

YESTERDAY'S WINGS:

# The Fleetwings Sea Bird

This unique amphibian received a lot of publicity and became well known, but only six were actually built

by PETER M. BOWERS / AOPA 54408

■ ■ One of the oddities of the technical and popular aviation press is the erroneous impression that it can create in a reader's mind concerning the prevalence of a particular airplane model. When a new model is introduced, feature articles about it appear in most of the aviation magazines and such reference annuals as Jane's All the World's Aircraft or Aircraft Yearbook pick it up. The directory issues of the major magazines sometimes carry it for several years even though true production may never have been achieved. If a photo happens to be used in an aviation textbook to illustrate a particular type, such as an amphibian, that model is publicized for many more years.

All of this exposure can create the impression that a particular model is quite common when in reality it exists only as a prototype or in very limited numbers. While the reader may not have personally seen that model at his local airport, he does see it in print often enough to accept it as part of the everyday aviation scene.

Such is the case with a unique amphibian known as the Fleetwings *Sea Bird*. The mere fact that it was an amphibian was sufficient to give the *Sea Bird* extra coverage in the contemporary aviation press and make it seem a common item. Actually, only six were built, and their net effect on the general aviation scene was about zero. However, the *Sea Bird* is sufficiently interesting in spite of its small numbers to justify a place in this "Yesterday's Wings" series.

Other than being an amphibian, which automatically introduces a whole collection of design compromises and outright handicaps, the *Sea Bird* is notable for being a true pioneer in the field of stainless steel aircraft construction. While this material had been used for several years for some aircraft com-

ponents, the parts were usually held together mechanically. The *Sea Bird* not only used stainless steel throughout (except for fabric wing and tail covering in engine and landing gear struts) but it used spot-welding rather than the traditional bolts and rivets to hold the structure together. The Edward G. Budd Company had built a spot-welded stainless steel amphibian a few years earlier, but it was strictly an experiment so the Fleetwings can be regarded as the first production model to use the process.

The firm that became Fleetwings, Inc., got its start in a non-aviation field about 1926, with a patent on a mechanical timing device. This was well suited to the control of automatic spot-welding machines, and a brisk business developed in adapting welders to use the timer. From this type of manufacturing and modification work, the company moved on to the welding itself. Having found that stainless steel was well suited to the spot-welding process, the

company reorganized as Fleetwings, Inc., in 1929 and began building stainless parts for established airplane manufacturers in a small shop on Roosevelt Field, Long Island. Two of the customers were builders of amphibians, which derived particular benefit from stainless steel, since corrosion of aluminum and conventional steel parts is one of the major seaplane headaches.

Seeing the disadvantage of basing a business on the fortunes of other firms over which he had no control, Fleetwings' President, Cecil DeGanahl, decided to put the firm into aircraft manufacturing on its own. This decision resulted in the unique situation of a process looking for a product. With no aeronautical engineering staff of its own, Fleetwings hired outside talent that designed and built a conventional landplane that had little competition potential in the established market. DeGanahl then decided that the amphibian field, wide open at the time (1933), was a natural for stainless steel construction. With this objective, Fleetwings hired James C. Reddig (who had long been associated with pioneer amphibian designer Grover Loening) to design the airplane, and acquired the plant of the old Keystone Aircraft at Bristol, Pa.

This was a natural for amphibian production, as it was right on the shore of the Delaware River with a seaplane ramp leading into the water.

With great confidence in the structural and fabrication economies possible with welded stainless steel construction, DeGanahl set what seemed fantastic design goals for the new amphibian (Fleetwings spelled this "amphibion" in its advertising). With all of the natural handicaps inherent in the amphibian design, the Fleetwings *Sea Bird* had to equal or exceed the performance of equivalent landplanes then available and not exceed them in weight.

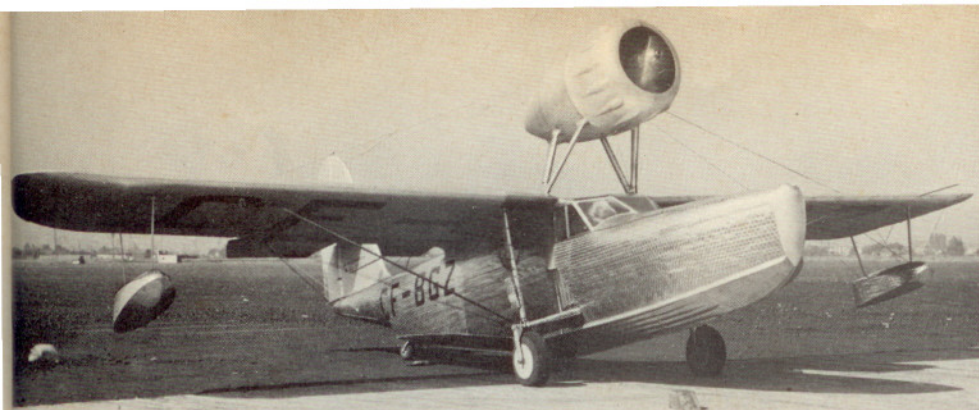
Reddig met the requirements with four-to five-place cabin designs based on the last of the Loenings, a high-wing monoplane with the wing wire-braced to the top-mounted engine and the lower longeron. Since the Fleetwings plant lacked extensive engineering facilities, wind tunnel model testing of the *Sea Bird* was done in the general aviation plant (formerly Fokker and Berliner-Joyce) at Dundalk, Md.

