

The BARRACUDA FLIES

By G. L. Siers (EAA 24653)
P. O. Box 853
Bellevue, WA 98009

(Photos Courtesy the Author)



WHEN A FAMOUS poet once said, "... the best laid plans of mice and men often go awry", he must surely have had homebuilding in mind.

No matter how simple a project may appear it is very easy to underestimate the time required to complete it. This is especially so when

one's ambitions grow as the project progresses, and the simple concepts give way to sophisticated ones. The result is always — delay.

This happened with the Barracuda. Some of the delays were a result of design changes and incorporation of extras and some were beyond my control.

However, whatever reason can be found for these delays is of no consequence as it is at long last finished! All the frustrations and problems are behind me and fade into insignificance when I look at my very own creation.

The Barracuda was conceived as a fast cross country airplane with aerobatic capability. In addition to this, it had to carry two big people and their baggage in supreme comfort. Besides having crisp fighter-like response and performance, good stability was required for cross country flying, and good manners at low speeds were also considered desirable.

I am happy to report these requirements have been met.

The Barracuda is made entirely of wood. The basic structure is of spruce with plywood covering. The wings are constructed in three pieces — two outer panels and a center section. This was done for several reasons, the main one being that it allowed construction in a fairly small shop. The outer panels are parallel chord which allows all the ribs to be identical. The main spar is a box section with spruce booms and ply webs. The ribs are $\frac{3}{8}$ " square spruce of conventional truss design. When the wing is assembled, the ribs are sim-

ple landing gear and the seats. An electrically operated plain flap runs under the fuselage for the full width of the center section and is extremely effective.

The fuselage is built in the same manner as a model airplane. The sides are simple frames of 1 x $\frac{3}{4}$ " spruce and are built one on top of the other to ensure accuracy. The two sides are then joined by a tail post at the rear and an "X" frame just behind the cockpit. Cross members are then glued in and once again, Presto! — no jiggling required. The fuselage side frames are then attached to the center section and the resulting assembly becomes an extremely strong and rigid structure capable of withstanding immense loads.

The cockpit which is 40" wide at the shoulders is entirely covered by a large canopy. The curved portion which hinges "gull wing" fashion is the same as a T-18. The windshield and rear windows are single curvature and are made to fit this air-

was done but, of course, resulted in a long delay. However, it was well worth the effort as flight testing has shown the new gear to be exceptionally fine.

The gear is constructed entirely of standard size 4130 steel tubing welded by gas and heliarc. Springing is by commercially available steel coil springs. Retraction is electro-hydraulic, the power unit being the same as a Piper Arrow. The gear is mechanically locked in the up and down positions and a simple gravity free-fall emergency system is incorporated. The entire gear is simple to construct, extremely rugged, and operates faultlessly.

Hanging from the firewall on the prototype is a Lycoming GO-435-2 driving a three blade Hartzell controllable pitch prop. When the engine was purchased it was thought to be of 260 hp, and all design and performance calculations were done to this figure. Subsequent information obtained from Lycoming showed it to be only 220 hp and somewhat



ply glued to each face of the main spar and Presto! — no jiggling is required. This is a very good way to do it — so good in fact, that when the prototype wing was assembled, absolutely no sanding of the ribs was required prior to skinning! The wing outer panels are skinned with $\frac{3}{32}$ " Mahogany and are torsionally very stiff indeed.

The center section is an integral part of the fuselage, but is constructed separately. It houses all the controls, the fuel tanks, the retracta-

