



The S-12 Amphibian Air Car of 1941 was the predecessor of the Republic Seabee. Republic bought the Air Car from its designer and then had him update the craft.

The Republic Seabee

Age has not diminished this amphibian's appeal.

BY PETER M. BOWERS

Most owners of antique airplanes are proud of their birds' unique status. Their major enjoyment results from operating airplanes that are recognized antiques (21 years old by some standards, 30 by others) and therefore different in both appearance and concept from the current crop of computer-designed look-alikes.

A notable exception to this joy of antiquity is found among the owners of a very distinctive airplane known as the "Seabee" (note that this is written correctly as one word, not "Sea Bee," as sometimes seen). Since the last one was built in 1947, it is a bona-fide antique by anyone's standards, except those of Seabee owners. To them, the airplane is an entity all its own that does not fit any of the convenient categorical slots; mere age has nothing to do with the Seabee mystique.

Although marketed as a new design after World War II, the Republic RC-3 Seabee did not move directly from the drawing board to the marketplace. Two notably different prototypes flew in 1941 and 1944, but the basic layout can be traced all the way back to 1919.

Percival H. Spencer, AOPA 129012, had been in aviation for a long time and had designed 11 airplanes on his own before teaming up in 1937 with Vincent Larson. They formed Spencer-Larson Aircraft Corporation to finalize a unique amphibian that Larson had designed. When completed, the aircraft was known as the SL-12, even though Spencer actually had little to do with the design. The SL-12 had many problems; Spencer decided that he could design a better amphibian on his own and quit. In September 1940, he started work on his own S-12, a two-place, wooden flying boat amphibian with side-by-side seating and a 110-hp Franklin en-

gine. He called this the "Amphibian Air Car," and it first flew in August 1941.

Since his Air Car had good performance, Spencer was considering putting it into production when the attack on Pearl Harbor cut his idea short. He stored the airplane and went to work as a test pilot for the Republic Aviation Corporation. (Formerly the old Seversky Aircraft Corporation, Republic was renamed in 1939 but carried on the same designs in the same plant at Farmingdale, Long Island, New York.)

Early in 1943, Spencer received an attractive offer from a former Republic executive who had joined a company in Chicago that was trying to enter aviation. The job offered an opportunity to use the company's tooling to refine his homebuilt Air Car, so Spencer took the position and was able to upgrade his airplane. The Chicago company soon lost interest in aviation, so Spencer returned to Republic.

By this time, in late 1943, Republic was looking forward to the end of the war and needed a civil design to replace the P-47 "Thunderbolt" fighter that was then its principal product. Spencer proposed a redesign of his proven Air Car. Republic management not only bought the idea, but also paid for the design rights. Spencer was then teamed with Wendell Miller, and work on what would become the Republic RC-1 "Thunderbolt Amphibian" began in January 1944. Other employees joined the team later.

Acceding to current structural and tooling trends, the three-seat RC-1 (for Republic Commercial No. 1) was all-metal instead of wood and used a tapered full-cantilever wing, instead of the former straight-chord design with strut bracing. Further aerody-

amic refinements came from a single, large, wrapped-sheet-metal strut supporting each wing-tip float; the main landing wheels now retracted partway into the hull, instead of having the entire assembly, strut and all, out in the breeze as it had been on the Air Car. More substantial structure was built into the rear of the hull and the base of the fin, a major improvement that made the tail a cantilever unit and eliminated the need for the Air Car's unsightly tail booms. Power was supplied by an experimental Franklin engine driving a fixed-pitch propeller.

Considering all the inherent handicaps forced on an amphibian, the RC-1 was as good an airplane in its weight/power class as could be expected. However, the "big airplane" practices followed in the RC-1's design and construction were costly—much too costly for the existing market, according to Republic management, which was then looking at a \$12,000-plus airplane. The sales department thought that \$3,995 was a more attractive price, but the RC-1 could never be produced for that.

