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Boeing 314 Clipper

From Wikipedia, the free encyclopedia

The **Boeing 314 Clipper** was a long-range flying boat produced by the Boeing Airplane Company between 1938 and 1941. One of the largest aircraft of the time, it used the massive wing of Boeing's earlier XB-15 bomber prototype to achieve the range necessary for flights across the Atlantic and Pacific Oceans. Twelve Clippers were built; nine were brought into service for Pan Am and later transferred to the U.S. military.^[2] The remaining three were sold to BOAC by Pan Am and delivered in early 1941. (BOAC's 3 Short S.26 transoceanic flying-boats had been requisitioned by the RAF).

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Design and development

Pan American had requested a flying boat with unprecedented range that could augment the airline's trans-Pacific Martin M-130. Boeing's bid was successful and on July 21, 1936, Pan American signed a contract for six. Boeing engineers adapted the cancelled XB-15's 149 feet (45 m) wing, and replaced the 850 horsepower (630 kW) Pratt & Whitney Twin Wasp radial engines with the 1,600 horsepower (1,200 kW) Wright Twin Cyclone.^[3] Pan Am ordered six more aircraft with increased engine power and capacity for 77 daytime passengers as the Boeing 314A.

The huge flying boat was assembled at Boeing's Plant 1 on the Duwamish River and towed to Elliott Bay for taxi and flight tests. The first flight was on June 7, 1938, piloted by Edmund T. "Eddie" Allen. At first the aircraft had a single vertical tail, and Allen found he had inadequate directional control. The aircraft returned to the factory and was fitted with the endplates on the ends of the horizontal tail in place of the single vertical fin. This too was found to be lacking and finally the centerline vertical fin was restored, after which the aircraft flew satisfactorily.^[4]

The 314 used a series of heavy ribs and spars to create a robust fuselage and cantilevered wing, obviating the need for external drag-inducing struts to brace the wings. Boeing also incorporated Dornier-style sponsons into the hull structure.^[5] The sponsons, broad lateral extensions at the waterline on both sides of the hull, served several purposes: they provided a wide platform to stabilize the craft while floating on water, they acted as an entryway for passengers boarding the flying boat and they were shaped to contribute additional lift in flight. Passengers and their baggage were weighed, with each passenger allowed up to 77 pounds (35 kg) free baggage allowance (in the later 314 series) but then charged \$3.25 per lb (\$7.15/kg) for exceeding the limit.^[6] To fly the long ranges needed for trans-Pacific service, the 314 carried 4,246 US gallons (16,070 l; 3,536 imp gal) of gasoline. The later 314A model carried a further 1,200 US gallons (4,500 l; 1,000 imp gal). A capacity of 300 US gallons (1,100 l; 250 imp gal) of oil was required for operation of the radial engines.

Pan Am's "Clippers" were built for "one-class" luxury air travel, a necessity given the long duration of transoceanic flights. The seats could be converted into 36 bunks for overnight accommodation; with a cruising speed of only 188 miles per hour (303 km/h) (typically flights at maximum gross weight were carried out at 155 miles per hour (249 km/h)) in 1940 Pan Am's schedule San Francisco to Honolulu was 19 hours. The 314s had a lounge and dining area, and the galleys were crewed by chefs from four-star hotels. Men and women were provided with separate dressing rooms, and white-coated stewards served five and six-course meals with gleaming silver service. The

Boeing 314 Clipper



A Boeing 314 flying low

| | |
|----------------------|--|
| Role | Flying boat airliner |
| Manufacturer | Boeing Airplane Company |
| First flight | June 7, 1938 |
| Introduction | 1939 |
| Retired | 1946 |
| Status | Retired (Foynes Flying Boat Museum , County Limerick , Ireland , has a replica) ^[1] |
| Primary users | Pan American World Airways British Overseas Airways Corporation United States Navy |
| Produced | 1938–1941 |
| Number built | 12 |



The *Yankee Clipper* in 1939.



