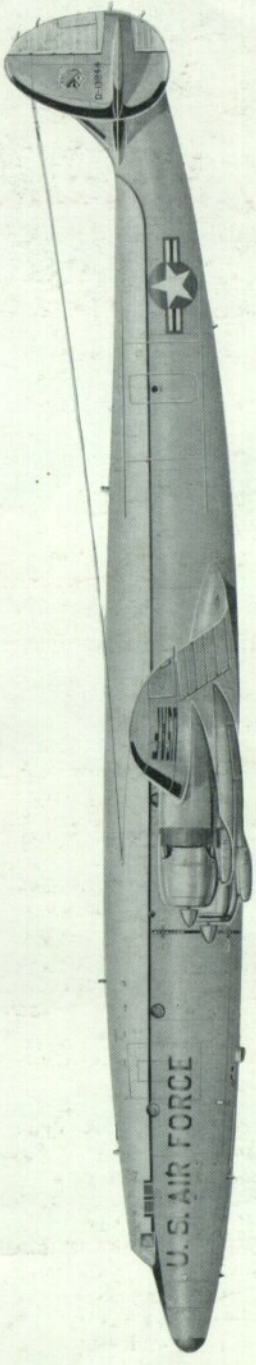
PROFILE
PUBLICATIONS

The Lockheed Constellation

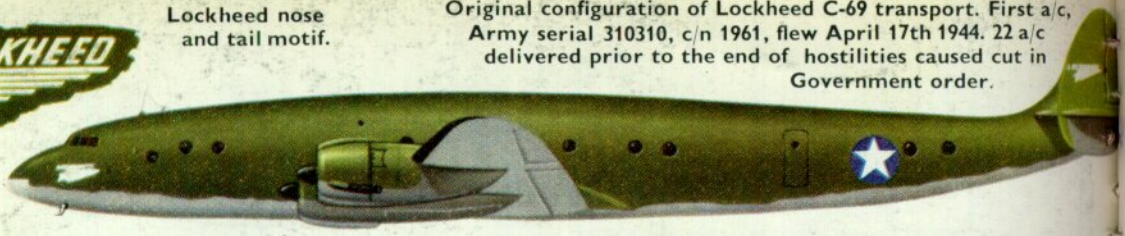
NUMBER 120

TWO SHILLINGS



Lockheed nose and tail motif.

Original configuration of Lockheed C-69 transport. First a/c, Army serial 310310, c/n 1961, flew April 17th 1944. 22 a/c delivered prior to the end of hostilities caused cut in Government order.



Nose and tail motif.

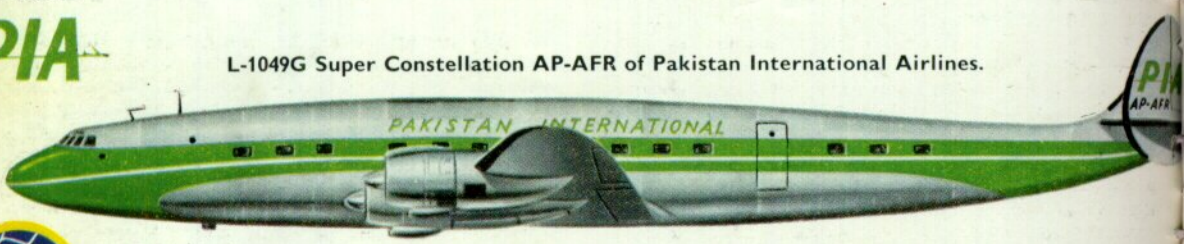
Constellation, PP-PCF, of Panair do Brasil S.A.

Nose and tail motif.

L-049 Constellation NC70000 of Eastern Air Lines.

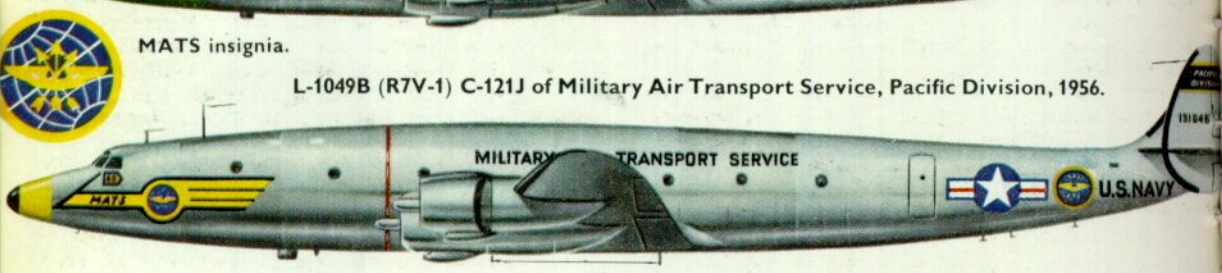
Tail motif.

L-1049G Super Constellation AP-AFR of Pakistan International Airlines.

