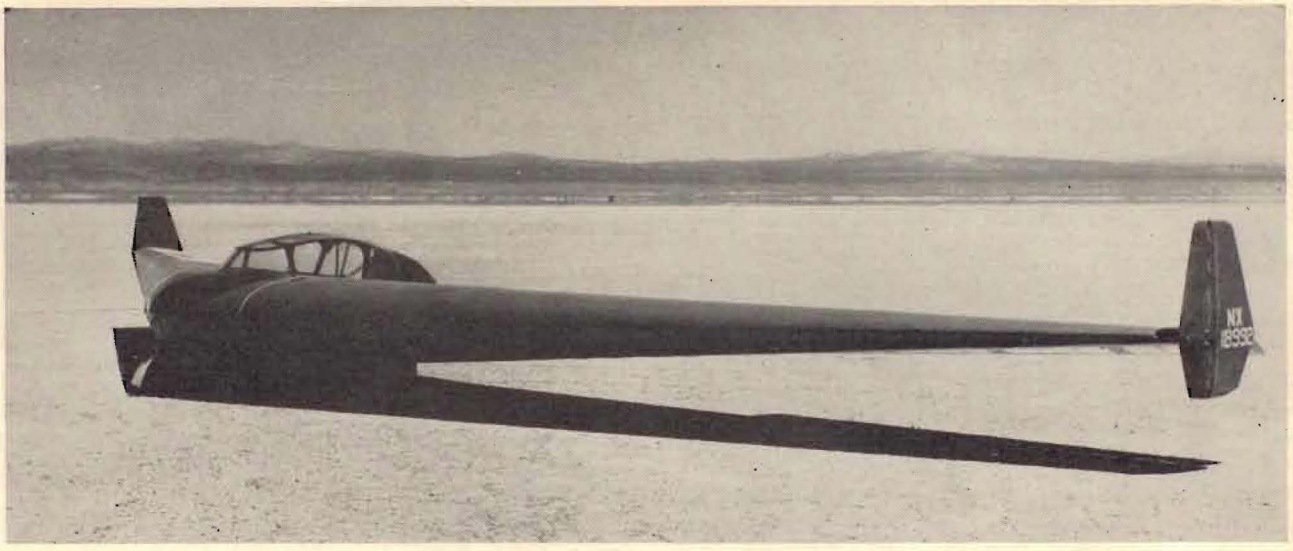

The Super Skywing at Rosemend Dry Lake, Calif., during test flights by the author.

FLYING WING SAILPLANES

By DON S. MITCHELL

FOR years it has been recognized that a flying wing, if it could be made controllable and stable, has distinct advantages over conventional aircraft. With this theory in mind, the author has put eight years of research into the development of the Super Skywing and the Super Osprey.

In 1942, by gathering information on flying wings built up to that time, the author came to the conclusion that the method of control being used in these ships was inadequate, with little hope of ever attaining popular acceptance.

After study of free flight models he developed a new method of control by using an external surface for elevator control and longitudinal stability.

Both the Mitchell Super Skywing, which has been successfully flown as a glider and as a power sailplane, as well as the Super Osprey, to be test flown in the latter part of August, incorporate these advantages.

External surfaces have been used as ailerons and flaps on conventional ships, but have *never* previously been made to function as an elevator on a flying wing.

Tip stalling of conventional flying wings takes place when the ship attains a relatively high angle of attack. When it occurs, elevator effectiveness is lost and as a result the ship is unstable and uncontrollable. Slots and twist (washout), or change in airfoil toward the tip do help this condition, but in themselves present structural, areodynamic and production problems.

The external surface prevents wing tip stalling at all angles of attack without the use of any of the above stall aids. It does this partly by controlling the boundary layer over the wing due to the venturi effect between the trailing edge of the wing and the leading edge of the surface, and partly by lowering, aerodynamically, the angle of attack of the wing preceding the surface when the ship is brought up to high angle of attack.

From the structural and production standpoints, this design is ideal. The wing has no washout whatsoever, therefore by the use of symmetrical airfoil from root to tip the right and left hand wings are identical, thus interchangeable.

The external surface functioning as an elevator and aileron reduces the number of parts to be built, and in addition only one set of controls have to be run into the wing to accommodate the elevator and aileron.

The absence of washout makes for a more efficient ship at slow speeds and one capable of extremely high speed in flat glides.

There are many other advantages—structurally, aerodynamically and from a production viewpoint—but they will not be outlined here.

The Super Skywing has been successfully flown as a glider and now has had a 28-horsepower Nelson engine installed with which it is being used as a powered sailplane.

SPECIFICATIONS

Two-place side by side seating.
Area—230 sq. ft.
Aspect ratio—11.
Taper ratio—4.3 to 1.
Airfoil root to tip Modified N.A.C.A.
Symmetrical airfoil.
No wing twist.
Tricycle gear.
Brakes on rear wheels.
All-wood construction.
External surfaces used as elevators — patents applied for.