this nature does not cause the electrical system to fail immediately. What happens is that the two other sets of diodes now have to do the work that three used to do. If the load is not reduced, these diodes will blow in short order due to over-heating. The alternator analyzer measures ripple current and indicates immediately when this condition has occurred. By reducing the load on the alternator, you can keep the remaining diodes from blowing, and you can act accordingly. Without this instrument, you will be unaware of the problem that is brewing, and you are likely to have the alternator fail when you need it the most. I should mention that the voltage regulator compensates for the loss of capacity by sending additional current to the field, so the voltage does not vary in this senario. The alternator analyzer was developed by Ward Aero about 10 years ago. Ward Aero was sold to Airborne which discontinued the instrument since it was not a high-volume item. It is now being made again and can be purchased some of the catalogue houses or through us. Our price at \$130.00 is about \$20.00 cheaper than elsewhere. The instrument is a 1½" diameter gauge that is mounted on the center console.

Following my discussion in our last builders letter concerning modifications to the design, I received a number of calls and letters. All supported our position and a sampling of letters is included in our "Mailbox" section. We are also reprinting an article from Aviation Safety which I urge you to read. It clearly illustrates the sort of thing that goes on out there, and I can tell you that this is not an isolated incident. We have been given permission to reprint this by the magazine.

Aviation Safety is published by the same company that publishes Light Plane Maintenance and The Aviation Consumer. I can recommend all three magazines highly. These magazines fill the role as watchdog of the public, a role largely abdicated by much of the aviation press who leave to government agencies to do what they should be doing in warning the public. I read these magazines carefully, always asking myself how we can keep dangerous situations from occurring. Our seat belt system is the direct result of an article in The Aviation Consumer. I would think that all of you would benefit from a subscription to The Aviation Consumer and Light Plane Maintenance. Aviation Safety does not often cover the homebuilder scene, but I still find the magazine useful in that from the mistakes and misfortunes of others I am able to learn lessons are nominal cost compared to repeating the same mistakes. Subscriptions rates are: Aviation Consumer \$48.00, Light Plane Maintenance \$60.00, Aviation Safety \$32.00. The address for all three is: 1111 East Putnam Avenue, Riverside, Conn. 06878. Light Plane Maintenance is currently offering charter subscriptions for \$45.00.



Nona, thank you... I think! I just hope "Falco" gets enough to eat, so I am not called upon to feed her. I have a photo of "Falco's" tail... somewhat less elegant than Stelio Frati's version.

This builder letter is surprisingly expensive to publish and mail, currently running about \$1000.00 per letter. In an effort to hold down costs, we have decided to offer it on a subscription basis. The subscription rate will be \$12.00 a year for the United States and Canada and \$15.00 per year for overseas for the quarterly publication. We will give a two years free subscription with the purchase of the plans and will extend the free subscription for two years with the purchase of any of our complete kits. We would like to supply this to everyone, but clearly there is a limit on what we can do. Also we need a mechanism to be able to know when someone has lost interest. As this subscription is an expression of some interest, we will also stop sending out additional drawings and revisions to anyone who fails to renew their subscription. We will include a notice of expiration and renewal form with your builder letter when you are up for renewal.

We have also condensed our price list. When we first started out, we only listed the complete kits. Tony Bingelis requested that we publish the prices of individual parts. Ironically, Tony has bought mostly complete kits! There are really very few builders who purchase individual parts as most builders go with the full kits. We now have two price lists. The kit price list is enclosed, and we have a separate parts price list that is available on request. We will maintain a list of those builders who use the parts price list and will include a copy if you are one of them. If we missed you, please drop us a line and we'll send you a copy and put you on the list. I should also mention that we do not plan to send out the drawings for the paint schemes as part of the plans. These will be available on request at no charge, so it would be best if you request them in conjunction with a kit order. We'd like to see all Falcos painted with these schemes, but it seems to be of little use to send them out early in the construction process.

On the price list, please note a change in two of the instruments offered by IFR. Basically, the prices on the airspeed indicator and manifold/fuel pressure gauge were in error. The prices are still very reasonable, particularly when you consider that the dial faces are already custom screened for the Falco. We have also added a section for Cochran Aircraft and Flight International.

You may remember from my September 1982 builder letter the account of flying my Falco to California. During that trip I stopped in Big Piney, Wyoming, to see Bret Miley and his Falco project. Bret had not worked on his Falco for the past few weeks due to a family tragedy; one of his brothers had been murdered by some unknown individual in Salt Lake City. Later that night Mr. Miley flew in. A former WWII pilot, Mr. Miley was plainly a hero for Bret. I still recall the pride in his voice when he said "I'd like you to meet my Dad". In November, Ralph Wooden, a friend of Bret and his brother Paul, stopped by to see our Falco and reported that Mr. Miley had died in a plane crash a few weeks before. Paul, who was Ralph's flight instructor, had moved back to Big Piney to help Bret run their FBO. I knew that Bret would be slow to get

back to work on his Falco after all of this, so I was not surprised that I didn't hear from him as often as before. The other night I called Bret to check in on him. I'm sorry to report that Bret and Paul were both killed on April 26. They had just bought a Cessna 340 and were practicing ILS approaches at Rock Springs when they were involved in a mid-air with a Bonanza, who apparently descended into them. If any of you would like to write Mrs. Miley, she is Mrs. Flora Miley, P. O. Box 628, Big Piney, Wyoming 83113.

