PILOT REPORT

on the fully AEROBATIC SKYOTE single-seat biplane

By R. A. Hoover

Editor's Note: The **Skyotë** *is a new homebuilt designed by O. E. "Pete" Bartoe of Boulder, Colorado. By way of introducing the aircraft to EAAers, we are pleased to present a pilot report by none other than Bob Hoover – more familiar to Oshkosh goers behind the wheel of a Shrike or doing the Tennessee Waltz down the runway in his bright yellow Mustang. Bob's report is followed by some interesting technical comments by designer, Pete Bartoe.*

Six **Skyotes** *are presently under construction and the one flown by Bob and shown in the pictures belongs to Brad Davenport of Broomfield, Colorado.*

Designer Bartoe reports that he has done the spin tests in NX8XX and found spin characteristics to be normal, with a nose down attitude of about 55° and with recovery from 6 turns in just over one half turn. – JBC

Skyotë has a wing span of 20 ft. and length of 16 ft. and was designed for an 0-200 Continental 100 hp engine, with a total fuel capacity of 13 gallons. The empty weight of the aircraft flown was 595 lbs. and was powered by a C-85, rather than the 100 hp engine called for in the design. As you can appreciate, the 85 hp Continental engine was easy to start and smooth running. The airplane was flown at an elevation in excess of 5,000 at Boulder, Colorado on June 23, 1976 at a temperature of approximately 65°. The engine started immediately with a one prop pull through. During taxi, the visibility was exceptionally good. The ground handling was considered satisfactory, though perhaps might possibly be considered sensitive by other pilots; however, I personally like sensitive tail wheel steering. S turns while taxiing were not required because of the excellent visibility over the nose and in all directions.

The Cleveland disc brakes are more than adequate, very responsive and capable of holding the airplane at

(Photo Courtesy Pete Bartoe)

full power, and more than adequate for stopping. The rudder became effective almost immediately upon the power application during the take off roll.

The airplane was held down to approximately 55 mph and upon lift off was maintained in a very shallow climb until a speed of approximately 85 mph was attained. After turning away from the airport, the speed was decreased to the best climb speed of 65 mph and the rate of climb increase was quite noticeable.

The airplane was climbed to approximately 9,000 ft., at which time a series of stalls power on and off was performed decreasing the air speed at approximately 1 knot per second until the stall was fully developed, wings level. There was no tendency for an abrupt roll. Any slight rolling tendency as a result of the stall could be corrected with either the ailerons or the rudder, and those extreme cases where the airplane was placed in an accelerated stall in turns either to the left or right, they could be corrected with a reduction in power along with opposite aileron application or opposite rudder.

Snap maneuvers were performed from straight and level flight both to the left and right at air speeds ranging from 55 up to 95 mph. Obviously, the roll rate or snap rate was much more rapid at the higher speeds than at the lower speeds. The recovery charateristics were excellent and snap rolls from vertical reverses were accomplished without difficulty from left to right and right to left.

Loops were performed from 100 mph up to 160 mph with a total diameter for the average loop approximately 500 ft. which is a very tight circle. A series of loops were performed starting with a conventional loop, a square loop and an eight-sided loop. Depending upon the air speed entry, these loops could be accomplished with relative ease and without a loss of altitude. Even though at this altitude of entry at 9,000 ft., I could well appreciate the decrease in power available and could only imagine what a delightful performance this airplane would have at sea level conditions.

Four, eight and sixteen point rolls were easy to accomplish, because of the delightful handling qualities and lateral control available, thanks to four ailerons. Knife edges were held on both the left and right side without difficulty.

Inverted flight was limited to short durations because of the lack of an inverted fuel system. However, the actual handling qualities of the airplane inverted were just as delightful as the upright characteristics power off. Side slips were performed at air speeds ranging from 80 mph down to 50 mph very comfortably.

The attitude at the stall is very comfortable without an extremely nose high attitude and the power off stall speed is approximately 40 to 45 mph with a gentle break away at the stall, power off. The power on stall is approximately 30 mph and the controls are effective right into the stall and can be flown out of the stall just by a slight drop of the nose.

An exact measurement was not taken on the landing roll, but I would guess that the actual distance was approximately 600 to 700 ft.

On this flight, the touchdown was accomplished carrying a wee bit of power, rather than at idle power. There is no difficulty in holding the direction after touchdown, nor was there a tendency to balloon or bounce as the landing gear design is more than adequate in providing a soft landing capability, because of the shock arrangement.

In the overall, I can only say that it was a rare experience to fly an airplane that exhibited such delightful flying qualities, along with an immense amount of creature comfort. My six foot plus frame fit very comfortably into the cockpit with ample leg room and the correct relationship between the rudder pedals and knee bend angle was such that the rudder pedals could be conveniently reached without leg cramping, and brakes could be applied if needed without concern for an awkward angle of the ankles, which is often required on small airplanes. In addition, there was a noticeable lack of buffet and wind in the open cockpit.