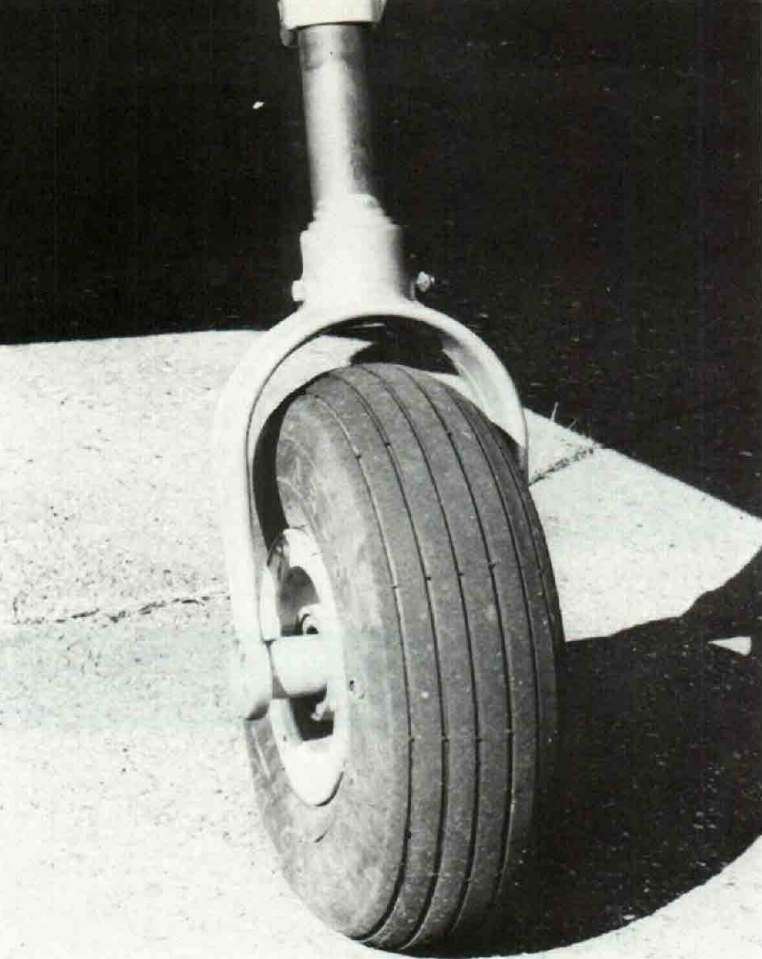
plane only.

The landing gear was originally intended to be taken from a Comanche, and was in fact, fitted to the prototype at one time. However, since several people expressed a desire to build a Barracuda of their own, it was decided to design a gear especially for this airplane. Since I refused to commit others to building a landing gear which I had not personally tested, it was decided to tear out the Comanche gear and install the new gear system in the prototype. This

Sleek new profile in the sky, the Siers Barracuda.

heavier than previously believed. Performance has therefore suffered somewhat, but it is still a pretty potent machine.

The first flight was made on the evening of June 29, 1975. Six minutes into the flight the oil pressure gauge dropped to zero causing me a certain amount of consternation. However, I had at all times kept my-



Barracuda nose gear detail.



The Barracuda's landing gear legs are constructed of standard size 4130 steel tubing and are welded by both gas and heliarc. Doors completely conceal the mains and nose gear when retracted.

self in a favorable position relative to the runway. It paid off as I was able to immediately initiate an approach. The engine showed no signs of distress so was not shut down but kept at idle. A long curving approach and flapless landing put it down on the numbers for one of the smoothest landings of my career and the first turnoff was made with no problem. It turned out that an intermittent ground on the electrical gauge had caused the problem, this despite extensive preflight testing of the system. However, I believe it says a lot for the airplane that such an approach and landing could be made after only six minutes of experience in it.

Flight testing is now complete and the following is a brief resume of handling characteristics.

Acceleration is very rapid and lift off occurs at around 65-70 mph indicated. Gear is fully retracted in six seconds and with two people and half fuel the rate of climb is 2,000 fpm.

All controls are very sensitive and produce rapid response. Despite

this, the airplane is very easy to fly and no one who has flown it has had the slightest difficulty. Rate of roll is very high and can be initiated and stopped instantaneously. There is very little trim change in any mode and what there is, is easily taken care of with the electric trim. Visibility is superb and two big people can ride in extreme comfort for long periods. Stick free stability is very good and makes cross country flying a pleasure.