Mrs. Miley would also like to sell Bret's Falco project. Bret had purchased the following kits: 801-1, 802, 806, 809-1, 201, 302, 402 & 405. The wing spars are still in the crate as are the fuel tanks. The fuselage and tail group is in the fuselage jig. The workmanship was quite good, and most of the work consisted of gluing pieces together. I can't remember if any skinning had been done, but I seem to recall that the tail group might had been skinned on one side. In addition to the above kits, Bret also bought some additional spruce and plywood and a few instruments. Any of you who might be interested in this should get in touch with Mrs. Miley as soon as possible as she would like to make a decision on the sale within the next month or two. The project will require a flat bed trailer to move it, although it might be possible to get the project in an enclosed truck. One key to this is whether the longerons are glued in place or just clamped. I don't remember this. Please contact Mrs. Miley at the above address or call her at (307) 276-3386. If you fly up to Big Piney from the Rock Springs area to see the project I would suggest flying above the road. I've never seen such territory before. There is no place to safely put a plane down except the road.

Many of you have read about the use of auto gas in aircraft. This has been approved for certain aircraft in the UK and New Zealand. The FAA has approved the use of autogas for the Cessna 150 and testing is now underway on a Cessna 182. I understand that Australia is in the process of a similar action to that of the UK and New Zealand. Largely for reasons of product liability, the airframe and engine manufacturers have understandably refused to endorse the use of autogas. Our Falcos will eventually be operated on autogas by their builders. Also, we are now talking to a number of smaller countries about the use of Falcos for training. In many parts of the world, avgas is non-existent and Sial Marchetti is doing a steady business in converting their SF.260s to Allison turboprops so that they can operate on the available jet fuel. If the Falco can be operated on autogas -- within limits we believe it can -- then the savings to these countries would be enormous. For these two reasons, we are beginning to assemble a file of information concerning the use of autogas in aircraft. This will be a long time in the making, and in its final form the information will be presented in the form of a guide for the testing and use of autogas in the Falco.

The subject is vastly more complicated than it may appear from what you have been reading in the press. It is also impossible to summarize adequately. One of the experts on this subject is Al Hundere, of Alcor, who has been kind to send me a complete file of information on the subject. Al Hundere is in favor of the use of autogas in aircraft where he feels it may be used without adverse effects, however he also



warns that "it is very dangerous" to do so "without complete knowledge of the factors involved." Our guide will be an effort to acquaint you with the factors involved so that you can approach the subject with a reasonable method of testing the fuel in your aircraft.

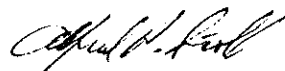
Oshkosh is just around the corner. It does not look like Dave Aronson will be there with his Falco since I am still knee deep in drawings. Charles de Gaulle once said that "treaties, like little girls and roses, last as long as they last". The same is true of the design process. All I know is that I am making good progress, and that I am not far from finishing, but I don't know how long that will be.

We will have an instrument panel display at Oshkosh so that you can see what the panel actually looks like in real life. We've also put together a seat so that you can try that out as well. Parke Smith, who has been at Oshkosh for the past two years giving rides in our Falco, cannot come this year, so there is some question about whether we will be able to give any rides. Parke was in the pattern last year when the mid-air occurred, and even before the accident he was questioning the wisdom of our giving rides under such circumstances. If we are to give rides this year, it will have to be me, and I'm not so sure I want to do all of that in heavy traffic.

Peter Hunter won the London-Londonderry air race in his Falco, beating 26 other aircraft. This is the first of eight races for the British Air Racing Championship. The May 28 issue of Flight International has a photo of Peter's Falco along with the article covering the event.

Final reminder for Oshkosh: The Falco forum will be on Monday, August 1, at 10:30AM. The annual Falco builders dinner is at the Midway Motor Lodge in Appleton at 8:30 on Tuesday, August 2. Our Sequoia crew will be staying at the Paper Valley Inn in Appleton, however due to a mix-up, we do not have rooms on the July 31, August 1 & 2. We are on the waiting list at the Paper Valley, but if any of you have to cancel out at the last minute, I would appreciate it if you would let me know before you do!

Sincerely,  
SEQUOIA AIRCRAFT CORPORATION



Alfred P. Scott  
President

#### ROLL CALL

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

518. John Harns. Just a note to tell you the canopy fit like a glove! Had to trim about 1" off rear end but otherwise a nice fit.

632. Jimmy Shaw. I have the tail section completed, inspected and ready for closing. All my fuselage frames are completed, inspected and closed. All wing ribs received in good order from Francis Dahlman. Aft wing spars and flap and aileron beams complete and main wing spar ready for closing. Should have the skeletal structure complete in a couple of months. I'm really looking forward to finally seeing an airplane in my garage. Of course, my wife's not looking forward to the temporary extension I have to build on to the front of my garage. C'est la vive'.

654. Bjoern Eriksen. I have now finished all tail ribs and started on the wing ribs. All kits purchased and a steady progress from now expected.

718. Ralph McWhinnie. All spars except horizontal stabilizer and elevator eompleted. All ribs completed. Four fuselage bulkheads completed. I got all my spruce from Western Aircraft Supply and highly recommend them. I hope to start assembly this fall and will be ordering the fuselage and wing kits then.

#### MAILBOX

You've done an outstanding job on this whole project -- keep up the excellent and conservative work. I'm with you on major or even minor mods. Frati and Dave Thurston are people to listen hard to!!  
William E. Roerig

Last October, or thereabouts, I decided to abandon my Barracuda project after 2½ years and order plans for the Falco. Before you worry about the contents of this letter, let me say I am very happy that I went to the Falco.

After reading your last news letter, especially the part about the dude who wanted to modify the trim tab, a few things come to mind that I would like to say.

I'm sure there are a lot of quality builders out there who are qualified to make some changes in the airplane, but there are also a ton of guys out there like me who are not experienced and have to depend on people like you to help us build a beautiful, safe airplane.

I for one am very thankful, as I got the strong impression from your letter, that you care a great deal about what we are doing out here as builders. It's very reassuring. I'm grateful for good knowledgeable support, it's one of the reasons I'm not building the Barracuda. The designer bailed out. There are a lot of guys out there with lots of advice, but I'm sure not qualified to assess their advice. For all I know, I could be talking to one of these dudes you were referring to in your news letter.