The *California Clipper* at Cavite, the Philippines, 1940.

standard of luxury on Pan American's Boeing 314s has rarely been matched on heavier-than-air transport since then; they were a form of travel for the super-rich, at \$675 return from [New York](#) to [Southampton](#), comparable to a round trip aboard [Concorde](#) in 2006.^[7] Most of the flights were transpacific with a one-way ticket from [San Francisco](#) to Hong Kong, via the "stepping-stone" islands posted at \$760 (or \$1,368 round-trip).^[8] The [Pan Am](#) Boeing 314 "Clipper" planes brought exotic destinations like the Far East within reach of air travelers and came to represent the romance of flight. The transatlantic flights continued to neutral [Lisbon](#) and [Éire](#) (Ireland) after war broke out in Europe in September 1939 (and until 1945) but military passengers and cargoes necessarily got priority and the service was more spartan.

Equally critical to the 314's success was the proficiency of its Pan Am flight crews, who were extremely skilled at long-distance, over-water flight operations and navigation. For training, many of the transpacific flights carried a second crew.^[9] Only the very best and most experienced flight crews were assigned Boeing 314 flying boat duty. Before coming aboard, all Pan Am captains as well as first and second officers had thousands of hours of flight time in other seaplanes and flying boats. Rigorous training in dead reckoning, timed turns, judging drift from sea current, astral navigation, and radio navigation were conducted. In conditions of poor or no visibility, pilots sometimes made successful landings at fogged-in harbors by landing out to sea, then taxiing the 314 into port.^[10]

Operational history



Flown "trioptych" cover carried around the world on PAA Boeing 314 Clippers and Imperial Airways Short S23 flying boats June 24–July 28, 1939

The first 314, *Honolulu Clipper*, entered regular service on the [San Francisco-Hong Kong](#) route in January 1939. A one-way trip on this route took over six days to complete. Commercial passenger service lasted less than three years, ending when the United States entered [World War II](#) in December 1941.

At the outbreak of the war in the Pacific, the *Pacific Clipper* was en route to [New Zealand](#). Rather than risk flying back to Honolulu and being shot down by Japanese fighters, it was decided to fly west to [New York](#). Starting on December 8, 1941 at [Auckland](#), New Zealand, the *Pacific Clipper* covered over 31,500 miles (50,694 km) via such exotic locales as [Surabaya](#), [Karachi](#), [Bahrain](#), [Khartoum](#) and [Leopoldville](#). The *Pacific Clipper* landed at Pan American's [LaGuardia Field](#) seaplane base at 7:12 on the morning of January 6, 1942.



Boeing 314 in US Navy colors, c. 1942

The *Yankee Clipper* flew across the Atlantic on a route from [Southampton](#) to [Port Washington](#), [New York](#) with intermediate stops at [Foynes](#), [Ireland](#), [Botwood](#), [Newfoundland](#), and [Shediac](#), [New Brunswick](#). The inaugural trip occurred on June 24, 1939.

The *Clipper* fleet was pressed into military service during World War II, and the flying boats were used for ferrying personnel and equipment to the [European](#) and [Pacific fronts](#). The aircraft were purchased by the War and Navy Departments and leased back to Pan Am for a

dollar, with the understanding that all would be operated by the Navy once four-engined replacements for the Army's four Clippers were in service. Only the markings on the aircraft changed: the Clippers continued to be flown by their experienced Pan Am civilian crews. American military cargo was carried via [Natal](#), [Brazil](#) to [Liberia](#), to supply the British forces at [Cairo](#) and even the [Russians](#), via [Teheran](#). The Model 314 was then the only aircraft in the world that could make the 2,150-statute-mile (3,460 km) crossing over water,^[11] and was given the military designation **C-98**. Since the Pan Am pilots and crews had extensive expertise in using flying boats for extreme long-distance over-water flights, the company's pilots and navigators continued to serve as flight crew. In 1943, President [Franklin D. Roosevelt](#) traveled to the [Casablanca Conference](#) in a Pan-Am crewed Boeing 314 *Dixie Clipper*.^[2]

