

# THE SAILPLANE T-BIRD, ITS DESIGN PHILOSOPHY

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*(Note: This paper was originally presented in Los Angeles on Sept. 16, 1961, at the SSA Technical Symposium on Soaring.)*

In the year 1954 the author had just completed the development work on the sailplane Tiny Mite, under the guidance of Dr. August Raspet and associates. The results of our efforts were most satisfying. We had a very small machine, easy to fly, easy to crew for and with a performance equal to many of the much larger sailplanes. The best glide ratio from actual test data was 31:1 with a 40 foot wing span.

This small machine served quite well in competition. Its reason for showing outstanding performance was not because of any special design secrets, but was accomplished by very careful control of the aerodynamic flow. This machine proved to the author that a high efficiency factor is of utmost importance for any sailplane intended for competition. In the case of the Tiny Mite, this factor was 92, raised from an original point in the low 60's.

It is quite probable that the development work done on the Tiny Mite was the strongest influence toward this new design. Pleasant to fly as the Tiny Mite was, competition was proving that a new design must be forthcoming if the author was to avoid unnecessary frustrations in competition in the immediate future. Laminar flow sailplanes were being developed the world over, many of them proving to be outstanding.

The desire to build a new machine became strong enough by 1956 to change my contemplation of a new design to reality, and work began in earnest. The original intent was for a strictly spare time construction program. It was believed that one could fly at least once a month in existing aircraft and work on a new sailplane on an occasional week end: thus enjoy a wide range of the sport. The eventual end would be the ownership of a new sailplane plus the pleasures that accompany the many aspects of soaring.

At the point where ideas are drawn, molded and glued into actual parts, and the parts are in turn bonded to frames, it became appar-

ent that week ends spent at the flying field were causing wide gaps between the actual periods of construction. There was a point when the pleasures enjoyed in the workshop were far greater than those to be expected on the flying field. The decision was made to dispose of the sailplane owned by the author at that time and full effort was to be placed on the new machine. Early in 1958 an attempt was made to maintain an average of 14 hours a week in the workshop. This average has been held and in many cases exceeded except for two brief periods when I was out of the country as a member of the U.S. soaring team.

One of the greatest pleasures in building your own sailplane is derived from some obvious point of

## ABOUT THE AUTHOR

Ray Parker is known as one of America's finest craftsmen in the use of wood for constructing sailplanes. His T-Bird is a masterpiece in this field.

Much of Ray's soaring background was in the flying end of things. He graduated from Central Instructor's School at Randolph AFB during the war and then was chief pilot at the 29 Palms Air Academy for glider pilots. Later he was a pilot with the Thunderstorm Project and chief pilot for the Sierra Wave Project. He spent some time at Mississippi State with the late Dr. Raspet as a technician and pilot and currently is a lab technician for the AiResearch Mfg. Co. in Los Angeles.

Ray designed and built most of the Tiny Mite sailplane, which he mentions in this paper, and flew it to notable success in a number of Nationals, including second place in 1954. He was the fourth American to complete the Diamond C badge.

Ray is married and has one daughter, forming a very successful soaring family. Having crewed for him many times, they will no doubt be his chief boosters as he flies the T-Bird in the 1962 Nationals.

progress such as completion of the vertical stabilizer or the mounting of the horizontal surfaces, etc. As one reaches such points, it gives a great satisfaction and a sense that something has been created. Pleasant were the many hours spent relaxed in the easy chair contemplating the design approach to the next area of construction.

The earliest phase of construction was on the fuselage and the greatest emphasis placed on the comfort of the cockpit. At first glance this fuselage does not appear to have adequate space but actual construction was preceded by a full scale mock-up. Although this mock-up was quite simple it did serve to establish the dimensions of the cockpit area as it is at the present time. The intent was to obtain comfort yet keep cross section of the fuselage as small as practical. A reason for building the fuselage first was that the selection of the airfoil at this time could have been a mistake. The laminar profiles available were still being debated loud and long. It was felt that by the time the fuselage was completed more information on newer sections could be available.

From the start the general planform of the sailplane was known, but an attempt was made to avoid finalizing to such a point that deviations would be too difficult to perform. The selection of the overall dimensions of the aircraft were determined by the requirement that two people, if necessary, could assemble or disassemble without excessive physical labor.

The wing span is 50' 8½". To make the wing panels easier to handle, it was decided that a 3-piece wing would be necessary. The center section should not be heavier than the outer panels. The center section should also be as long as the trailer width would permit, with the intent that it should be removed from the fuselage only when absolutely necessary.

The aspect ratio was to be in excess of 20 and the safety factor was intended to be an ultimate of 12, and this factor has been carried throughout the design. The T tail has proved to be controversial but the reasons for using it are two-fold. The aerodynamic reason will be discussed later. To simplify the assembly of the aircraft, it was decided that the horizontal stabilizer would be non-removable as it was on my previous sailplane. Again the width of the trailer was a limiting factor, in