Be sure to know that there is one builder here who supports you in these matters.

Dr. Gary W. Rene

Upon return this past week I found your March 10 builder letter and the plans tube. Superb panel!! Now I can just read your mail with guys asking why you didn't do this or that. I like it just like it is, thank you!

Progress? Old #717 has finished the rudder, fin and stab, working on the elevators, getting materials together for the fuselage jig, have the formers from Trimcraft and your metals kit for the same.

Bill Wink

As a relative newcomer to the ranks of Falco builders, I would like to communicate my feelings and observations in regard to your fine organization. Charlie Snow and I grew up together; and although we both talked often of our desire to one day learn to fly, it was he who also wanted to build his own aircraft, a proposal which never really turned me on. Charlie is, I suppose, three years into his project by now, and I have watch with growing curiosity the metamorphosis of his little bird. During each periodic visit with the Snows, I have poured over the plans and newsletters, only to find myself wanting to build one of these things myself.

Not withstanding the superb and time-proven design of Mr. Frati, I confess I was actually drawn to the airplane by the caliber of organization that stands behind it. As a businessman myself, I can verify that corporate mismanagement and sloppiness is an epidemic in our country; and I can only assume from what I have seen so far, that Sequoia's management has taken issue with this trend and adopted a policy of rigid adherence to detail. For the airplane I build and fly, I would have it no other way. My commendation on the quality of parts, plans and publications.

In another vein, I would like to cast my vote with you regarding component modifications. Certainly all of our builders would qualify as above-average artisans and craftsmen. I can't remember a time when I was not building or repairing something. I suggest, however, that this project we are now involved with is of necessity in a class by itself. The prospect of second guessing the design expertise of Mr. Frati, as well as all of the engineering inputs available to Sequoia, defies the imagination.

Please know of this one builder's obsession to do it by the numbers. Thanks again for all the extras you are providing us.

Steve Futrell

#### QUESTIONS & ANSWERS

Q: Why do you have two ammeters on the instrument panel?

A: The ammeter (which is part of the engine instrument cluster) shows the flow of current to or from the battery. This tells you if the battery is being discharged or charged. It does not show the discharge of the battery during starting, but after start-up the ammeter should show a charge as the battery is being recharged from the starting drain. If the alternator or voltage regulator failed, the ammeter would show a slow discharge.

The "alternator amps" is a load-reading ammeter. We specify a 60 or 70 amp alternator (12 volt). The alternator should not be operated at more than 80% of its rated power on a continuous basis. It's a very good thing to know how much of a load you are putting on the alternator, and it's a good idea to keep the load low while taxiing since the alternator is not getting a good blast of cooling air. Also fluctuations in alternator load after startup accompanied with fluctuations in voltage can be a signal of problems with the electrical system.

Q: Why don't you have a "both" position on the fuel selector valve?

A: We thought long and hard about that and decided against it. There were a number of factors which weighed against the use of such a

system. The tanks are at different levels, so without the use of check valves, the front tank would dump fuel to the aft tank and overboard. Check valves are prone to leakage due to dirt and cannot be depended to work all the time. In our view, this potential problems of these two moving parts in the fuel system out-weighed any benefits to be gained by their use. There is also the problem of center of gravity, and there are times when you are flying a Falco that you want to be able to burn one tank before the other. You should always have control over the center of gravity of the aircraft and with a both system you would be leaving this to the flow of fuel to decide for you. Also, with an inverted fuel system, the "both" valve would contribute more problems than solutions.

I should mention that we have not yet released drawings for the fuel system for the Falco for a reason; we don't like the original system and want to see it improved. The primary concern is that of water traps, and we want to have a system in which you drain all of the water out of the system, something that cannot be done with the original system. Potential vapor traps, minimum flow restrictions, resistance to vapor formation and lock, problems related to inverted operation, and keeping it simple with a minimum number of fittings are just some of the other things on our mind. The fuel system is one of those dead-simple things that can trick you into thinking that there is nothing more to all of this than just hooking up some plumbing.

Q: I'm getting ready to order the canopy and windshield. How much extra for the green tint?

A: In our earlier brochures, we mentioned that clear and tinted windshields and canopies would be available. We only make it with a gray tint, and there is not extra charge. It would be very unwise to use clear plexiglass since the cockpit will get too hot. We don't like the green tint normally used on production aircraft. Our grey or "smoke" tint is a neutral color of about the same degree of darkness as the usual green used on production aircraft.

# Aviation Safety™

The accident and safety report to pilots and aircraft owners

## Homebuilder spins fatal web of boasts, fibs, insecurity

Consider how audacious it is for a person to order up some plans and undertake to build his own aircraft: He may have been "handy" with a saw or wrench before, but now he must somehow become an expert at everything from riveting to rib-stitching, from welding to wiring, from pitot tubes to propellers. Even if he gets expert advice or hands-on help in some of these tasks, he is the sole authority on quality control. If he doesn't perform all his self-assigned duties to perfection, someone could die.

Consider yet again the audacity it takes to depart from the plans. Some homebuilders take out into new, unknown territory with a "make-off" design of their own. Some see "improvements" they can make in their plans-built aircraft. Either way, the homebuilder takes on the title and burden of an aircraft designer. The aircraft built to plans at least has a tacit promise of flying safely so long as it is faithful to the prototype. Modify the design, or create a new one, and such promise evaporates. Someone could die.

Finally, consider the builder who test-flies his aircraft. This is the height of audacity. It is to put oneself in the same league as test pilot Chuck Yeager or astronaut Alan Shepard. But even they had training and experience in their corner, and could look to teams of skilled professionals for assurances that their craft would fly. The amateur aircraft constructor-designer-test pilot has only his own face in the mirror. Someone could die: himself.

