

THE LOCKHEED MODEL 14 SUPER ELECTRA



A
Twin-Tailed Beauty
Airliner, Personal Airplane & Warbird
Alive Again in Flight Simulation

By
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HISTORY

Lockheed needed an aircraft larger than the Model 10 Electra to stay in the airliner game. The goal was to produce a faster aircraft but with a lower passenger capacity than the DC-3. Specifications for the new aircraft included a cruise speed of 215 mph (DC-3 was about 170 mph) and a passenger capacity of 14 (DC-3 was 21). The significant 45 mph speed advantage required use of a high wing loading and a relatively short wing. Fowler flaps, which act to increase both camber and area of the wing, were used to provide for reasonable approach and landing speeds.

Despite tight money and the Model 10, Model 12 and Lightning programs, the Model 14-H prototype flew on July 29, 1937. The test program went well (the Super Electra was a little hot on takeoff or landing for its day) and an Approved Type Certificate No. 657 was awarded on November 15, 1937. Northwest Airlines was the first customer for the Super Electra, ordering nine before the first flight (five were delivered before the award of the ATC). Public reaction was favorable, with passenger and flight crew praise for the high cruising speed - until - three of the Northwest Model 14-Hs crashed during the first 15 months of operation. Tail flutter was blamed for the first crash on 10 January, 1938 and was cured by retrofitting balanced rudders. While a total of ten crashes occurred through January 3, 1939 in the United States and Europe, at least six of these were caused by pilot error; but, while the Model 14 exhibited much higher performance than the Douglas airliners, its higher seat-mile costs compared to the DC-3 and loss of public confidence limited its acceptance in the United States.

The Super Electra was more successful overseas, with six major carriers operating 81 aircraft. The first of the operators, KLM and its East Indies subsidiary KNILM, took advantage of the Super Electra's performance on their long Amsterdam - Batavia route, speed proving more attractive than the greater comfort of the wider cabin DC-3. British Airways, also interested in high cruising speed, employed its Model 14-WF62s on its projected route from the United Kingdom to West Africa and on to South America. The Polish airline LOT accomplished the first transoceanic delivery flight of an airliner in May 1938 by flying Super Electra SP-LMK from Burbank to Central and South America, across the South Atlantic, over West Africa and on to Europe. Trans-Canada Air Lines was Lockheed's largest airline customer with 16 Model 14-Hs. Dai Nippon Koku KK (Greater Japan Airlines), was the largest operator with 30 Lockheed produced aircraft (Japan also produced 119 under a prewar licence agreement).

Over the production life of the aircraft, significant standard installations, changes and variations were incorporated, offered by retrofit or as options: Balanced rudders were retrofitted to all aircraft. Fowler flap extension was limited to 60 percent. Leading edge slots were added to delay wing tip stall. Wing and tail deicing was offered. Passenger accommodation could be reduced to 10 and a galley and cabin attendant added. Full-feathering propellers and integral fuel tanks were included. Two versions of the Pratt & Whitney Hornet, five of the Wright Cyclone and one of the Pratt & Whitney Twin Wasp engines were offered.

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Lockheed produced 112 Model 14s:

The prototype, a Model 14-H was operated briefly by TACA de Honduras, returned to Lockheed, modified as a C-14H (prewar version of a Guppy), briefly tested at Wright Field in the spring of 1938 and found unsuitable. It was reconverted to a standard Model 14-H and placed in service in Brazil and later Nicaragua. Nineteen additional 14-Hs with P&W Hornet S1E-G engines were produced. Thirty-two 14-H2s with P&W Hornet S1E2-G engines were produced. Later one 14-H and two 14-H2s were



rebuilt as Lodestars and twelve 14-Hs were re-engined with P&W Twin Wasp S1C3-Gs and redesignated 14-08s. XR40-1 (c/n 1482, BuNo 1441), with 850 hp Pratt & Whitney R-1690-52s, was a staff transport version of the 14-H2. This aircraft, delivered to the US Navy on 15 October, 1938, later served with VP82, and was struck in 1944.

Lockheed built four Model 14-Ns with Wright Cyclones (also known by engine designation as, for example, Model 14-G102 for the N2) for private owners. Two Model 14-Ns, with GR-1820-G105 engines, and one Model 14-N3 with -G105As, were finished with deluxe interiors as executive transports. The 14-N2, powered by GR-1820-G102s, was built for Howard Hughes who was pursuing an round-the-world record. In order to maximize the advantage of a 235 mph (378 km/h) cruising speed over long legs, some over water, the standard fuel arrangement, four integral wing tanks, was supplemented by fuselage tanks increasing total capacity from 644 to 1,844 US gal (2,438 to 6,980 liters). Additional radio and navigational equipment and flotation bags were installed in the fuselage. Support for a crew of five (three forward and two aft of the cabin tanks), including a rest area right aft, was installed. With its full fuel load the Model 14-N2 takeoff weight of 24,295 pounds exceeded the value in its Approved Type Certificate. Consequently, the aircraft (c/n 1419) was given the experimental registration NX18973 by the CAA

when it was delivered on 20 May. 1938.