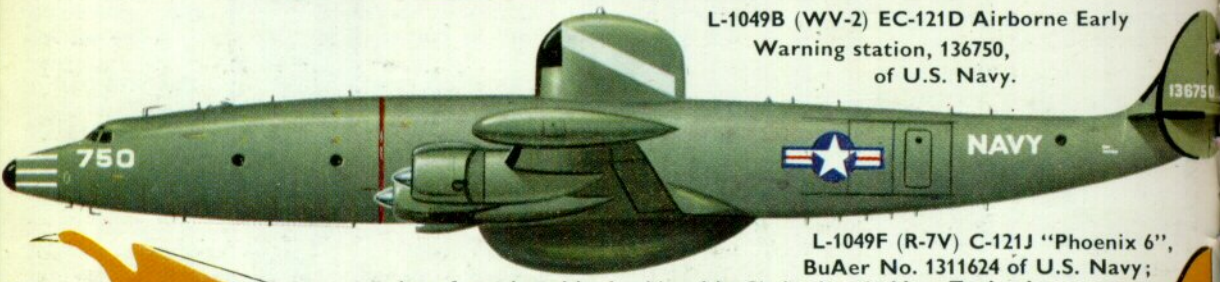


MATS insignia.

L-1049B (R7V-1) C-121J of Military Air Transport Service, Pacific Division, 1956.

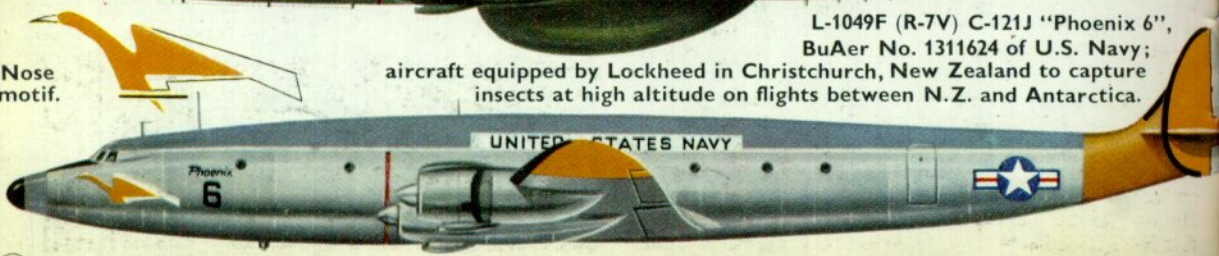


L-1049B (WV-2) EC-121D Airborne Early Warning station, 136750, of U.S. Navy.



Nose motif.

L-1049F (R-7V) C-121J "Phoenix 6", BuAer No. 1311624 of U.S. Navy; aircraft equipped by Lockheed in Christchurch, New Zealand to capture insects at high altitude on flights between N.Z. and Antarctica.



The Lockheed Constellation

by Holmes G. Anderson

A Pan-American World Airways Clipper, NC88832, in flight; the Constellation first went into commercial service with this airline, flying the New York-Bermuda route on February 3rd, 1946. (Photo: PAA)

To some, the Constellation was a beautiful airplane; to others it was an ungainly beast. But whatever its appearance, it must surely rank as one of the great airplanes of all time. Never flashy, never a show stealer, the Constellation was one of those airplanes born in the late 1930s, developed during the war years, and matured with the jet age.

Its design was conceived in 1939 by Howard Hughes and the Lockheed Aircraft Corporation, for his Transcontinent & Western Airlines (TWA) as the continent-spanning "airliner of the future". It was developed by the military during World War II as a high speed transport, and following the war it saw international service with the world's major airlines, pioneering many of the new "long haul" routes of the post-war world.

The Constellation was produced in many versions for many duties. It was under continuous development from 1939 until 1958, when at last Lockheed gave up trying to increase its performance. It grew in progressive increases of power, payload, range, take-off and landing weights and performance, and held its own with post-war developed aircraft right up to the jet age. The Connie had a long and colourful career and if all guesses are right, there's still a few years left in the old girl.

FLIGHT TEST

The Constellation's first flight took place 9th January, 1943. At the controls were Eddie Allen, Boeing Aircraft Company pilot and Milo Burcham, P-38 Lightning Test Pilot. Also on board were C. L. "Kelly" Johnson, Lockheed's Chief Research Engineer; Rudy Thoren, Johnson's assistant in solving the many test flying problems, and Dick Stanton, Chief Mechanic, who knew every working part.

A total of six flights were made that day in the prototype L-049 Constellation, NX25800; three by Eddie Allen and three by Milo Burcham. Allen said after his turn at the controls, "This thing works so perfect you don't need me around here any more". He was killed just 39 days later in the crash of the first B-29 (Profile No. 101). After these flights around the San Fernando Valley, the ship headed North over the mountains for the Army's air base on Muroc Dry Lake, since renamed Edwards AFB, which is in the California Desert. Here further tests were made.