One such face was reflected in the mirror as Robert A. Serack arose on October 13, 1980 and prepared himself to go out to the airport at Livermore, California and attempt the first flight of his sparkling, pristine, yellow and blue biplane. Perhaps the mirror didn't foreshadow it, but at 11:00 a.m., Bob Serack would advance the throttle of his highly modified Baby Great Lakes, the product of a decade of his dreams. At 11:02 a.m., Bob Serack would be dead.

The circumstances of Serack's death may provide valuable lessons, not only for homebuilders currently working on their projects, but also for anyone contemplating the idea. There are even lessons for pilots who will never get near a homebuilt.

### Unique But Universal

It should be stressed that, in many respects, the case of Robert Serack is perhaps an aberration, a "freak" happening that may not have any exact counterpart among the cases of thousands of homebuilders, or hundreds of thousands of pilots in the country. On the other hand, certain elements of the case may have the ring of familiarity to many, if not all, airmen. Serack had many pairs of shoes—enough for any of us to find a fit.

Also, try as we might through interviews with Serack's friends and acquaintances and the accident investigators, we could not learn everything there is to know about him (nor can anyone, of course). We will delve as deep as we dare go into the man, however, since the machine was only a product and extension of his will.

### The Accident

The first and last flight of N13BS was mercifully brief and rather readily understood by investigators.

On the morning of October 13, Serack showed up at the airport and joined an acquaintance who would help with the preparations for the flight. The acquaintance was the person who had installed the plane's comm radio, completing the job the previous evening. Although Serack was known to have conducted run-ups of the Continental A-75-8 engine, he had not been seen to conduct taxi tests because, he told friends, Livermore Tower required a radio for that, and it had taken him several months to acquire one and get it installed. That occurred on a Sunday,

and today was a Monday, Serack's day off from his job.

The acquaintance was equipped with a high-quality camera and a 1,000-mm telephoto lens. Unfortunately, the camera had a bad battery, and Serack had to postpone the flight while the two drove to a store and bought another battery. Ironically, although the camera would work long enough to get pictures of Serack in the cockpit while taxiing out, it would then fail before the takeoff. Consequently, there would never be a photographic record to show that the biplane flew—only that it taxied and crashed.

During the preparations in the hangar, a local pilot with understandable curiosity watched as Serack wedged his 250-pound frame into the tiny airplane and adjusted headset, helmet and goggles in a somewhat fidgety manner. (The impressions of this observer, a dentist by profession, will be discussed later.)

Serack now took the airplane over to the pumps and got it gassed up. There is no precise record, but investigators believe the plane was topped off, with a total of 14 gallons on board (the Baby Lakes plans call for a 12-gallon capacity, but this was far from a "standard" Baby Lakes).

The plane was now propped and started, and Serack guided it slowly down the taxiway to the start of runway 25.

Serack now sat motionless in the cockpit for as much as 10 minutes, according to witnesses. As far as they could tell, the engine remained at idle. He had the appearance of a pilot thinking about the tasks that lay before him, or perhaps mustering his courage.

An aircraft departed ahead of him, another aircraft taxied up behind him, and now Serack swung out on the runway for takeoff. Since he now told the tower it was to be the biplane's first flight and he would remain "close to the airport," it appears clear that a takeoff—as opposed to a high-speed taxi test—was intended. Without appreciable

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delay, the plane accelerated slowly forward, broke ground gently and was airborne.

The climb speed seemed slow to a witness in the tower, who noted what appeared to be pitch and roll changes "as a pilot might do when feeling out the controls." But the movements might also have been considered jerky and mechanical. Over the departure end of the runway at perhaps 300 feet, the plane turned crosswind and "although the turn was shallow, the aircraft abruptly lost some altitude, but reacted to this and climbed back," the witness related. The plane turned downwind and had a similar altitude loss, but climbed and eventually got to about 600 feet AGL (substantially below pattern altitude).

The tower controller had now begun calling to ask the pilot's intentions, and whether he had a problem. On the downwind, the plane was seen to make abrupt and somewhat severe pitch changes. After the controller's third call, the pilot answered, saying he "had a little bit of trouble and would come on in," the controller later reported. There would be no further transmissions from the pilot.

At this point, the controller radioed that a Fairchild F-27 was on final, but if the biplane pilot could turn base now, he could land first; otherwise, he would have to extend his downwind. The biplane turned base without comment. The F-27 pilot radioed that he would go around if the other plane was having trouble, and the propjet now commenced a go-around.

Meanwhile, on the base leg, the biplane was descending when witnesses heard the sound of power being reduced and noticed a slight flattening of the pitch attitude.

An instant later, the plane snapped over into a left spin, completing nearly one rotation before impact. It hit the ground nearly vertically, the left wing striking slightly before the right. Almost simultaneously, it burst into flame. Whether Serack survived the impact is moot; he could not have survived the fire.

#### Investigator's Findings

The FAA investigator in charge of the crash was aided by a four-member committee from the local chapter of the Experimental Aircraft Association, in which Serack had been a member.

Among the findings in the wreckage was an interesting but probably not germane discovery. The plane's wooden propeller, though found splintered, probably had remained intact until impact. But it showed signs of "glue starvation/delamination" in some of its layers. Further, it had a tunnel through it, caused by a termite or wood worm. Because these flaws did not appear related to the accident and because the propeller had been purchased from a Texas wooden prop maker some unknown years previously (with its storage and care in the interim unknown), this is only a sidelight in the accident report. However, it is ironic that, had the biplane flown successfully, it might later have been downed by prop failure.

Another finding was much more significant. Because apparently a bushing had been

omitted during assembly and there was an elongated bolt hole in an attach fitting, the airplane's right elevator was free to move in relation to the left elevator a distance of one inch upward and three inches downward, measured at the trailing edges. The consequences of this could range from mild to severe, from a mere vibration to aerodynamic flutter and problems with pitch control.