Anyone interested in a small, fully aerobatic airplane with economy in mind will certainly appreciate this great little airplane.

Anyone who is interested in building this outstanding airplane should contact Mr. Bartoe, the designer, for information. His address is 621 Aurora Ave., Boulder, Colorado 80302.

SKYOTË DESIGNER'S COMMENTS

The Skyotë was designed to meet some very specific criteria, the major items being:

1) Outstanding aerobatic qualities
2) Superior slow flight capabilities and ease of handling
3) Economical operation based on the Continental 0-200 engine
4) Absolute structural integrity

To achieve this required several specific features. For good snap roll performance and to obtain a small equal amount of lateral stability both upright and inverted, both upper and lower wings are swept back. There is no geometric dihedral. Four large ailerons give very powerful lateral control, and these are driven by torque tubes for a minimum of friction and play. All of the cockpit controls are ball-bearing mounted for smooth operation. The rudder pedals are hung from overhead with large toe brake pedals in "big aeroplane" fashion. The cockpit is adequate for 6'2" pilots.

It was desired to have a maximum stall speed of 38 knots with good, honest, slow speed characteristics so that the airplane could be flown easily by low time pilots. This was achieved by using a wing loading of about 7#/sq. ft. People always ask what airfoil is used. The airfoil is an NACA 4-digit airfoil but not one that you will find in the books. In the four digit system, the first digit is the camber expressed in percent of chord. Normally this is a single digit, i.e., 2412 has 2 percent camber. The Skyotë airfoil has 1.8 percent camber and is correctly specified in the four digit system as an NACA (1.8) 412. In other words, it is an NACA 4-digit series airfoil having 1.8 percent camber with maximum camber at 40% chord and a thickness of 12% chord.

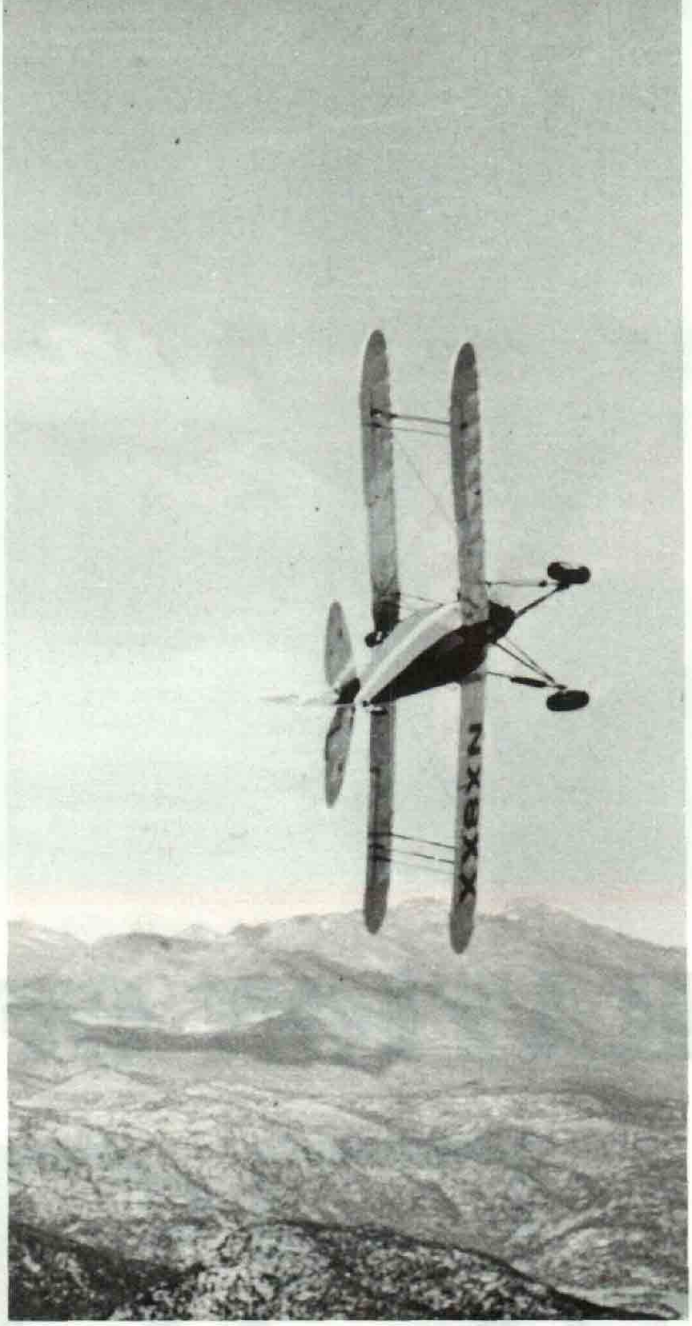
The slow flight feature also provides short field performance that makes any little grass strip quite suitable. The Skyotë gets off as quickly as a Super Cub (maybe quicker). This type of takeoff performance is equalled by the Rose Parakeet, but not by any of the other currently popular aerobatic biplanes.

