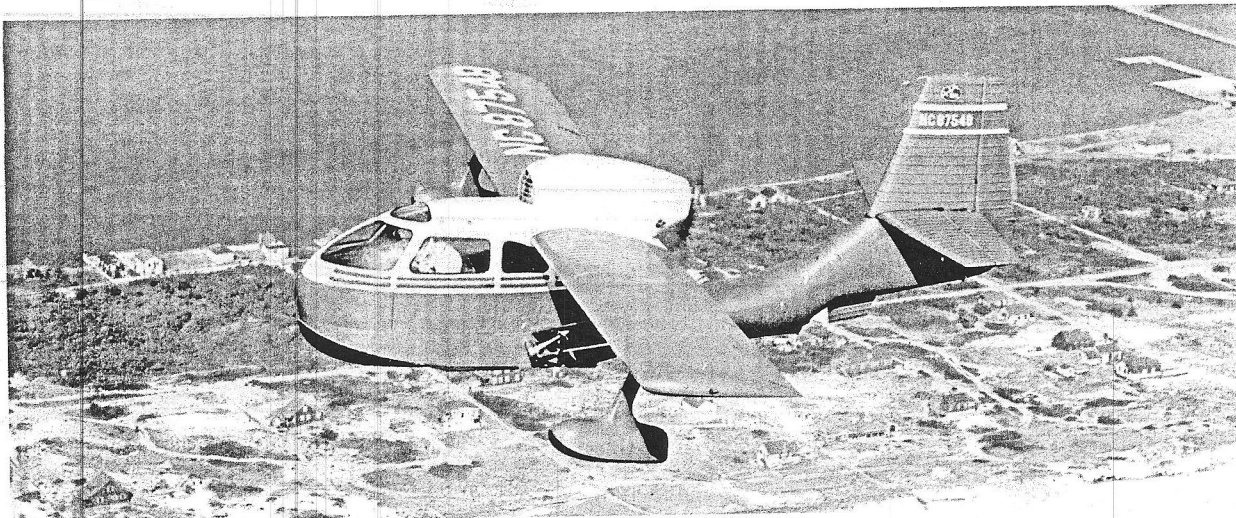


Republic's Big Bad 'Bee

By Rod Simpson



Many light aircraft tend to look very similar and be dismissed as mere "spam cans" but some post-war General Aviation designs are highly distinctive and have great character. One such machine is the Republic Seabee which still commands great respect from its loyal owners but experienced only a short production life with just over 1,000 being manufactured.

Republic Aviation Corporation was the successor to the pre-war Seversky company and its P-47 Thunderbolt is famed as one of the leading fighters of World War II. Republic built 15,329 Thunderbolts during World War II, with production reaching 450 a month from the Farmingdale and Evansville plants, and it established itself as a major manufacturer with substantial financial resources. However, as with other American manufacturers, Republic saw that the end of the war would mean the end of the huge military contracts, and the need to move forward, burdened by a large factory infrastructure and considerable capital responsibilities taken on during the war.

In the event, cancelled military contracts with Republic totalled \$242 million and, consequently, the company President Alfred Marchev launched a major re-invention of the company. His theory was that the private aircraft market would be lucrative, particularly as wartime flyers would be returning home with fat gratuities

payments and would want to have their own private aircraft. However, he realised this would only work if the mass production techniques pioneered by Detroit's car makers could be adopted – and, for Republic, used to building military-specification aircraft at military prices, this would be a total culture shock.

Marchev envisaged turning out around 40 light aircraft a day which would provide the company with sufficient volume to keep the price down and make a good profit. In retrospect, this seems completely far-fetched, but it should be remembered that Piper and Champion were both delivering aircraft at the rate of 21 per day in 1946 and the car industry was hitting much higher levels. As for the product, he envisaged that customers would be private owners who wanted a versatile family aircraft which could go anywhere and would, particularly, appeal to their hunting, shooting and fishing leisure activities.