What followed was a minor miracle in airplane design. Where most models pick up weight and cost as they move from prototype to production, Republic went the other way. President Alfred Marchev ordered a massive redesign of the RC-1 to simplify the structure and reduce manufacturing costs to meet the target sales price. If a little performance was lost in the process, no matter—there were not enough competing amphibians around for the loss of a few mph to be a sales handicap.

A major risk for Republic was the cost of entirely new tooling for the revamped amphibian, now renamed the RC-3 "Seabee" (the RC-2 was to have been a civil transport version of the fast, four-engine XF-12 pho-

toplane that Republic had built for the U.S. Army; since the airliner was never built, the four preproduction Seabees are sometimes referred to as RC-2's). Handwork was reduced greatly by large machine-formed units that previously had been built up of several small components. The hull structure, which retained the lines of the RC-1, was reduced from 360 parts to 63, and the rivet count dropped from 6,500 to 2,400.

The major change was in the wing, which lost its graceful taper. It was now straight, with the traditional multiple ribs reduced to three on each side and with deeply beaded aluminum skins that both maintained the airfoil shape (NACA 4412) and provided torsional stiffness. An in-plant joke was that this structure was "built by the mile and cut off by the yard." A single strut on each side of the hull now carried the flight loads.

An aerodynamic step back was the landing gear, which was now entirely external and almost identical to the original Air Car design. It simply rotated aft through a great enough arc for the wheels to clear the water. Tailwheel retraction was really clever. Instead of hinging upward through complex linkages, the tailwheel was mounted on a longitudinal torque tube that simply rotated in place to raise the wheel. The water rudder, immediately aft of the tailwheel, did not retract. The RC-3 picked up a minor refinement over the RC-1, however, in the fabrication of the extremely clean wing-tip floats, which were pressed in two halves from sheet aluminum and supported by a single slim strut.

A further and very significant improvement was made in the engine installation. In the past, most flying boats with pusher engines showed a tendency toward tail-heaviness because the engine had to be mounted far enough aft to allow the propeller to clear the trailing edge of the wing. Aircooled Motors took care of this with a new 215-hp flat-six (opposed) Franklin engine that featured a long extension to the propeller shaft and allowed the bulky power section to be installed farther forward on the airplane for better balance. (Aircooled Motors had succeeded Franklin Automobile Company, of 1920s' air-cooled engine fame, and had been competitive with Continental and Lycoming for the lightplane-engine market since 1938.) Since the engine was enclosed in a cowl and pushers and seaplanes were notorious for overheating their engines when afloat, the new Franklin engine drove a fan that sucked cooling air through the cowl when the airplane had low or no forward speed.

To assure its supply of these special Seabee engines, Republic bought Aircooled Motors Company, which remained at its plant in Syracuse, New York.

The added power plus the space saved in the cabin by eliminating the impinging wheel wells, allowed the Seabee to become a four-place airplane with more elbowroom and legroom for each occupant than any



With World War II coming to an end, Republic was anxious to replace its Thunderbolt fighter with a civilian design. Thus, the greatly refined Air Car became Republic's RC-1 Thunderbolt.



This view of a production RC-3 shows how the special long-shaft, 215-hp Franklin engine was built onto the cabin instead of being mounted on struts as on most pusher flying boats and amphibians.

contemporary four-seater. As on the RC-1 and the Air Car, large doors were provided on each side of the hull, in line with the front seat, as on an automobile. Plus there was a large bow hatch on the right side for access from a dock or beach when the side doors could not be used. The two pilots shared a throw-over control wheel, but later modifications provided dual wheels or even a stick control for the pilot in the right seat.

The new Seabee was flying in May 1946 and received Approved Type Certificate (ATC) A-769 on October 15. The new price did not quite make the targeted \$3,995, but was set at \$4,495, still a terrific buy. In July 1946, it was raised to \$4,995 and in 1947 climbed to \$5,995. The optional Hartzell reversible propeller and its controls added another \$1,000 to the price.