Skyotë's structure is all metal. The wings have hydro-formed aluminum ribs and built up I-section aluminum spars. Great care has been taken in the design to assure that all load paths are through the appropriate centroids thus avoiding excentric loading moments. The structure was designed to FAA Part 23.0 requirements for aerobatic category. Empty weight using the Continental 0-200 engine is 595 lbs. Wing span is 20' with an area of 123 ft.^{2}.

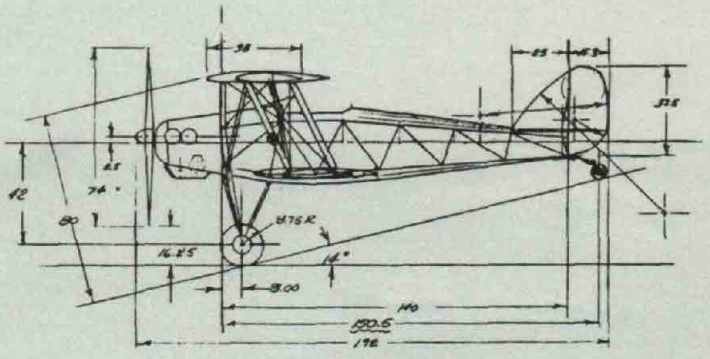
I had hoped that the Skyotë would fly like a swept wing, 4 aileron Parakeet with the structural strength and smoothness of controls of a Jungmeister. So far with 71 hours on Serial No. 6 airplane, I think the design comes close to those ultimate goals. Pending further testing, it is planned to make the Skyotë available in kit form.

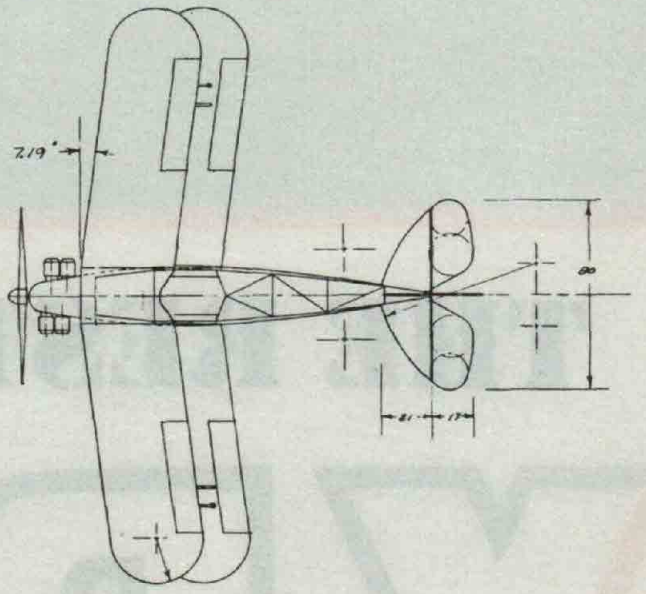
EXPERIMENTAL AIRCRAFT ASSOCIATION

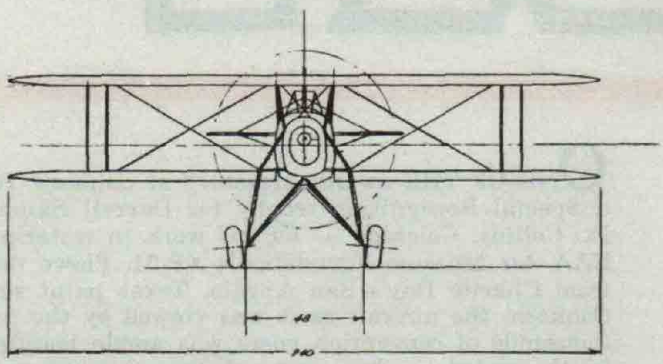
(Photo Courtesy Pete Bartoe)



(Photo Courtesy Pete Bartoe)







SKYOTE SPECIFICATIONS

Empty Weight	595 lbs.
Gross Weight	895 lbs.
Wing Area	123 Sq. Ft.
Wing Loading	7.28
Fuel	13 Gals. (U.S.)
Rudder Area	3.28 Sq. Ft.
Fin Area	2.11 Sq. Ft.
Stabilizer Area	6.95 Sq. Ft.
Elevator Area	6.70 Sq. Ft.
Stagger	19.0 inches
Gap	40.0 inches
Aileron Area	3.55 Sq. Ft.
Never Exceed Velocity	137 Kts.
Maneuvering Speed	93 Kts.
Structural Cruise Speed	97 Kts.
Stalling Speed	38 Kts.
Span (both wings)	20 Ft.
Length	16 Ft.
Height	6 Ft. 8 In.
Engine	Continental C-85 or C-90