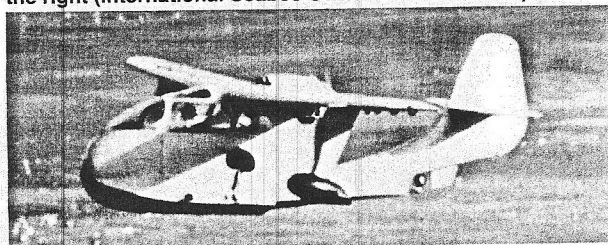
The Spencer Air Car

In late 1943, Republic carried out market research which revealed a niche for a small low-priced amphibian which would fulfil the role of the "family aircraft". They had already been approached by Percy H.

Spencer, the former Chief Test Pilot of Ireland Aircraft Corp., who offered his prototype design, the wood, tube and fabric Spencer Amphibian Air Car No.1. Republic's Board approved purchase of the design rights for \$17,000 and allocated development funds of \$300,000 to develop an all-metal version which they named the Thunderbolt Amphibian and Marchev assured them that there was a market for 2,500 aircraft. In fact, subsequent market research revealed a smaller number – in the region of only 1,500. Nevertheless, on 3rd December, 1944, Republic announced their plans for the aircraft, which would be priced at under \$4,000, and market reaction was good following a showing of the aircraft at the St. Louis National Aviation Trades Association Convention with thirty distributors being signed up, showing potential for up to 5,000 aircraft.

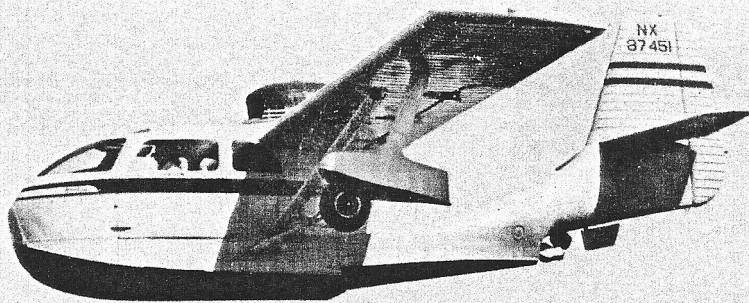
P.H. Spencer joined Republic and, with the company's Chief Engineer, Alexander Kartveli, re-engineered the Amphibian Air Car for all-metal construction, following which they proceeded with construction of a prototype. The Thunderbolt Amphibian had a very unusual layout with a pod and boom fuselage and a cantilever high wing with fixed stabilising floats. The tailwheel

Top: An early production Seabee, NC87548 (c/n 108), seen over the Florida coast in this photo by Harold G. Martin. Below and right: Two views of the Thunderbolt Amphibian, NX41816. In the right hand photo, PH Spencer is standing on the right (International Seabee Owners Club – IRSOC).

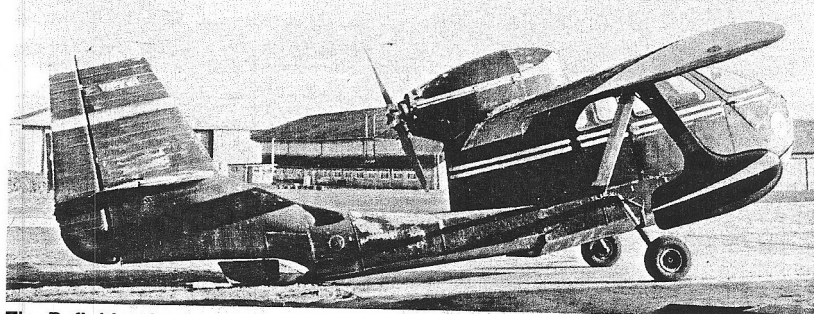


undercarriage had main units which folded upwards into the fuselage sides and the cabin could accommodate four people. They mounted a 175 h.p. six-cylinder Franklin 6ALG-365 pusher engine above and behind the cabin, selecting this engine because Republic had acquired Aircooled Motors Corp. which manufactured this particular powerplant.

