



The Beech 18

There have been other Beechcraft twins, but only one "Twin Beech."

BY PETER M. BOWERS

Honors for the most versatile, noncombat twin-engine airplane ever built certainly must go to the Beechcraft Model 18. It first flew on January 15, 1937, and the last one was delivered on November 26, 1969. In the years between, it underwent various airframe and powerplant modifications and served in a variety of civil and military roles.

Its continuous production life of more than 32 years, during which 9,226 were built (or extensively rebuilt), set a record that has been exceeded only by the Taylor/Piper "Cub" line of 1931 through 1982.

The Model 18 was never given a catchy popular name, like the later "Bonanza"; it simply was referred to by its civil users as "The Twin Beech" and, by the military, by its various service designations. When other twin-engine Beech designs were introduced in the 1950s, the civil references had to get a bit more specific. Sorting them all out is a major chore, and I will not try to discuss every one of the minor variants here.

Also, the Model 18's resemblance to the 10-passenger Lockheed Model 10 Electra airliner of 1934 through 1937 was very noticeable, which led to early identification problems for the Beech. The Model 18 also was nearly wiped out by competition at birth. Just a month before the new Beech prototype flew, Lockheed introduced its Model 12A, which was essentially the Model 10 Electra airliner scaled down as a fast, eight-seat airliner. But Beech survived that period of very slow sales, and the Model 18 came to dominate the small-twin market. More than 2,000 are still on the U.S. civil register, to say nothing of how many are on foreign registers.

The Beech 18 was a milestone in operational concept. It was intended to give exec-



Beech saw a need for an executive aircraft between the big singles and the twin-engine airliners and designed the Model 18. The 18A (top) was converted to an 18B and is still in existence. The 18D (bottom) was one of three Model 18 variants produced under ATC-684.

utive aviation a relatively large and roomy eight-seater with the twin-engine capability and reliability of an airliner. Most corporate aircraft of the time were the top single-engine models of various manufacturers. However, a few big corporations were buying established airliners and having them fitted with custom executive interiors at the factory since they were the only suitable twins then in production.

The Model 18, designed jointly by Walter Beech and his chief engineer, Ted A. Wells, originated as an eight-place utility design primarily for executive use. Much of the original detail requirements were worked up by Dewey Noyes of the Ethyl Corporation, a user of the earlier Beech 17. Although the 18 was not intended to be a scheduled airliner, many 18s eventually were used as such, especially after the widespread establishment of commuter airlines and countless charter operations in the 1950s.

The first Twin Beech was designated Model 18A. On March 4, 1937, only seven

weeks after its first flight, the Beech 18 received Approved Type Certificate (ATC) A-630. Selling price was \$37,500, which was established as a reasonable market cost for a production airplane exclusive of development costs.

From outward appearance, it was a conventional all-sheet-aluminum twin in the style of the contemporary Lockheed and Douglas twins. The center section, however, was built up of heavy, welded steel tubing that formed a truss main spar to support the engines and landing gear. Spars for the outer wing panels were aluminum girder construction. The remaining structure was sheet aluminum except for fabric covering on the movable control surfaces.

The initial powerplants were the 320-hp Wright R-760-E2 (J-6-7) Whirlwind radial engines under NACA cowlings that were so close-fitting they had to have bumps in them to accommodate the rocker boxes on the cylinder heads. (This detail was not peculiar to Beech; other users of radial engines



also employed it extensively.) Fuel normally was carried in two 180-gallon tanks in the center section, but additional tanks could be installed in the outer wing panels.

The landing gear was not quite fully retractable; a small portion of each main wheel and the tailwheel protruded into the airstream when retracted. Two pilots sat at dual wheel controls, and, normally, six airline passenger seats occupied two rows in the cabin. Seating could be rearranged as desired or the interior stripped for cargo work. There were baggage compartments in the nose and aft of the cabin, plus an optional lavatory.