But in addition, the investigating committee reported that Serack had been known to have made extensive modifications to the original Baby Great Lakes plans. He had told fellow EAA members there were a total of 147 differences between his airplane and the one depicted in the drawings. They ranged from minor alterations of fittings, to major airframe changes. In summary, the FAA investigator said the changes were reported to have "increased both the forward and stalling speed of the aircraft as much as 29 mph. However, no log of modifications has been located."

Finally, however, the committee made a startling discovery, and one which was to figure in the NTSB's probable cause statement. Upon reviewing the aircraft's weight and balance records, it was found that Serack's calculations contained a gross error. The actual center of gravity of the aircraft upon takeoff was likely at least 1.2 inches (and perhaps more) aft of the rearmost limit defined in the builder's manual.

The aft c.g. problem easily accounts for some of the pitch problems and the prompt snap-spin at power reduction. An airplane in such a c.g. condition may be marginally controllable or totally uncontrollable, depending on speed, power, and aspects of the design.

As we've mentioned before (*Aviation Safety*, November 1981, Page 9), even professional test pilots in factory prototype aircraft proceed cautiously on c.g. by starting out well inside an expected normal range and sliding weights aft until controllability becomes suspect. The c.g. limit is set reasonably forward of this point, and the test is over. Test pilots do not explore the region behind the aft limit, because that regime can be assumed to produce an uncontrollable airplane. In effect, Serack had gone where test pilots fear to tread.

And as far as the committee could tell, he had done it deliberately. To boil down a complex audit of the weight and balance figures, it appeared that Serack had worked out the c.g. as acceptable by ignoring the facts of the airplane's as-built empty c.g. and his own much-heavier-than-standard weight. "He more or less forced the numbers to fit," the committee leader told us.

#### Pilot Experience

And then there was the question of Serack's ability to fly any airplane, let alone an out-of-c.g. taildragger biplane on its maiden hop.

Investigators located two logbooks from Serack's possessions. Logbook No. 1 contained entries commencing with the pilot's first flying lesson in 1945, continuing with a fairly typical training period and noting the is-

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suance of a private license in 1947. The entries proceeded to show a spotty history of flying over the next two and a half decades, leaving off with an entry in June of 1971. The total experience recorded in the logbook was 71.4 hours, leaving many blank pages.

Logbook No. 2 had just one entry. It stated that Logbook No. 1 had been lost in a burglary, and to the best of the pilot's recollection, the experience to be carried forward into the new logbook was 170 hours of dual and 950 total hours.

Further, among the FAA airman records in Oklahoma City were statements made on medical applications where Serack variously claimed lots of recent and total flying time. One in 1976 claimed 350 total hours. This all culminated in his medical of April, 1980, in which he claimed 1,000 total hours. (To fly 650 hours in four years, one must be in the air every weekend without fail for an average three-hour trip.)

Of many acquaintances and friends consulted, not one could recall any direct knowledge that Serack had flown at all since around the time of his last logbook entry—nine years before the fatal flight.

Serack apparently had logged what is known as "Parker pen time." (Insert any favorite brand name of pens.) This is fictitious flying experience logged in order to appear qualified for FAA or other eyes, or simply to inflate a pilot's own ego. While most pilots appear to be scrupulously honest in logging time, we've seen a fair number of "Parker pen" logbooks. We must point out that they always come to light after a crash, and they fool no one—unless it be the pilot himself.

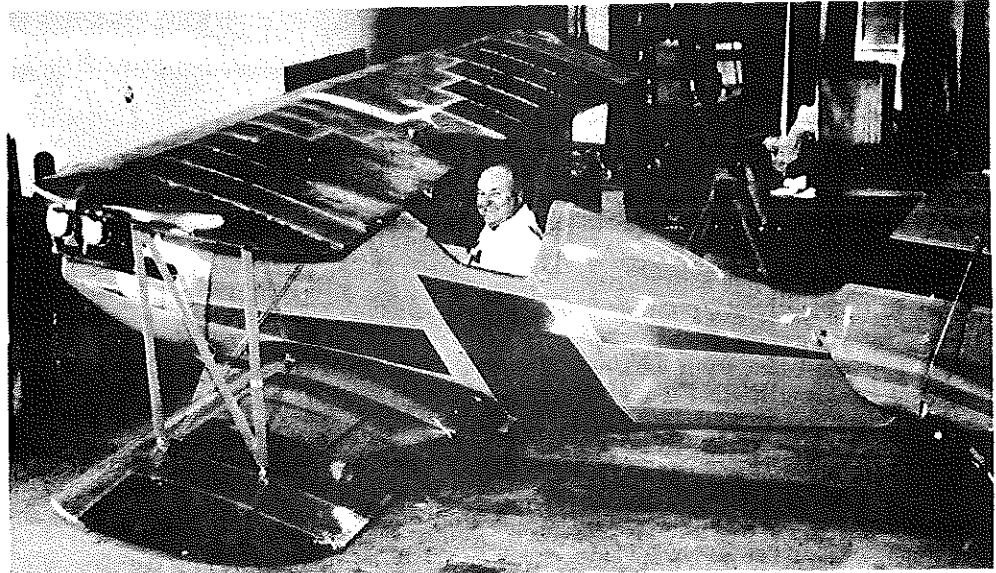
#### Legality Aside

It is appropriate to note that Serack was not evidently in violation of the FARs when he undertook the test flight without any recency of experience, since he was not carrying passengers. He held a license, a current medical, and a special airworthiness certificate for the airplane, allowing for flights within close proximity of the airport until the plane could be demonstrated to be controllable in all normal speed regimes. The real question is not whether rules would have stopped him, but why fear did not.

What could drive a man to finagle the weight and balance figures, falsify the logbook, fail to make a runup and mag check, ignore any pretense of taxi tests, and launch an unknown and likely dangerous vehicle so recklessly into the air? Why did he do it?