The prototype RC-1, NX41816 (c/n 106-1) made its first flight on 30th November, 1944 – just a few days before the public announcement but it was soon obvious that considerable redesign would be needed to make the RC-1 into an acceptable production aircraft. For a start, the RC-1 was underpowered and it was clear that it was overweight and over-engineered. Because of the poor performance, it was decided that the definitive RC-2 should be powered by a 215 h.p. Franklin 6A8-215-B7F – but it also became clear that it was impossible to build the aircraft for sale at the target price of \$4,000. This led to a major redesign aimed at weight reduction, procurement of cheaper components and, more critically, a reduction in production man-hours. The cantilever wing was abandoned in favour of a strut-braced wing, and stressed skin construction allowed large numbers of ribs, stringers and fasteners to be eliminated with corrugated skins being substituted to stiffen the lifting surfaces. As an example of the simplification process, the wing floats, which originally had many parts, were redesigned to be made from two simple metal pressings welded together. Republic's project engineer, Alfred Boyajian, managed to reduce the parts count by three-quarters and reduce man-hours by over 80%, partly by automating production with a new automatic riveting machine and other labour-saving equipment. By bringing the estimated 2,500 man-hours down to 200 per aircraft, the company saw the prospect of building each machine for \$3,500 which would make it possible to sell for under the targeted \$4,000, including a VHF radio. This was crucial as Cessna was selling the two-seat Model 120 for \$2,695 and a 1946 Piper Super Cruiser was priced at \$3,295.



Above: The prototype RC-2, NX87451, shows many differences from the RC-1. Below: One of the Seabees which reached Australia, VH-WWA (c/n 416), was looking a bit shabby when photographed by Peter Keating at Melbourne Moorabbin.

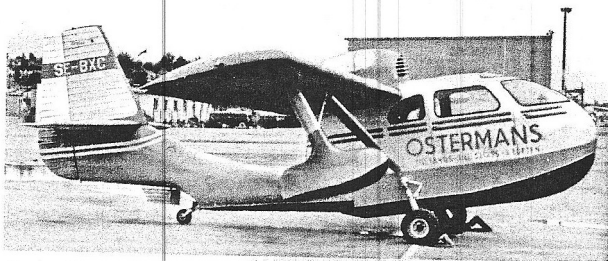


The Definitive Seabee

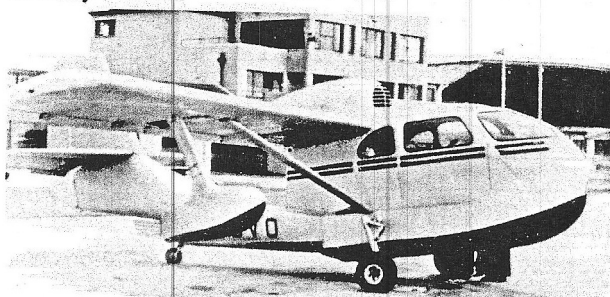
The prototype RC-2 (NX87451, c/n 1), which was first flown by P.H. Spencer on 1st December, 1945, was much different from the Thunderbolt Amphibian with greater wingspan, a longer fuselage and the 215 h.p. Franklin engine. It had a larger vertical fin and several changes to the forward fuselage design which contained a cabin with a 2-3 place rear bench and two front seats. There was a throw-over control column so that the aircraft could be flown from either crew seat. The aircraft was fitted with two large main doors together with a forward-opening windshield door on the starboard side to aid docking. The main undercarriage was redesigned to swung backwards and upwards instead of fully retracting into the fuselage as had been the case with the C-1. The targeted maximum speed of 120 mph was maintained and, surprisingly, despite the larger engine and bigger airframe, the aircraft

only weighed 400 lbs more – and had better useful load. In fact, the load could be improved by 196 lbs if the owner removed the undercarriage and operated only in seaplane mode.

Republic built ten RC-2 development airframes (c/n 1 to 10) in advance of the production version which was officially named the RC-3 Seabee in March, 1945. Externally, the RC-3 Seabee, was very similar to the RC-2 although the engine nacelle was extensively modified. The first of two prototype RC-3 Seabees was NX87461 (c/n 11) and, after testing, the type certificate (A-769) was issued on 15th October, 1946. Deliveries were already in progress to the dealer/distributor network at a retail price of \$3,995 and the first aircraft (NC87463 c/n 13) was handed over to Republic's distributor, Rankin Aviation Industries of Tulare, California on 25th July, 1946. Production and deliveries then built up with 212 aircraft handed over by



A good number of Seabees reached Europe – mainly for Scandinavia. Above left: SE-BXC of charter operator, Ostermans, seen at Arlanda and, above right, LN-PAH of Widerøes comes in to land at Trondheim's Ringve Lufthavn in September, 1960. Below left: G-AJVO was imported into the UK but soon sold as LN-TSN. Below right is Danish example, OY-ABZ, which was formerly G-AJNM.



the end of 1946 and a total of 163 reaching customers in the month of April, 1947 alone.