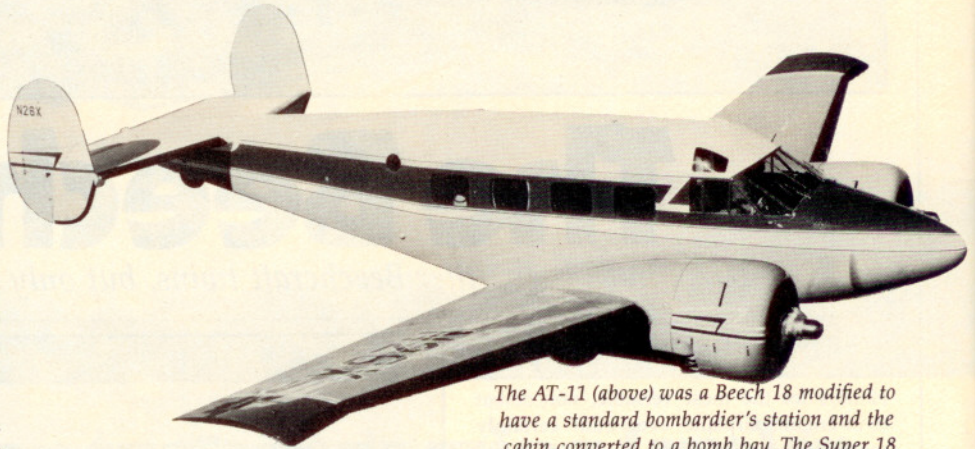
When the airplane was fitted with twin Edo 55-7170 floats (a real pioneering step for an American-made twin), it became the S-18-A (S for seaplane).

Only the prototype airplane was certificated under ATC A-630; Beech made enough improvements in the following production articles to justify a new ATC, A-656, issued on October 29, 1937. The most significant change to the 18-B model was the use of the 285-hp Jacobs L-5 engines; even the prototype was converted with them. Sales were slow, however, even at the reduced price of \$33,500, and only three 18-Bs, besides the converted prototype, were built.

Further refinements resulted in more designations and a new ATC; A-684 was issued initially on June 15, 1938, with revisions through May 7, 1940, for the 18-D, A-18-A and A-18-D variants. All used the 330-hp Jacobs L-6 engines and could be outfitted with floats. Sales were a bit better, with seven sold at \$37,000 each.

Major changes came with the B-18-S model of 1940. Outward differences were enlarged vertical tail surfaces and smooth cowlings for 450-hp (takeoff) Pratt & Whitney R-985 Wasp Jr. engines. The B-18-S received ATC A-710 on April 17, 1940, and although the civil market was now more receptive, the B-18-S was to see relatively little civil use at first. The principal customer turned out to be the U.S. Government. A few more than 5,000 were bought between 1940 and 1944.

These all used the basic B-18-S airframe. The Army C-45 (Navy JRB) was a light transport that was virtually an off-the-shelf civil model. The AT-7 (Navy SNB) was the first of a new breed of military trainer, a



The AT-11 (above) was a Beech 18 modified to have a standard bombardier's station and the cabin converted to a bomb bay. The Super 18 (left), introduced in 1954, was the first civil model to differ outwardly from prewar models.

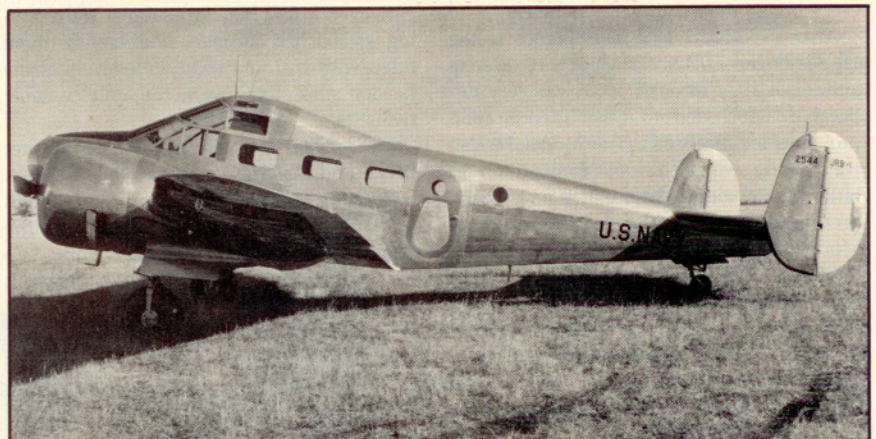
dedicated navigation trainer. Previously, such training was given in obsolete bombers or other suitable types that were passed down to the schools. The AT-7/SNB was fitted out for three student navigators and an instructor. The F-2 (also designated Navy JRB) was a photographic model with additional ports for fixed and hand-held cameras.