Christened New York World's Fair 1939 and flown by Howard Hughes, with Harry Connor (copilot and navigator), Tom Thurlow (navigator), Richard Stoddart (radio-operator and Ed Lund (flight engineer), NX18973 left Floyd Bennett Field, New York, on 10 July, 1938. Stopping at Paris, Moscow, Omsk, Yakutsk, Fairbanks and Minneapolis, Hughes and his crew landed back at Floyd Bennett on 14 July.

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Total elapsed time for the 14,672 miles (23,612 km) was 91 hr 14 min 10 sec, with a flight time of 71 hr 11 min 10 sec at an average speed of 206.1 mph (331.6 km/h). In 1940, Hughes sold his Model 14-N2 to the Canadian Department of National Defence but its subsequent wartime use is not known.

Twenty one Model 14-WF62s (also known as Model 14-F62 were produced exclusively for the export market, this version was powered by Wright Cyclone SGR-1820-F62s, rated at 900 hp for takeoff and 760 hp at 5,800 ft (1,770 m). The first Super Electra delivered to British Airways, G-AFGN, was used to fly British Prime Minister Sir Neville Chamberlain on the last two of his appeasement flights to Germany. On September 13, 1938, he disembarked from his Super Electra on its return from the Munich conference that had so brutally sacrificed Czechoslovakia, carrying the infamous “scrap of paper” that, he said, promised “peace in our time”.

In March 1942, four Model 14-WF62s of KNILM, to avoid capture, were flown to Australia where they were purchased by the USAAF for service with the ADAT (Allied Directorate of Air Transport). One crashed almost immediately but the other three - c/ns 1414, 1442 and 1443 - were designated C111s and were respectively assigned the US military serials 44-83233/44-83235 and the Australian call signs VH-CXI/VH-CXK.



Thirty-four Model 14-WG3Bs, powered by Wright Cyclone GR-1820-G3Bs, rated at 900 hp for takeoff and 840 hp at 8,000 ft (2,440 m) were produced. Four were delivered to Rumania. Thirty were delivered to Japan. These aircraft code named Toby, and the Japanese produced version code named Thelma created some recognition problems when operating in the same area as RAAF and KNILM Model 14-WF62s.



The basic design of the Super Electra gained military importance beginning with an airplane that flew less than ninety days after Chamberlain's return from Munich. The Model B14L, named for explorer Henry Hudson, propelled Lockheed to a major position in the industry and was responsible for the development of a long line of maritime patrol bombers. In the spring of 1938, a British purchasing commission visited the United States looking for aircraft that would be available to fill England's

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pressing needs, augmenting British production. Lockheed quickly designed and prepared a mock-up for a reconnaissance bomber version of the Model 14-WF62 transport. The underwing fuselage



section was readily adapted to a bomb bay and provisions were made for an aft fuselage-mounted dorsal gun turret. With otherwise minimal change to the airframe, early delivery was possible. A contract for 200 B14Ls was signed, and on December 10, 1938, the first Hudson flew, followed closely by increasing production deliveries. By the end of production in 1943, a total of (variously reported) 2936 - 2941 aircraft were produced, including several Mk numbers, for the RAF, RAAF, USAAF and USN.

By the end of World War II, the 14's basic airframe design, modified to produce the Loadstar/Ventura/PV-1 Harpoon would be supporting takeoff gross weights of up to 31,000 pounds and engines delivering up to 2000 hp and would see service as both a Navy patrol bomber and a Marine night fighter.