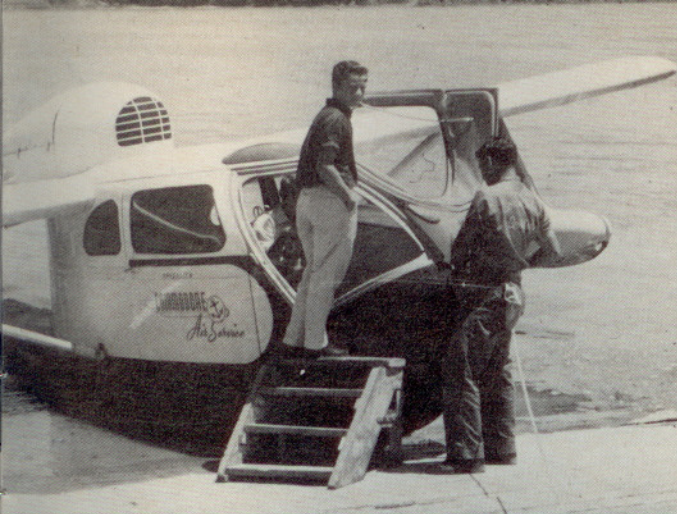
Orders for the new amphibian poured in, and with Republic's estimated production rate of 40 units a day, the skies should have been full of Seabees but such was not to be. The private-flying boom collapsed in 1947, and several manufacturers of lightplanes were forced out of business. Republic was left with acres of parked and unsold amphibians. The production line was shut down in October 1947, after 1,060 units had been built. This was far below the break-even point; every Seabee built lost money for Republic. The last Seabee was not sold until 1950. The company did not close down as had some others, however,

since it had by this time reestablished itself as a major military producer with the F-84 jet fighter.

After leaving the Seabee business, Republic sold its Aircooled Motors subsidiary to Tucker Industries of Cleveland, Ohio. For a few years, the Franklin engines were the principal moneymakers for the builder of the short-lived Tucker automobile.

As an airplane, the Seabee did relatively well, considering the built-in weight and configuration handicaps that you find in an amphibian. The major drawback, other than its obvious lack of power, was the high maintenance requirements of the "big airplane" systems and the special Franklin engine. (Another industry joke was that the Seabee mechanics prospered while Seabee owners went broke.) The rugged hull construction permitted the occasional wheels-up landings on the ground to be accomplished with relative impunity.

Over the years, various modifications were made by individuals and specialty firms to increase Seabee performance. The modifications ranged from increasing the wingspan, to adding wing-tip fences and "booster" wing tips, from three-blade metal propellers, to even larger engines (the 295-hp Lycoming in a "Super Seabee"). Supplemental type certificates (STCs) were issued for some of these. A unique, major modification was undertaken in 1961 by United Consultant Corporation of Norwood, Mas-



THE REPUBLIC SEABEE

RC-1 Thunderbolt Amphibian	Specifications	RC-3 Seabee
Franklin 6ALG-315	Powerplant	Franklin 6A8-215-B8F
175 hp		215 hp @ 2,500 rpm
36 ft	Wingspan	38 ft 8 in
26 ft	Length	27 ft 11 in
170 sq ft	Wing area	196 sq ft
15.2 lb/sq ft	Wing loading	15.3 lb/sq ft
14.9 lb/hp	Power loading	14.2 lb/hp
1,775 lb	Empty weight	1,950 lb
2,600 lb	Gross weight	3,000 lb
	Performance	
125 mph	High speed	120 mph
105 mph	Cruising speed	103 mph
53 mph	Landing speed	58 mph
750 fpm	Initial climb	700 fpm
420 sm	Range	560 sm



Although primarily a private-owner aircraft, the Seabee occasionally was used in commercial operations (top photograph). To enable the Seabee to carry extra paying passengers, the company would remove the amphibian's landing gear; the aircraft then operated only as a flying boat. The curved-down booster wing tips (directly above) were a popular modification to Seabees because they cut down on wing-tip vortex drag and increased wingspan slightly.

sachusetts. Two 180-hp Lycomings on the leading edge of the wing replaced the pusher Franklin engine; the wingspan was stretched six feet and the hull three feet; gross weight increased to 3,900 pounds; and the airplane was equipped with five seats. This was called the UC-1 "Twin Bee" and received a whole new ATC, A6-EA. It is way out of the original Seabee class. United Consultant changed its name to STOL Aircraft Corporation and continues to make the conversions. Joseph Giganti, president of STOL Aircraft, said that he currently is working on his twenty-second conversion.