The AT-11 (Navy SNB-1) was the most militaristic, a bomber-crew trainer with a redesigned full-vision nose for the student bombardier, bomb racks in the cabin and either a machine gun turret or a navigator's sighting dome on top of the fuselage. The bomber variant had been developed for the Chinese in 1939; when U.S. Army officials

saw it during an inspection of the Beech plant in 1941, they immediately ordered some for the Army and assigned the designation AT-11 (AT meant Advanced Training).

In 1940 and 1941, the Navy was converting obsolete service airplanes and developing new designs as radio-controlled drones for gunnery targets and needed suitable airplanes to carry the controllers and their equipment. It had Beech fit a large cupola for the controller over the forward cabin of 11 JRB-1s. The Army also had some C-45s converted to controllers, but without the cupolas, under the designation of CQ-3.

Some 430 Beech 18s in the C-45 and AT-7 configurations, designated Expedito I,



The Navy JRB was a utility model fitted with a cupola above the cabin for the use of crews controlling drone aircraft. The panel inside the entry door opens for oblique photography.

were supplied to the Royal Air Force under a lend-lease contract.

With civil production suspended following the attack on Pearl Harbor, production of the Model 18 for the military continued on expanded production lines. The various minor changes and improvements made were not submitted to the Civil Aeronautics Administration for approval. By 1944, however, the military demands were tapering off and many of the country's leading business firms supporting the war effort needed replacement or additional executive aircraft. So, Beech submitted the improved 1943-1944 Army C-45F model (of which 1,137 were built altogether, including transfers to the Navy and RAF) for a new ATC. Certificate A-757 was awarded to Beech Model C-18-S on September 23, 1944, but the subsequent sales were not made directly to civil users. The paperwork went through the Army, which had contracted for the airplanes as C-45Fs, after which the Army released them to the selected civil users without the airplanes actually having carried military crews or markings. The C-45Fs cost the Army \$57,838; the civil buyers paid a little more than \$60,000.

The end of the war stopped military production at Beech for a while but did not close the Model 18 line, even though the military released many Model 18 variants plus larger twins for surplus sale. All but the AT-11 qualified for full civil licenses under some approved type certificate already issued. The structural differences in the AT-11 precluded a full ATC, but it could be licensed for commercial use under Memo Approval 2-582, issued on May 2, 1946.

Beech kept right on with civil developments and presented the D-18-S, still with the Wasp Jr. engines, under ATC A-765 on April 26, 1946. This was to receive various improvements and supplements to the same ATC through July 1962, as the E-18-S, G-18-S and H-18, plus further civil approval of features used on the military C-45G.

The military still had wide use for the Model 18, and between 1952 and 1961 sent 2,263 service-wear Model 18s back to the Beech factory in Wichita for refurbishing. This work was so extensive that Beech and the services both considered them to be new airplanes; the Air Force assigned new serial numbers and later designations (C-45G and -45H), and Beech includes the rebuilds in its tally of Model 18 production. The Navy rebuilds were designated SNB-5s but retained their original Navy serial numbers. And in 1962, under the new joint services designating system, Navy SNBs were redesignated C-45s.

In June 1947, with an eye toward the new feeder transport market, Beech introduced the nine-passenger D-18-CT under ATC A-770. The executive version was D-18-C. There were no obvious external differences, but the engines were changed to the new 525-hp (takeoff) Continental R-9A radials, which were basically the old Wright R-975



Even turboprop engines became one of the approved modifications for the Beech 18s.



Beech's final production Model 18 was the Super H-18, which featured tricycle landing gear.



The Dumod Corporation stretched the Model 18 to 43 feet five inches, producing a 15-seat airliner.