To attempt an answer (although, admittedly, there can never be an absolute one), we must go deeper into the man and his background. Friends, acquaintances and coworkers of Bob Serack were interviewed to form an over-all impression of his personality. While none appeared to have any animosity toward Serack, some described his facets with admiration, while others were not so complimentary. Some questions could not be answered, and will remain a mystery.

Among them is his name and early history. It is known that he was born in 1923 (and was



Robert Serack in the safety of his garage with the nearly finished 'BS-1.'

56 at his death) and was a U.S. citizen, but somewhere in his youth or early manhood, he changed his original name. We could not learn the name or the reason he switched to Robert Allen Serack.

It was said he was orphaned as a youth and for reasons that are unclear, was reared in Canada. He told a coworker when World War II broke out, he joined the Canadian Air Force and had progressed far into pilot training, but then the military found out he was a U.S. citizen, and expelled him. He then made his way to the U.S. and joined the Marines. However, this story is undermined by another recollection of Serack's telling a coworker he had gone to a San Francisco area high school.

We learned of records and photographs to demonstrate that Serack did enter the Marines and did serve in the South Pacific. However, we could not learn what duties he had.

Serack told many people, however, that he was a member of the famed Black Sheep Squadron, the Marine unit led by Gregory "Pappy" Boyington, whom he claimed as a personal friend. Serack alluded to flying Corsairs, as well as bombers, his acquaintances recall.

Based on the evidence we've been able to gather, this probably is a complete fiction. Anyone who had flown a Corsair in 1944 would hardly have needed a complete primary training program in 1945, for one thing. For another, although Boyington did later casually meet Serack at an EAA convention in Oshkosh in the mid-1970's, he cannot recall Serack from the war days. And even Serack's closest friend hinted that the claim of being a Black Sheep fighter pilot was not to be believed.

Upon returning to the States, Serack within a few years had become an officer with the San Francisco Police Department, serving at least part of the time as a mounted patrolman. After roughly 5-7 years, he left the department and joined California's Alameda County Sheriff's Department, where he served as a deputy for perhaps six more years.

Around 1962, he joined the California Department of Motor Vehicles as an investigator, a job he held from then until his death. As an investigator, his duties included such things as checking into consumer complaints against car dealers and repair shops, probing automobile license and registration frauds, and investigating auto thefts. He brought a good knowledge of automobile mechanics to the job, which served him in good stead. The job may be considered 'interesting by some, but compared to police work, it is rather tame.

He also was what is often known as a self-educated man. With little formal schooling above high school, he read widely, becoming interested and knowledgeable in many subjects. He was an avid hunter, fisherman, skier, amateur astronomer and photographer. He drew whimsical cartoons and sketches, and wrote poetry.

Serack never married and lived alone as a confirmed bachelor all his life, mostly in apartments and later, in his own condominium.

Some coworkers and acquaintances described Serack politely: he was "not shy," "very friendly," "very bright," and "there wasn't a subject you could think of that he couldn't talk knowledgeably about."

Others saw the same traits as follows: he was "loud," "opinionated" and "Bob was very convincing if you didn't know anything about the subject he was discussing, but you sometimes got the feeling that he didn't let facts stand in the way of a good story. If you had some knowledge, you might come to doubt what he was telling you." For instance, Serack's claim of being a skier who "could have made the Olympics" drew smiles as coworkers surveyed his overweight frame.

In short, Serack apparently had the need to impress people with his knowledge. To put it bluntly, he was insecure.

One of his former supervisors said Serack's personality may have been the reason he did not advance in his career. Serack told him he

left his former police department jobs when he failed to get promotions and felt "his abilities weren't being appreciated." The supervisor said, "I always felt Bob had a lot higher IQ than most people. He would take the written civil service tests and score a 98 or 99 every time. But he would go in for the oral exam and score very low, because of his loudness."

### Allure of Aviation

In the several years prior to 1971, Serack reportedly had a friend who owned an airplane, and the two would take occasional trips together. But they had a parting of the ways, at about the same time as Serack logged his last hour.

Whether this loss of access to flying was the direct cause is unknown, but this is also the same period when Serack acquired the plans for a Baby Great Lakes and began building it. A friend recalls Serack piecing together wing ribs in his bedroom.

Serack also joined the EAA, in the spring of 1972.

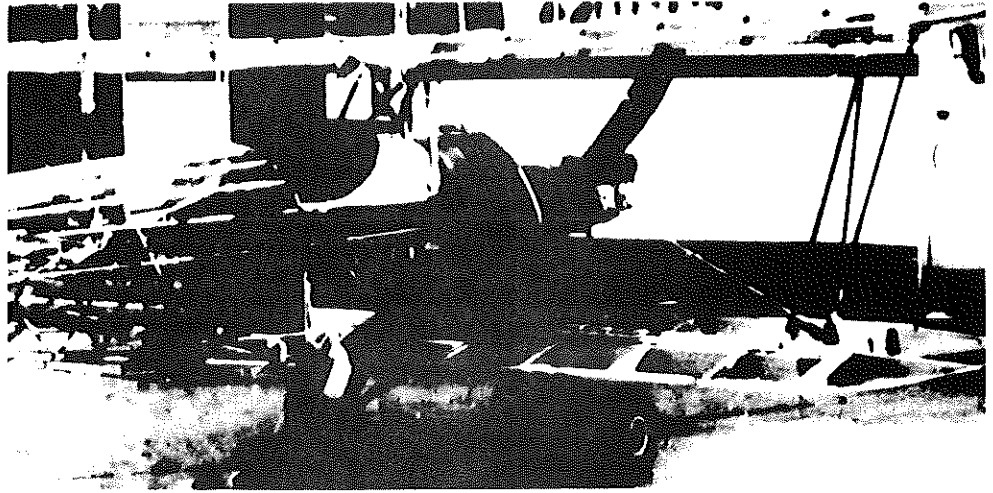
The Baby Lakes is a very small, traditionally built biplane—smaller than even the diminutive Pitts Special in all dimensions. Although less powerful than the Pitts (65-85 hp versus 125-180 hp) and therefore not as able in vertical maneuvers, the Baby Lakes is a responsive aerobic one-seater of the same open-cockpit genre. It is a short-coupled, light biplane, making c.g. a critical concern. What may be thought a vice by a pilot eager to fly it could be considered a virtue by a craftsman whose interest is sheerly in the construction: it is assembled from literally thousands of tiny parts, and takes years to build.