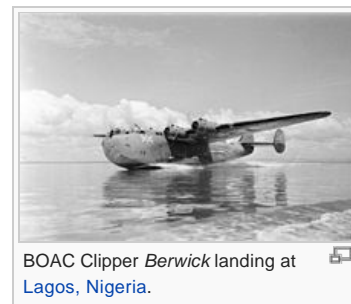
The success of the six initial Clippers had led Pan Am to place an order for six improved 314A models to be delivered in 1941, with the goal of doubling the service on both Atlantic and Pacific routes. However, the fall of France in 1940 caused some doubt about whether the Atlantic service could continue; passenger numbers were already reduced due to the war, and if Spain or Portugal was to join the Axis, then the flights to Lisbon would be forced to stop. Pan Am began to consider reducing their order and, in August 1940, reached an agreement to sell three of the six under construction to the United Kingdom. The aircraft were to be operated by the [British Overseas Airways Corporation](#) and were primarily intended for the UK - West Africa route, as existing flying boats could not travel this route without stopping in Lisbon. The sale made a small net profit for Pan Am - priced at cost plus 5% - and provided a vital communications link for Britain, but was politically controversial. In order to arrange the sale, the junior minister [Harold Balfour](#) had to agree to the contract with no government approval, leading to stern disapproval from [Winston Churchill](#) and lengthy debate by the Cabinet over the propriety of the purchase.^[12] Churchill later flew on the *Bristol* and *Berwick*,^[2] which he praised intensely,^[12] adding to the Clippers' fame during the war.^[13]

After the war, several Clippers were returned to Pan American hands. However, even before hostilities had ended, the Clipper had become obsolete. The flying boat's advantage had been that it didn't require long concrete runways, but during the war a great many such runways were built for [heavy bombers](#).^[2] New long-range airliners such as the [Lockheed Constellation](#) and [Douglas DC-4](#) were developed. The new landplanes were relatively easy to fly, and did not require the extensive pilot training programs mandated for seaplane operations. One of the 314's most experienced pilots said, "We were indeed glad to change to DC-4s, and I argued daily for eliminating all flying boats. The landplanes were much safer. No one in the operations department... had any idea of the hazards of flying boat operations. The main problem now was lack of the very high level of

experience and competence required of seaplane pilots".^[14]

Retirement

The last Pan Am 314 to be retired in 1946, the *California Clipper* NC18602, had accumulated more than a million flight miles.^[15] Of the 12 Boeing 314 Clippers built three were lost to accidents, although only one of those resulted in fatalities: 24 passengers and crew aboard the *Yankee Clipper* NC18603 lost their lives in a landing accident at [Lisbon, Portugal](#) on February 22, 1943. Among that flight's passengers were prominent American author and war correspondent [Benjamin Robertson](#) who was killed and the American singer and film/TV actress [Jane Froman](#) who was seriously injured.^[16]



BOAC Clipper *Berwick* landing at [Lagos, Nigeria](#).

Pan-Am's 314 was removed from scheduled service in 1946 and the seven serviceable B-314s were purchased by the start-up airline New World Airways. These sat at [San Diego's Lindbergh Field](#) for a long time before all were eventually sold for scrap in 1950. The last of the fleet, the *Anzac Clipper* NC18611(A), was resold and scrapped at [Baltimore, Maryland](#) in late 1951.

BOAC's 314As were withdrawn from the Baltimore-to-[Bermuda](#) route in January 1948, replaced by [Lockheed Constellations](#) flying from New York and Baltimore to Bermuda.^[17]

Variants

Model 314

Initial production version with 1,500 horsepower (1,100 kW) Twin Cyclone engines, six built for Pan Am.

Model 314A

Improved version with 1,600 horsepower (1,200 kW) Twin Cyclones with larger-diameter propellers, additional 1,200 US gallons (4,500 l; 1,000 imp gal) fuel capacity, and revised interior. Still air range approx 4,700 miles.^[18] Six built, three for Pan Am and three sold to BOAC.

B-314

Five Model 314s impressed into military service with the U.S. Navy

C-98

Four Model 314s impressed into military service with the U.S. Army Air Forces

Model 306

A concept aircraft using a Model 314 fuselage with a tailless delta-wing planform. No examples built.