THE TWIN BEECH MODEL 18

	18-A 1937	B-18-S 1941	D-18-CT 1947	Super H-18 1963
Specifications				
Powerplants	2 Wright R-760-E2 320 hp @ 2,150 rpm (350 hp takeoff)	2 Pratt & Whitney Wasp Jr. 400 hp @ 2,000 rpm (450 hp takeoff)	2 Continental R-9A 500 hp @ 2,300 rpm @ 3,900 ft (525 hp takeoff) (w/Hydromatic props)	2 Pratt & Whitney Wasp Jr. 400 hp @ 2,200 rpm @ 5,000 ft (450 hp takeoff)
Wingspan	47 ft 8 in	47 ft 8 in	47 ft 8 in	49 ft 8 in
Length	31 ft 11 in	34 ft 3 in	34 ft 2 in	35 ft 2.5 in
Wing area	347 sq ft	347.5 sq ft	349 sq ft	360.7 sq ft
Wing loading	18.7 lb/sq ft	21.6 lb/sq ft	27 lb/sq ft	27.5 lb/sq ft
Power loading	9.3 lb/hp	8.3 lb/hp	9 lb/hp	11 lb/hp
Empty weight	4,100 lb	5,043 lb	6,000 lb	5,680 lb
Gross weight	6,500 lb	7,500 lb	9,450 lb	9,900 lb
Fuel capacity (optional)	160 gal (210 gal)	210 gal (260 gal)	206 gal (253 gal)	198 gal (318 gal)
Performance				
High speed	202 mph	240 mph @ 5,000 ft	240 mph @ 3,900 ft	236 mph @ 4,500 ft
Cruising speed	167 mph @ 75%	224 mph @ 11,000 ft @ 75%	224 mph @ 8,500 ft @ 75%	209 mph @ 5,000 ft @ 66%
Landing speed (flaps)	55 mph	61 mph	68 mph	87 mph
Initial climb	1,250 fpm	1,850 fpm	1,490 fpm	1,400 fpm
Service ceiling	20,000 ft	27,500 ft	23,800 ft	21,400 ft
Range (normal fuel)	668 sm (65% power)	1,000 sm	900 sm	1,530 sm (44% power)

(J-6-9) Whirlwinds of 1929 through 1945 upgraded for both helicopter (horizontal) and airplane use. The Beech D-18-C was the only airplane to use this engine in the closing years of the Big Round Engine era. About 30 D-18-Cs were sold at \$64,887 each.

Model 18 production continued on the ATC A-765 models. Major outward changes came with the E-18-S of July 1954, which was called the "Super 18" and featured redesigned wing tips, increased wingspan, and had the cabin roof raised nine inches. A more streamlined nose increased the length by a foot and a half.

While Beech was making its improvements to the Model 18, civil users were making modifications of their own for special work. Usually, these consisted of simple things—enlarging the doors for bulk cargo or stretchers, higher-density seating. But some aircraft manufacturing firms undertook major modifications, such as stretching the fuselage to accommodate up to 15 passengers for commuter transport work. Some owners even replaced the radial engines with turboprops, and one went so far as to develop a single-tail version. The only "modern" feature that the 18 could not be adapted to was pressurization—a natural to go with turbine engines.

These modifications, no matter how major, did not qualify the airplanes for new ATCs. Rather, the particular ATC was appended with a supplemental type certificate (STC) in the name of the modification firm.

Beech did not approve of all of the modifications, but did adopt one for its production models: tricycle landing gear as developed by John Thorp for Volpar Incorporated of Pacoima, California. Beech put tricycle gear on the final Super H-18 model that was added to ATC A-765 on July 11, 1962. The price of a Super H-18 ranged from \$130,000 to \$179,500, depending on equipment and custom installations.

The Volpar gear can be fitted to any previous Model 18 and uses the original main landing gear units. The modification mounts the gear farther aft than the original and has it retract forward instead of aft as before. The conversion adds two feet four inches to the nose because the nose gear also retracts forward. It also increases the speed slightly in spite of increased weight, because all three wheels are enclosed completely within the fuselage when retracted. Some of the military C-45G through -45J models were converted to tricycle gear and unofficially became C-45T (T for tricycle).

The last three Model 18s, delivered to Japan Air Lines as trainers, were turned over in a special ceremony in Wichita on November 26, 1969. In addition to ending a remarkable production record, these Super H-18s were also the last production passenger airplanes in the United States to be built with radial engines. □

Intrigued by airplanes long before his first ride in a Travel Air at age 10, Peter Bowers, AOPA 54408, has since logged more than 4,200 hours.