It is probably fair to say that Serack found his element in homebuilding. It now took up a great share of his free time, and was the subject of many conversations. Some even suggested it became an obsession.

As was his bent, Serack would read, study and practice the arts of aircraft construction, and in due course, became an "expert." Eventually, his local EAA chapter picked him as an EAA designee—an adviser to other homebuilders. He would make trips to Oshkosh, Wisconsin for the annual EAA convention.

EAA Aviation Foundation president Tom Poberezny pointed out to us that designees are chosen by their chapters, and EAA headquarters merely issues its approval. An aviation mechanic's license is generally a *prima facie* qualification to become a designee, or recognized experience in building an aircraft. Serack apparently was judged as having the latter.

One homebuilder recalls finding Serack at the "designee tent" at Oshkosh, where he had come seeking advice about a wooden propeller that was out of track (bought from the same supplier as Serack's propeller). "Here I was, a relative novice on the subject of propellers, but even I could tell I was getting questionable advice about it," the homebuilder told us. (An EAA spokesman



All who saw it agreed the BS-1 was meticulously crafted. (NTSB file photo.)

pointed out that Serack was not part of the designee tent staff, but merely a visitor.)

Back home, Serack continued his biplane project. But he began to see ways he could "improve" the Baby Great Lakes design. And he could not be content without sharing his expertise.

Harvey Swack inherited the Baby Great Lakes design from its original holder, Andrew "Barney" Oldfield, and still oversees the kits and plans today. Swack, who at the time was helping to improve the safety and construction of plans-built aircraft through the nascent National Association of Sport Aircraft Designers (the Baby Lakes plans were the first to get NASAD approval), began to get letters and sketches from Bob Serack.

"He would send me a letter and a sketch about this or that 'improvement,'" Swack recalled. "It got to the point where I was getting one of these every few weeks. After I had collected about 25, I got a letter from Serack asking, 'When are you going to send out copies of my 'improvements' to the other Baby Lakes builders?'"

"I told him, 'I'm not going to send out any of these changes to the builders. If you think they are 'improvements,' that's fine. But you go ahead and finish the airplane and put 100 hours on it. Then if your idea has proved itself, I'll consider giving it to the other builders.'"

Swack could see that Serack was irrepensible in his desire to "improve" the Baby Lakes. Swack argued for strict weight control. A Baby Lakes should come in within 10 percent of a nominal 480-pound empty weight, Swack said. Serack's would eventually weigh 565 pounds empty. The Baby Lakes gross weight is set forth as 850 pounds. Serack set his plane's gross weight at 925 pounds. Swack argued for a locking tailwheel; Serack chose a steerable one.

And though it makes for a tight pilot entry, the Baby Lakes upper wing is intentionally situated to bisect the pilot's field of vision, Swack said. Serack, in a gross departure from the design, chose to put the upper wing six inches higher than the plans specified, and change its angle of incidence as well.

Eventually, Swack put his foot down. He told Serack the airplane was no longer anything like the original design, and admonished Serack not to call it a Baby Great Lakes.

Serack complied, and used his initials to designate it the "BS-1." When friends recall his joking about it as the "Bullshit One," it is with sad irony.

But Serack was uncontent, Swack said, and began his own program of contacting other Baby Lakes owners to offer his advice and "improvements." Swack did his best to counter this when the same builders called him. "I think I was able to catch them all," Swack told us.

### More Advice Ignored

Although one friend recalls Serack as getting help and advice on his project, fellow EAA chapter members said invitations to view it were few and far between.

A fellow designee said Serack would call him to discuss what he was doing. "But I never got the impression he wanted my advice—he just wanted to tell me about the changes he was making. If I offered an opinion that it didn't seem like a good idea, he wouldn't dispute me, but I could tell he probably wouldn't follow my advice."

It should be here mentioned that Serack's craftsmanship was immaculate. We found no one—expert or layman—who viewed the BS-1, whether as an uncovered skeleton or finished airplane, who did not come away with admiration for the meticulous perfection of the ribwork, welding, covering and finish.

But as the facts show, the shiny perfection hid a host of design changes (plus the c.g. problem) that made airworthiness doubtful. The trouble was, unless they were as intimately familiar with the modifications as the builder, not even experts could readily gauge the fitness of the plane to fly.

This includes the FAA inspector who signed off the plane for its maiden flight. He could find little to fault in the airplane, and nothing wrong with the weight and balance figures Serack submitted. Besides, he pointed out, since every homebuilt aircraft is uniquely



the responsibility of the builder, it is irrelevant whether the figures conform to the plans.

Moreover, the FAA rules regarding homebuilts are designed to give the utmost freedom to the experimental builder, while protecting the safety of other citizens. Thus, the experimental certificate of airworthiness is limited to solo flights over unpopulated areas until controllability is established. Put bluntly, the homebuilt pilot is free to kill himself as long as he doesn't harm others. In a macabre way, Serack proved the wisdom of these rules.

### Getting Close

As Serack approached his denouement, it appears many forces were at work on him.