Republic's Sales Network

By late 1946, Republic had signed up 352 franchised dealers in its sales network within a distributor network. The initial batch of Seabees were earmarked for the 352 dealers, each of whom needed a demonstrator, but then the aircraft started to get out to retail customers. The tasks required of these distributors and dealers were considerable and Republic expected them to work with their customers and demonstrate the Seabee effectively in sales demonstrations, including showing them how to fly safely at maximum loaded weight, how to taxi in crosswinds and how to make safe power-on and power-off approaches. Quite apart from this, Republic had quotas for all its distributors which required them to take a certain number of aircraft every year – and this was then allocated down to the dealers.

Mostly, the aircraft went out with a standard specification, including a VHF radio, but many aircraft were also equipped with a reversible Hartzell HC-12X20-3 propeller to allow the Seabee to be backed out of mooring docks. Customers were varied and an early delivery was made to the US Department of the Interior which used a pair of Seabees for forest ranger duties. Another Seabee was modified with crop spraying equipment for use by the US Department of Agriculture to spray insects in the National Forests of the Adirondacks. Sales were also made to some famous customers such as the CBS anchor man, Arthur Godfrey. Many charter operators bought Seabees and they were popular in Europe with Norwegian and Swedish companies such as Widerøes, A/S Solbergfly and Østermans. Considerable numbers went to Canada, where the aircraft was approved for fitment of Model 3500 skis, and others reached Argentina, Brazil, Chile, Colombia, Iceland, India, Mexico, Portugal, Switzerland and Uruguay with



Above: Demonstrating the geometry of its undercarriage is N283GM and, below, Canadian "Thunder Bee" C-FOME fitted with a 320hp Chevrolet Corvette engine.



one also sold to Egypt. Three were imported into the UK (G-AJNM, G-AJVO and G-AJVP) but they only stayed briefly and soon moved on to Denmark and Norway.

New Seabee Variants

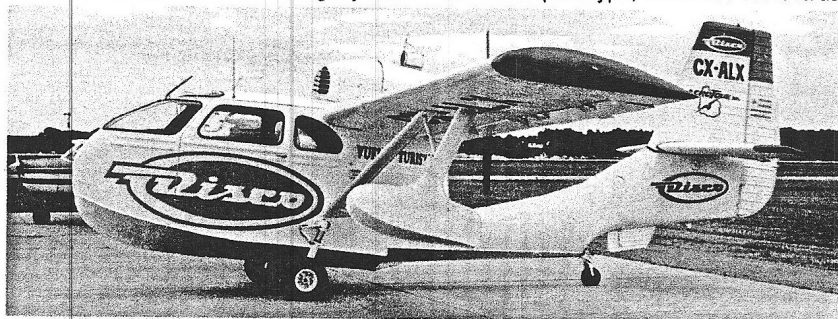
Republic saw the Seabee as the first of a much wider family of aircraft and looked at further development of the airframe in various ways. In fact, none of these projects got beyond the drawing board stage as events overtook the Seabee programme. The five-seat "Twinbee" was an enlarged RC-3 with two Franklin 6A8 engines mounted in a single nacelle driving one propeller. The "Landbee" was similar to the RC-3 without the seaplane hull – and the more radical "Beebee" was a smaller two-seat trainer with a 100 h.p. engine. In 1947, Republic also presented the RC-2 prototype, NX87451 for evalua-

tion by the U.S. Army as the YOA-15. It was to be powered by a 215 h.p. Lycoming O-425-5 engine and Republic announced in April, 1945 that an initial batch of 12 aircraft had been ordered for air-sea rescue work in the Far East. It was expected that larger orders would follow, and the military Seabee would be built at the Evansville factory rather than at Farmingdale. However, the contract was subsequently cancelled and no OA-15s were built.