Stalls are very gentle with no tendency to drop a wing, and aileron control is available down through the stall. Full stalls power on and power off have been explored with flaps down as far as 45 degrees with no adverse effects. It was feared that the large flap section across the fuselage might possibly affect elevator control but no such effects have been detected. There is only very slight trim change with flap extension and the only effect on the stall is for the airplane to fall through a little more sharply. With full flaps and gear down the airplane stalls at an indicated 54 mph. However, I

feel that there must be some pilot head position error in this figure for it does seem rather low. Calculations show the figure should be 9-10 mph higher.

The Barracuda has a gear and flap extension speed of 120 mph, but I have flown it to 145 mph with no problems.

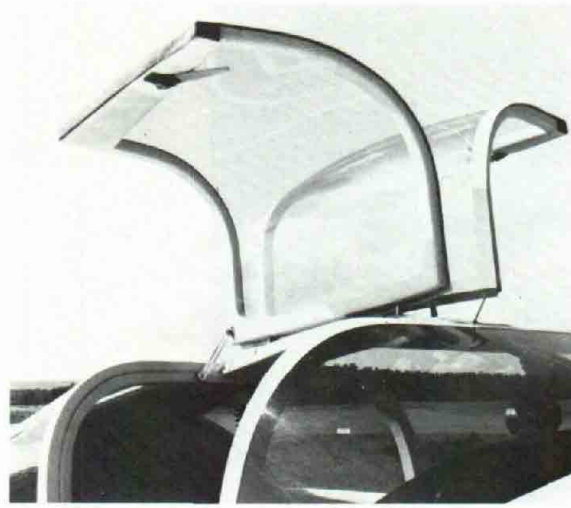
Landings are astonishingly easy. Initial approach at 85-90 mph is usually made, with extra flap added fairly late as it is very effective. Cross the threshold at 75 and hold off and the airplane settles down on the mainwheels in a very gentle and satisfying way, with never any tendency to bounce. The nosewheel can be held off for quite a long time and then gently lowered onto the runway. The ground handling and ride is also very good.

Obviously I am prejudiced, but I have tried very hard to give a balanced and objective appraisal of the Barracuda.

No project such as this can be produced without help, and help comes in many forms. The people who have helped me to have my Barracuda are

far too numerous to mention. They know who they are, and to them I offer my most sincere thanks.

I cannot finish this story without mentioning three people in particular. First, my wife for her almost saint-like patience and understanding. Secondly, there are two young men who have worked on this airplane as much as I and without whose help there simply would not be a Barracuda. Because of this project they have learned many skills and have become master craftsmen. They have learned that nothing is achieved without effort and that patience and determination will produce immeasurable rewards. They are my sons, in whom I am well pleased.



The Barracuda's "gullwing" canopy doors.



Philip Siers. He and brother Richard have as much working time in the Barracuda as their father, Geoff.

BARRACUDA SPECIFICATION & PERFORMANCE

Wing Span	24' 9"
Length	21' 6"
Wing Area	120 sq. ft.
Aerofoil Section	NACA 64 ₂ 415
Empty Weight	1,495 lbs.
Gross Weight	2,200 lbs.
Fuel Capacity	44 gallons
Baggage	40 lbs.
Engine	220 hp Lycoming (designed for engines from 150 hp to 300 hp)
Max. Speed	218 mph
Cruise Speed	200 mph
Stall Clear	75 mph
Stall Gear & Flaps Down ...	65 mph
Rate of Climb	2,000 fpm

Richard Siers lays up some glass cloth along the base of the windshield.



ABOUT THE AUTHOR

Geoff Siers was born and educated in England. He served in the P.A.F. as a fighter pilot.

Siers has spent almost seventeen years in various aspects of aircraft design, including structured control systems and mechanical design. He has worked on such airplanes as the BAC Lightning and Concorde and the Boeing 727.

Siers and his family came to this country in 1964 and have lived in Washington State for the past ten years. For the past four years he has been self-employed in his own very successful business and now does his engineering "purely for pleasure".