Operators

United States

- [Pan American World Airways](#)
- [United States Army Air Forces](#)
- [United States Navy](#)

United Kingdom

- [British Overseas Airways Corporation](#)

Aircraft operated by Pan Am

| Registration | Type | Name | In service | Remarks |
|--------------|------|---------------------------|------------|---|
| NC18601 | 314 | <i>Honolulu Clipper</i> | 1939–1945 | Successfully landed 650 miles east of Oahu after losing power in two engines while flying for the US Navy on 3 November 1945. Aircraft mechanics from the <i>escort carrier</i> <i>Manila Bay</i> were unable to repair the engines at sea. The <i>seaplane tender</i> <i>San Pablo</i> attempted tow into port; but the flying boat was damaged in a collision with the tender and intentionally sunk on 14 November by perforating the hull with 20mm Oerlikon gunfire after salvage was deemed impractical. ^[4] |
| NC18602 | 314 | <i>California Clipper</i> | 1939–1950 | Sold to World Airways after the War and was scrapped in 1950. |
| NC18603 | 314 | <i>Yankee Clipper</i> | 1939–1943 | Started Transatlantic mail service. Crashed on February 22 when a wing hit the water during a turn on landing at Lisbon Portugal . A total of 24 of 39 on board were killed. ^[19] |
| NC18604 | 314 | <i>Atlantic Clipper</i> | 1939–1946 | Purchased by the US Navy in 1942, but operated by Pan Am; salvaged for parts. |
| NC18605 | 314 | <i>Dixie Clipper</i> | 1939–1950 | Started transatlantic passenger service, later sold to World Airways. First Presidential flight for the Casablanca Conference . Scrapped 1950. |
| NC18606 | 314 | <i>American Clipper</i> | 1939– | Later sold to World Airways. Scrapped 1950. |

| | | | | |
|---------|------|--------------------------|-----------|---|
| | | | 1946 | |
| NC18609 | 314A | <i>Pacific Clipper</i> | 1941–1946 | Temporarily named <i>California Clipper</i> to replace 18602 that was being moved to Atlantic service, renamed <i>Pacific Clipper</i> in 1942. Later sold to Universal Airlines. Damaged by storm and salvaged for parts. |
| NC18611 | 314A | <i>Anzac Clipper</i> | 1941–1951 | Sold to Universal Airlines 1946, American International Airways 1947, World Airways 1948. Sold privately 1951, destroyed at Baltimore, Maryland 1951. |
| NC18612 | 314A | <i>Cape Town Clipper</i> | 1941–1946 | Sold to: US Navy - 1942, Sold to: American International Airways - 1947. As the <i>Bermuda Sky Queen</i> she ditched at sea on October 14, 1947. After the rescue of all passengers and crew she was sunk by the United States Coast Guard as a hazard to navigation. ^[20] |

Aircraft operated by [British Overseas Airways Corporation](#)

| Registration | Type | Name | In service | Remarks |
|--------------|--------------|----------------|------------|--|
| G-AGBZ | 314A (#2081) | <i>Bristol</i> | 1941–1948 | Originally NC18607, sold to General Phoenix Corporation, Baltimore as NC18607 in 1948 |
| G-AGCA | 314A (#2082) | <i>Berwick</i> | 1941–1948 | Originally NC18608, sold to General Phoenix Corporation, Baltimore as NC18608 in 1948. This aircraft flew both Winston Churchill and Lord Beaverbrook (Minister of Aircraft Production) back to the United Kingdom in mid January, 1942 after the British Prime Minister's extended stay in the United States following Pearl Harbor. Churchill was the first head of government to do a trans-Atlantic crossing by plane. ^{[21][22]} |
| G-AGCB | 314A (#2084) | <i>Bangor</i> | 1941–1948 | Originally NC18610, sold to General Phoenix Corporation, Baltimore as NC18610 in 1948 |

Surviving Aircraft

None of the dozen 314s built between 1939 and 1941 survived beyond 1951 with all 12 having been scrapped, [scuttled](#), cannibalized for parts, or otherwise written off.