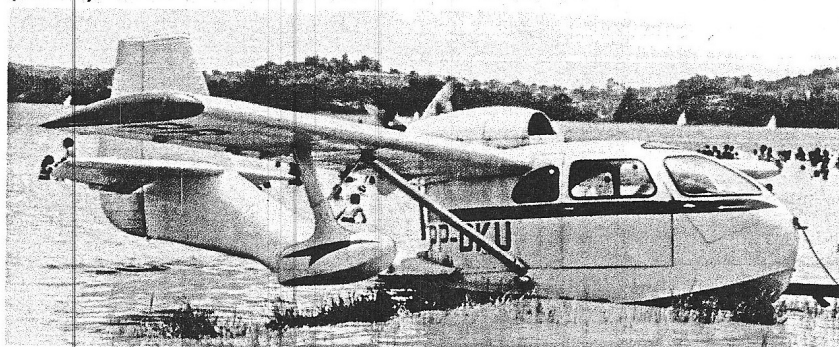
Crisis – And The End Of The Line

At the Republic factory, the production schedule was very ambitious – and was far from being met, partly due to delays in delivery of vital automated machinery. By September, 1946, output was only two aircraft a day and it was estimated that each Seabee was costing \$13,000 to build because of the excessive labour hours. Republic then raised the price from \$3,995 to \$4,495, and then \$4,995. Eventually, it went up to \$5,995 (which allowed distributors a \$1,250 margin) – and, not surprisingly, there was a market reaction. Deliveries started to slide and only 18 aircraft were handed over in September, 1947. By this time, the whole light aircraft post-war bubble was bursting. In 1946, the US General Aviation Industry delivered an enormous total of 33,254 aircraft, but this was down to 15,593 in 1947 and 7,043 in 1948. Second hand ex-military aircraft were coming on the market, the gratuities had been spent – and the light aircraft market was saturated.

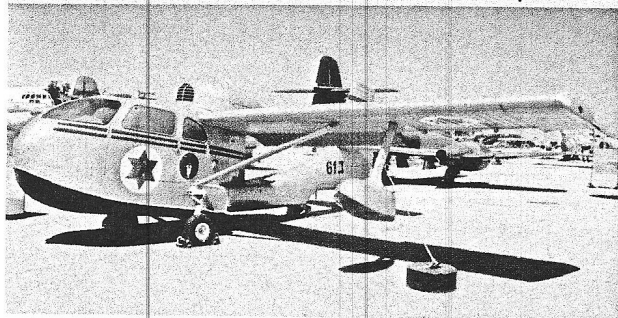
Faced with only a slim prospect of ever making any money with the Seabee, Republic announced, on 4th October, 1947, that it was closing the production line but would still provide parts and service for aircraft which had been delivered. They also said that negotiations were in progress for sale of the Seabee production rights but this eventually proved fruitless. On another front, Republic had invested a large sum in development of the XF-12 Rainbow high speed reconnaissance aircraft which could also serve as a 400 mph 46-passenger transport. Orders for 26 were placed by American Airlines and Pan American – but these orders lapsed and



A pair of South American Seabees – above the Uruguayan registered CX-ALX (c/n 534), used for sightseeing over Montevideo and, below, Brazilian example, PP-DKU (c/n 457).



Below: Preserved at the Israeli AF Museum is this Seabee (c/n 834) painted to represent c/n 1018 (ex VQ-PAV) operated by the *Haganah* from 1947. Above right: N255CB shows the large intake needed for higher-powered conversions and, below right, N6240K gets airborne at a Sun'n Fun Splash-In.



large scale military orders for the XF-12 were not forthcoming. However, Republic's lifeline was the F-84 Thunderjet which the USAF would need for the Korean War – which was becoming a future threat in 1948. Consequently, they leapt at the opportunity to turn over the new tooling and production space taken up by the Seabee to the much more lucrative government work.