Although primarily a private-owner airplane, the Seabee also was used in commercial operations. A popular modification was to remove the landing gear and operate it as

a pure flying boat, the weight-savings allowing an additional passenger.

Republic supported the Seabee fleet with the essential spares for a few years, then sold the inventory, tooling and design rights to the American Aviation Corporation of Freeland, Michigan. This firm soon merged with Downer Aircraft Industries of Saginaw, Michigan, which later acquired Bellanca as well. The Seabee rights have since passed to STOL Amphibians, Incorporated, of Key Biscayne, Florida.

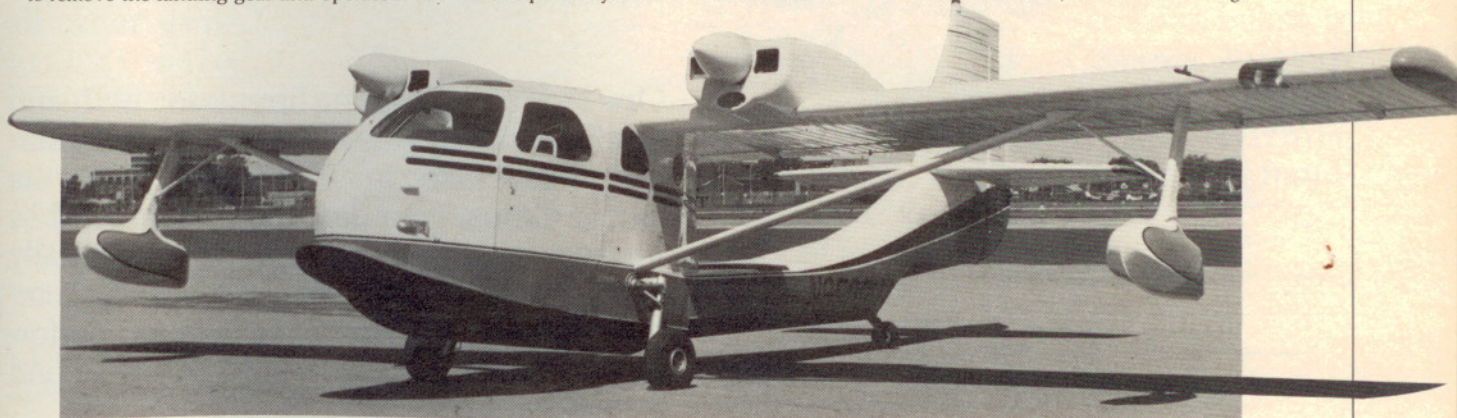
The Franklin engines also were involved in this game of industrial musical chairs. In 1961, Tucker sold Aircooled Motors to Aero Industries, which renamed it Franklin Motors. After business setbacks, Franklin was acquired by Audi S.A. of Brazil in 1974

and was then sold to WSK-Pezetel of Poland in 1975. A line of Franklin engines is now in production in Rzeszow, Poland.

Spencer is still in the homebuilt business. He offers an Air Car kit, derived from the Seabee, through his company in Sun Valley, California, Spencer Amphibian Air Car.

The distinctive and adamantly non-antique Seabee continues to fly. About 250 are on the U.S. Civil Register. As a mark of their present status, Seabee prices range from \$17,000 to nearly \$60,000, depending on condition and modifications, when they appear on the used-airplane market. □

Peter Bowers, AOPA 54408, works for Boeing. But when he flies, he prefers antiques or his homebuilt, winner of the 1962 EAA design contest.



Of the many modifications developed for the Seabee, STOL Aircraft Corporation's LIC-1 Twin Bee with two Lycoming engines is probably the most extreme.