Underwater Admiralty Sciences, a non-profit oceanographic exploration and science research organization based in Kirkland, Washington, announced in 2005, at the 70th Anniversary of the first *China Clipper* flight in San Francisco, its plans to survey, photograph, and possibly recover the remains of the hulls of two sunken 314s:

NC18601 (*Honolulu Clipper*), scuttled in the Pacific Ocean in 1945; and NC18612 (*Bermuda Sky Queen*, formerly *Cape Town Clipper*), sunk in the Atlantic by the Coast Guard in 1947. UAS has also spent significant time at Pan Am reunions and with individual crewmembers and employees of Pan Am conducting videotaped interviews for the mission's companion documentary.^{[23][24]} However, as of 2014, no search or recovery had been attempted, with the most recent news from 2011 suggesting that the company was still in need of at least US\$8 million to get the plan underway.^[25]



The full-size replica of a Boeing 314 flying boat at the [Foynes Flying Boat Museum](#), [County Limerick](#), [Ireland](#).

There is a life-size 314 mockup at the Foynes Flying Boat Museum, [Foynes](#), [County Limerick](#), [Ireland](#). The museum is at the site of the original transatlantic flying-boat terminus.^[26]

Specifications (314A Clipper)



Data from Jane's Fighting Aircraft of World War II^[27]

General characteristics

- **Crew:** 11, including 2 cabin stewards
- **Capacity:** *Daytime:* 74 passengers, *Nighttime:* 36 passengers
- **Payload:** 10,000 lb (4,500 kg) of mail and cargo
- **Length:** 106 ft (32.33 m)
- **Wingspan:** 152 ft (46.36 m)
- **Height:** 20 ft 4½ in (6.22 m)
- **Empty weight:** 48,400 lb (21,900 kg)
- **Loaded weight:** 84,000 lb (38,000 kg)
- **Powerplant:** 4 × [Wright R-2600-3 radial engines](#), 1,600 hp (1,200 kW) each

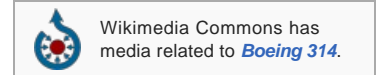
Performance

- **Maximum speed:** 210 mph (180 knots, 340 km/h)
- **Cruise speed:** 188 mph (163 knots, 302 km/h) at 11,000 ft (3,400 m)
- **Range:** 3,685 mi (3,201 nm, 5,896 km) normal cruise

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External links

- [The Boeing 314](#) 
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- [\[2\] !\[\]\(d190cc638f389909d4b049d6c19e4cb2_img.jpg\) LIFE colour photo camouflaged Clipper La Guardia Marine Terminal ca.1942](#)
- [\[3\] !\[\]\(4d34001966c7597a8c3e4293694bde37_img.jpg\) LIFE photo essay \(comprehensive\)'Pan American Clipper Ship' includes NC18605 in a glass doored hangar 1940](#)
- [\[4\] !\[\]\(70b9adae95aa76ce55f26a9fb944efce_img.jpg\) LIFE photo Pan Am skipper flying the 314](#)
- [\[5\] !\[\]\(7b780ea9fe954e20f3a1890df3f944e2_img.jpg\) LIFE photo essay 'Pan American Clipper'includes Eve Curie leading pax off Clipper at Lisbon 1940](#)
- [\[6\] !\[\]\(6ed942f5426e79452fae08b09c55d70a_img.jpg\) \[7\] !\[\]\(7ac021fc5aa83a899c22bb9c073b3a95_img.jpg\) LIFE photos NC18602 in Singapore Harbour 1941](#)
- [China Clipper 75th Anniversary Commemorative Flight \(November 2010 - San Francisco Aeronautical Society\)](#) 
- "Two Day Turn Around", February 1941 article 
- "Three Deck Clipper Has Aisle In Wings", *Popular Mechanics*, August 1937, early article on Pan American Airways new airliner for trans-ocean flight 
- "New York To Europe By Clipper", *Popular Mechanics* May 1939, large article with cutaway drawing of interior 
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