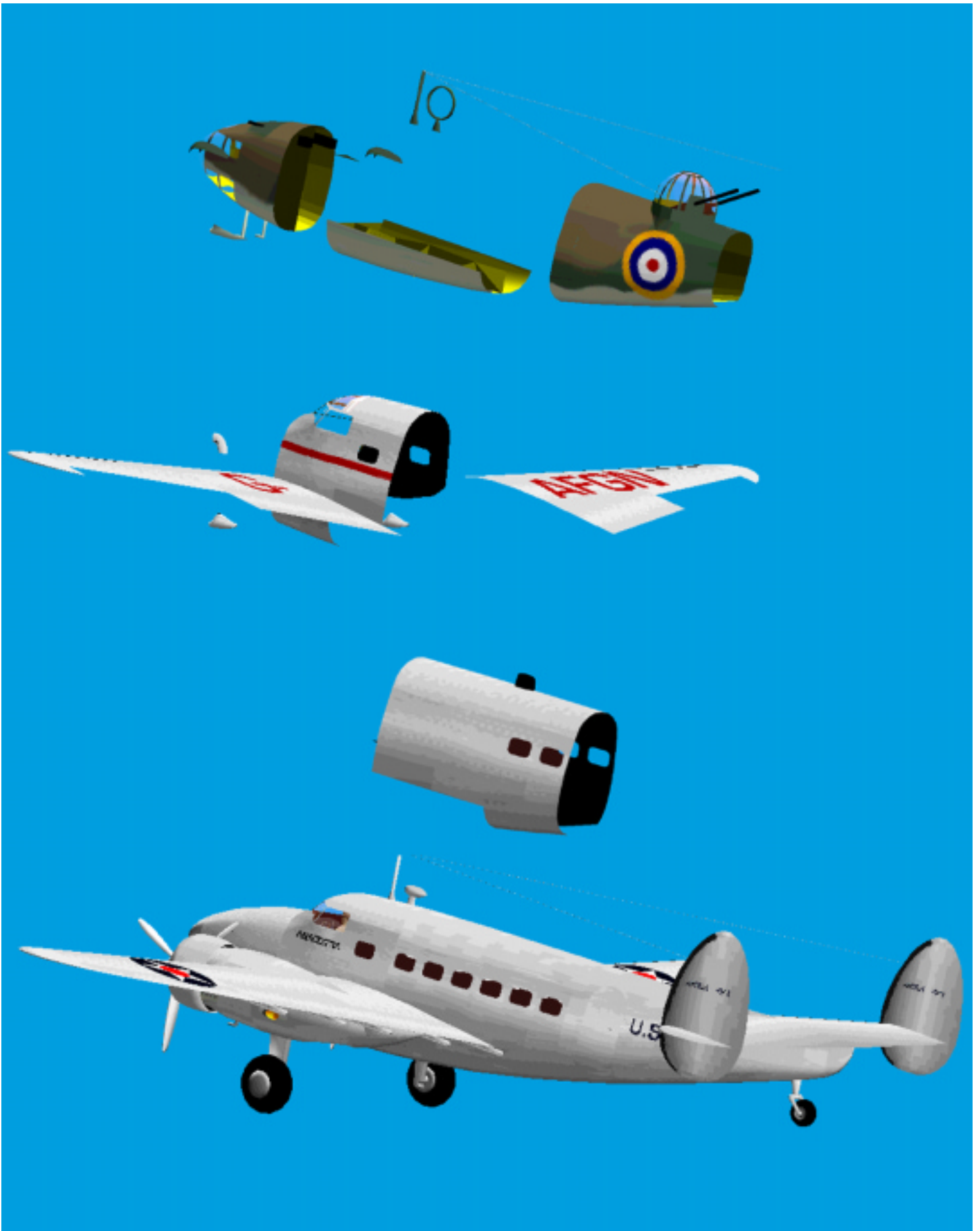
FLIGHT SIMULATION MODEL

The airframe variations required for flight simulation modeling are illustrated by the FS2S 3D rendering which includes the H/H2 basic airframe, the fuselage modification for Hughes' N2, the skylight and wing slot modifications for the WF62 and the nose, bomb bay and turret modifications for the B14L. Subtle variations in air scoops, coolers and antennae were also required. The B14L model consists of 177 parts, 18,133 vertices, 15,234 polygons. Animation includes all control surfaces, landing gear, propellers, baggage/bomb bay and cabin doors, the gun turret and the pilots head. As with my other models, I used Micrografx Designer and Photoshop for preparing backgrounds and textures and a Lotus spreadsheet to run numbers for FS2000 and FS2002 flight dynamics.

Textures were developed over several iterations, finalizing on a scale of 40 pixels/ft with 1024 x 1024 bitmaps. The same texture mapping and file identification was used for each 14 and B14L model to avoid repainting common parts. Use of this scale permits more accurate texture mapping and the bitmap size and scale can be reduced later (1024x1024 to 512x512 or 256x256 at 20 or 10 pixels/ft respectively), such as in FS2002, without altering placement.

One instrument panel and three panel backgrounds are provided for FS2000. The instrument set is Chuck Dome's. A different panel, also with three backgrounds is provided for FS2002. In this case, except for Chuck Dome's fuel gauge, the instrument set is FS2002 (Professional Edition) default. CFG Edit was used to assemble the panels.

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The Wright (cw) sound set is by Mike Hambly, Sound Designer (Blue Arrow). The Pratt & Whitney (pw) sound set is by Trev Morson. Their readmes are included in the sound directories.

The model has been thoroughly tested on my 650 MHz PIII Sager Notebook but the video memory is marginal for FS2002.

I freely offer my ideas for the use of other developers so that the breed may be improved. This package is freeware but any authors still hold the copyright. Any repack, repaint or rework of these models requires specific approval. If you know something more about these aircraft and would like to share it, please contact me.

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