By that time, the factory had built 1,048 production aircraft with the line closing with c/n 1060 (CF-GRL) and the final delivery being made to Submarine Engineering Co. of Norfolk, Virginia on 9th December, 1947. The type certificate was subsequently sold to STOL Amphibian Corporation of Key Biscayne, Florida but they did not re-start production. Republic Aircraft Manufacturing of Arlington, Washington had plans to build a modernised Seabee with a new single-step hull, larger wings, retractable floats, six seats and a 300 or 350 horsepower engine but this project also failed to move forward. As for the Seabee designer, P.H. Spencer, he developed another amphibian, the Trident Tri-Gull and followed this with the S-12 Air Car, which is a homebuilt aircraft very similar to the Seabee, and the smaller S-14 Air Car Junior.

Seabee Upgrades

The Seabee has always been considered as underpowered and the type has been a prime candidate for refitting with a larger

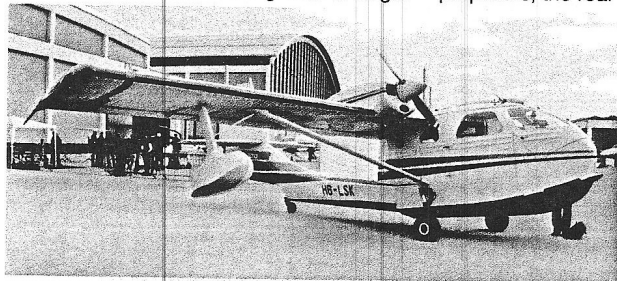
engine, particularly as spares for the Franklin have become scarce. The most common solution was to upgrade to "Super Bee" specification with a 270hp or 295hp Lycoming but powerplants such as the 300hp Continental IO-540 or the 340hp Lycoming GSO-480-A1A6 and IGSO-480 have been installed. These aircraft can be identified by the large rectangular air intake on the enlarged engine cowling. Several aircraft have been fitted with turboprops including C-GNVS (c/n 465) which has a Pratt & Whitney PT6A-20 and CF-MYT which was converted in 1982 with a Turboméca Astazou II. Another popular option is the Robinson V8 conversion which uses a 350hp Chevrolet Corvette LS-6 engine. Seabees often had aerodynamic modifications to improve performance and many were fitted with large wing endplates or various types of drooped wingtips. Other popular upgrades are electric flaps and undercarriage mechanisms and three-bladed propellers.

The most satisfactory conversion has been produced by United Consultants Corp. of Norwood, Massachusetts (later named STOL Aircraft Corporation). The first Twin Bee (N87589 c/n UC-1R158) was converted in 1966 with two 180 h.p. Lycoming IO-360-B1D engines mounted as tractor units on the upper wing surfaces. This permitted a fifth seat to be fitted beneath the old engine installation and, because of the position of the new propellers, the rear cabin windows on each

side were reduced in area and small portholes were fitted at the back of the cabin. 24 conversions were completed (UC-1R to UC-3R and UC-004 to UC-024) with a unit price of around \$300,000 and quite a few are still flying. The first aircraft gave many years of good service as a twin-engined trainer with Commodore Seaplanes at the seaplane base at Sausalito, California, just north of San Francisco.

The Seabee Legacy

So, how does one sum up the Seabee? At the time of writing, 208 (nearly 20% of the production total) remain on the US civil register and a handful are also active elsewhere. Their owners are enthusiastic about them and they were built with the precision of a military aircraft manufacturer – even though the Republic engineers tried hard to break away from their engineering traditions. There is still no aircraft equal to the Seabee – although Lake tried hard to make their LA-4 and LA-250 fill the gap and the SIAI Riviera was a direct equivalent – albeit, produced in very small numbers. In retrospect, Republic should never have embarked on the Seabee programme. There is a long-standing principle that companies that make small aircraft can move up to larger aircraft – but it seldom works the other way. Nevertheless, the Seabee has stood the test of time and we would be poorer if Republic had never taken the gamble of entering the fickle General Aviation market.



A collection of UC Twin Bees. Above left: HB-LSK, seen at Friedrichshafen in 2013 and, above right, N950TB climbs out of the water at Polk City, Florida. Below left: N65NE is used for twin-engined seaplane instruction at Winter Haven and, below right, N9508U, also flying in the Florida sunshine.