For perhaps a couple of years at the end, Serack had occasional periods of ill health. On several occasions, his supervisor witnessed him literally falling out of his chair. He would often need to hold onto a desk or wall to steady himself after rising from a seat. "He appeared to have a problem with his equilibrium. At one point, we required a note from a doctor saying he was okay for driving, which was required in his job. We were concerned about whether he could safely drive a car. I'm surprised to learn that he passed a flight physical exam," said the supervisor.

So was *Aviation Safety*. However, we could learn no details of the exam, and there was nothing in the accident evidence to suggest incapacitation as a causal factor. Nonetheless, the health question bears mentioning, since it may be a strong motivator, signalling a person at the time to achieve a life's goal is limited.

Aviation acquaintances suggested to Serack that he could prepare for his first flight by taking dual instruction in something similar to the BS-1, such as a Pitts S2, or even a modest-performance taildragger, like a Luscombe. They said he shrugged off these suggestions. "I don't need it. I've got thousands of hours," he told them.

Even more ironic, we were told that at least one and perhaps two test pilots offered to make the first flight for Serack. He refused with conviction. "If he didn't fly it, nobody would," said one acquaintance.

But a coworker noticed something peculiar. "You would think as a person got close to finishing a project, the more he would be in a hurry to get done. Bob was the opposite. It seemed like the closer he got to finishing the airplane, the slower he got."

Coworkers remember kidding him about when the airplane would fly. EAA chapter members were also giving him a ribbing. "We started to joke about it, because at every chapter meeting, Bob's project was always '99 percent finished,'" said a member.

Indeed, while ostensibly the reason the plane sat for two months after being granted its certificate was a problem in acquiring a comm radio, this seems a weak excuse. A "loaner" or a portable transceiver could have been borrowed.

Serack's fellow designee recalls their last conversation, a couple of evenings before the accident. "He had decided he was going to fly it by the next chapter meeting. I urged him to

conduct careful taxi tests before he tried flying it. He didn't answer me, just went on to another subject."

Oddly, Serack invited no one but the camera-equipped acquaintance to witness the first flight. None of the EAA members was informed, nor even Serack's closest friend, who told us, "I think he wanted to be able to make the announcement to everyone that he had flown, and didn't want people there if something went wrong."

Indeed, upon entering Serack's home after his death, the friend found an elaborate proclamation laid out on a table. It spoke in flamboyant terms of how "on this day the BS-1 loosened its shackles and took to the air for the first time," the friend said. The proclamation was filled out completely, except for Serack's signature.

### Trapped

It is axiomatic that pilots spend many more hours talking about flying than doing it; homebuilders compound the formula by spending untold hours talking about building, then about flying, and then perhaps they actually fly. Idle boasting is a harmless part of all "hangar flying."

When Serack built his first wing rib and joined the EAA, it was an innocent enough start to a "hobby." When he welded up the fuselage and sat the BS-1 on its gear, he could sit in the skeletal cockpit and dream of how it would fly—and brag to EAAers about his design innovations and flying prowess. Perhaps he entertained in his mind the danger he might someday face if he tried to fly his airplane, but that day was far away. Many homebuilt projects progress no farther than this, and therefore the final day never gets closer.

But somewhere along his nine-year homebuilding career, Serack had to reach a point of no return—whether he recognized it and went boldly forward, or merely followed the course blindly. It was no longer a hobby. After the engine was bought and installed, after being named a designee, after telling the world about his work, after the precover inspection—somewhere among these events is the day when Serack might have realized there was a certain inevitability to what he was doing:

An airplane is not a grandfather clock, to be admired for its beauty and workmanship alone. An airplane is made to fly and is not yet an airplane until it does. Serack could say anything he wanted about the plane and his skill—and the more he said, the more he might have noticed the sly, taunting smiles: Fly it. Then you can talk.

As time dragged itself down to the final moments, one can imagine the predicament Serack was in. He perhaps could think of the safe thing to do, but think again of a reason not to. For instance:

- He could cure the c.g. problem. Perhaps he had hoped he would lose weight himself along the way. Too late now. He could revamp the airplane. But, as the owner's manual indicated clearly, the way to fix a c.g.



Grim expression is apparent in photo taken minutes before the crash. (NTSB file photo.)

problem was to lengthen the engine mount. This could add a year to the project, and any fellow homebuilder who saw it would recognize the tacit admission that Serack had made a grave mistake.

- He could go get dual instruction in a taildragger biplane. But with his rusty skills, anyone who flew with him surely would have instantly learned that all his claims of "thousands of hours" simply could not be true. It might take dozens of hours and hundreds of dollars to be pronounced fit to solo a taildragger. The embarrassment would be mortifying.

- He could let another, more experienced pilot—even a test pilot—make the first flight. But that would be to subject his perfect work to the critical eyes of another. Besides, a Corsair pilot would never have a problem with a little 75-horse biplane, would he?

- He could plan and execute a series of careful taxi tests. But this could end in a ground-loop, which would put the lie to his claims of skill. Even the radio work required in taxi testing may have been beyond his knowledge and temerity. He may have postponed the taxi-test decision until the last. But there at the runway's edge, with other pilots ahead and behind, he realized that to commandeer the runway for ground work might incur the wrath or ridicule of other airmen. And could it be Serack had read those stories of other homebuilders on their first flights, who taxi back after a grand success and proclaim, "She's perfect—flies hands-off—I don't need to change a thing!" and he yearned to be able to say the same?

Again, we can never know, only guess. But one thing seems certain: in the last minutes, Serack had to face the trap he was in, and it scared him.

There is in the record the statement of the dentist-pilot who watched Serack in the hangar as he taxied out. Nothing of substance passed between the two men. The dentist asked Serack's companion, "Is he current?" and got the answer, "I hope so!"

The witness looked into Serack's face. Here is what he remembers: "It was absolutely uncanny. Have you ever looked at a corpse, or a person dying of cancer? They have a certain grey pallor to them. The only way I can