The prototype, with the factory designation of F-401 (for Model F-4, number 01), was completed early in 1936. The hull used semi-monocoque construction with extremely thin (.010") stainless steel skin stiffened by hundreds of bulb-angle and hat-section strips spot-welded in place at about two-inch intervals (Fleetwings called its spot-welding process "shotweld").

Power was provided by a 285 h.p. Jacobs L-5 radial engine, which turned a fixed-pitch Curtiss-Reed propeller. This installation reflected the growing trend toward using tractor engine installations on amphibians and flying boats with the engine mounted above the hull. The majority of designs produced in the

## SPECIFICATIONS AND PERFORMANCE

Wing Span	40 ft. 6 in.
Length	32 ft. 0 in.
Height	12 ft. 6 in.
Wing Area	235 sq. ft.
Powerplant	Jacobs L-5 300 h.p.
Empty Weight	2,450 lbs.
Gross Weight	3,750 lbs.
High Speed	150 m.p.h.
Cruising Speed	135 m.p.h.
Landing Speed	58 m.p.h.
Rate of Climb	900 f.p.m.
Service Ceiling	14,500 ft.
Range	540 mi.
Cost	\$22,500



The original Fleetwings Sea Bird F-401, with Canadian registration CF-BGZ. This plane is still flying and has reverted to its original American registration of N16793. The speckled effect on the unpainted hull results from the surface finish of the stainless steel skin. A. U. Schmidt photo

Fleetwings F-505, the last Sea Bird built. Note extreme upward angle of engine thrust line and negative angle of incidence of horizontal tail to reduce nose-over effect of high-mounted engine. Compare one-piece bubble canopy of F-5 to flat-panel built-up type of original F-4 and note larger side windows on F-5. E. M. Sommerich photo



early 1930's (and several since) were pushers. Since the high location of the thrust line naturally created a strong nose-down effect under power, the engine was installed with considerable up-thrust to deflect the slipstream downward onto the horizontal tail.

The hydraulically retractable landing gear was a remarkable piece of engineering that rotated the main wheels 90° upward and then folded the shock-absorber strut so that the wheel fairings fitted flat against the side of the hull nearly halfway to the wing to reduce the drag. Flaps and brakes were hydraulically actuated and the retractable (but non-steerable) tail wheel and

the water rudder were retracted hydraulically.

The F-401 *Sea Bird* came close enough to satisfying DeGanahl's requirements to receive the go-ahead for a production version. It was hoped that a production run of 50 F-5's could be attained, but such was not to be. Considerable detail redesign was undertaken to improve streamlining and hydrodynamic qualities and reduce fabrication costs. Some differences can be seen in the photos. The F-4 had a built-up flap-panel pilots' enclosure, while the improved F-5 had a one-piece bubble. The wingtip floats in the F-4 were supported by two struts and four wires each, while the F-5 used four struts and

no wires on floats of considerably different shape. The F-5 also had larger cabin windows that could double as escape hatches. Less obvious were the revised hull cross-section and bow-rise lines and the fact that the primary access door was under the engine nacelle on the F-4 and behind the wing on the F-5. The F-4 carried 50 gallons of fuel and the F-5 carried 70.

Original gross weight of the F-4 was 3,417 pounds, but this crept upward to 3,450 pounds by the time the design was certificated. With improved structure, the F-5 could fly at a gross weight of 3,750 pounds. The 1,300 pound useful load included full gas and oil, four people and 100 pounds of baggage, 25 pounds for such necessities as anchor, rope, tools, and engine cover, and 38 pounds for such optional equipment as the heavy radio and antennae of the day.

Handling characteristics were relatively docile for an airplane of such configuration, and some of the wild porpoising habits of other amphibians were quite well (but not entirely) subdued. The preferred technique for landing ashore was to make a tail-high wheel landing. Care had to be taken on water not to land at too high an angle of attack and touch the rear of the hull to the water first. The high center of gravity made wheel operations tricky and the high thrust line made very cautious use of the brakes mandatory. A full-throttle runup on the ground was impossible without tying the tail down.

The wire bracing of the wings on the relatively heavy airplane produced an odd effect. When a wing was hit by a gust, the resisting set of wires stretched a bit under the extra load and then acted like an undamped spring, giving the wing another jolt as it snapped back to the original dimensions.

Although the cabin was reasonably soundproofed, water landings on any but a glassy-smooth surface were a traumatic audio experience. The thin bottom skins and thin stiffeners flexed back and forth from the wave action and sounded, as one owner puts it, "like someone threw an armload of tin cans into the hold."

Of the six *Sea Birds* built (F-401 and F-501 through F-505), two are still flying today. F-401 is owned by Channing Clark of Glendale, Calif., who completed restoration just recently, while F-502 is owned by Bud Oliver of Daytona Beach, Fla. The exposure that these two get in their routine operations and at airshows throughout the country, with subsequent publicity, still creates the impression that the *Sea Bird* was a widely used design. □

One of two *Sea Birds* still flying is F-502, the second production model built. Restored after World War II by present owner Bud Oliver, this has such improvements as smooth-contour Cessna AT-17 cowling and oil cooler. Compare wing float shape and strut arrangement of this F-5 with the F-4 prototype.

Volusia Aviation Service photo