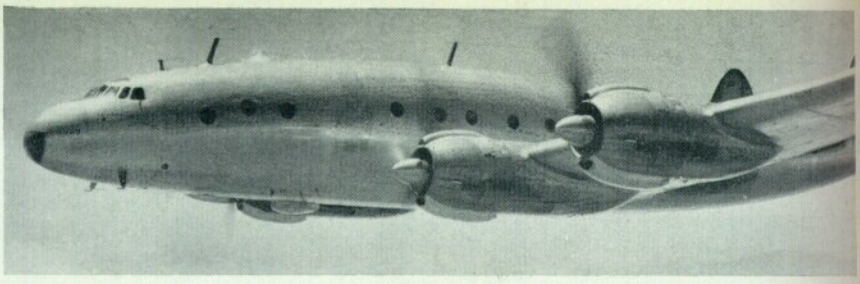
Weight and centre of gravity positions in flight were checked by means of a water system with a central pumping station composed of many large water tanks through the aircraft's fuselage connected by means of a large diameter piping system. To load the aircraft for flight required only attachment of a four inch fire hose and proper valve operation. The long nose landing gear was tested by installing Micro-switches on the sides and drag struts. Warning lights were used to indicate when critical stresses were reached. Bob Gross, President of Lockheed, admitted it was a good aircraft by saying, "I believe this airplane is the greatest contribution to air transit yet made by Lockheed. It is designed and built to do a necessary job as well as it can be done today, happily timed for the war cargo emergency which confronts us, and for the reconstruction to follow the victory we must first win".

Other Constellation test pilots were Capt. Lawrence Chiappino, Joe Towle and R. J. Thoren.

At this time the Constellation had a top speed of 347 m.p.h. which was comparable to the cruising speed of contemporary fighter planes but was also capable of flying a light tank across the ocean. The Constellation was actually faster than the famous Japanese Zero, and any four-engined bomber then in combat service. At about half power the Connie

The prototype L-049 Constellation in its olive-drab and grey warpaint, shortly before the first flight at Burbank, California on January 9th, 1943. (Photo: Wright Corporation)

The ninth Constellation's distinctive features seen here in a fine flying study and (below) the XC-69E, 43-10309;
(Photos: Erwin J. Bulban and Lockheed)



cruised approximately 100 m.p.h. faster than airliners of that day. Its four engines used very little fuel per hour and this economy coupled with great capacity, virtually eliminated costly and time consuming refuelling stops.

The Constellation was capable of flying above 20,000 feet while its pressurized cabin maintained a supercharged atmosphere equal to the 8,000 foot level, and the ceiling could be boosted to 35,000 feet in case of need. The Connie was designed to maintain a 25,000 foot altitude on three engines and fly at 15,000 feet with only two engines. Later a "tri-motored" Constellation was flown coast to coast in 11½ hours. This happened when a Pan American Connie made a crash landing. The damaged engine was removed, the area faired over and the aircraft was flown from the east coast of the U.S.A. to the west coast for repairs. This record probably stands for a tri-motor.

Originally ordered by Transcontinent and Western Airlines Inc. (TWA) before the war as a high speed long range passenger liner, the Lockheed Model L-049 Constellation was employed under the U.S. Service Designation of C-69 by the U.S. Air Transport Command. First indication of the Lockheed Constellation's performance and utility was proved on a Sunday evening, 16th April, 1944 when Howard Hughes and TWA president Jack Fry decided that "Tomorrow is the day".

Standing on the field at Burbank, California, looking like a streamlined whale with wings, the triple tail Lockheed Constellation C-69, Army Number 310310, c/n 1961, was ready for take off. In the early morning hours Hughes climbed into the cockpit behind the pilot's controls on the left side, Fry into the co-pilot's seat. Others in the crew included C. L. Glover, radioman, R. L. Proctor, flight engineer, Howard Bolton, navigator, and twelve passengers: L. J. Chiappino, Leo Baron, Robert L. Loomis, Edward J. Minser, Richard de Campo, Lee Sewell and Orvil R. Olson, all of TWA; Richard Stanton, R. J. Thoren and Thomas Watkins of Lockheed, S. J. Solomon, Chairman of the Airline Committee on Post-War Aviation Policy and Lieut. Col. C. A. Shoup of the Army Air Corps.

At 3-57 a.m. (Pacific War Time) the Constellation started rolling. Flying conditions were not perfect.

Bad weather including light icing conditions made it necessary for the plane to veer off the great circle route, but 6 hours 57 minutes and 51 seconds later at 1-54-51 p.m. (Eastern War Time), the Constellation was over Washington National Airport.

Five years before this flight, Hughes and Fry planned to have many planes in coast to coast passenger service and TWA had originally contracted with Lockheed for 40 Constellations but these had been turned over to the Army. The prototype Constellation 310310 built at Lockheed's Burbank Plant went to the Army 28th July, 1943 and remained at Lockheed for testing, and after this, went to Wright Field for further tests.

In 1944, at Wright Field, Ohio, Orvil Wright, who was the pilot on the first heavier-than-air flight 41 years earlier, and after whom the field was named, made a 50 minute flight in a new C-69 and took over the controls in the air. This was only his second flight in 25 years and he was then 72 years old.

When victory was in sight in 1945, the Government cut its C-69 order from 260 to 73 aircraft. At this time 22 C-69-LO aircraft had been delivered. The war's end brought a five day shut-down at Lockheed at which time Lockheed management decided that they would play their ace in the hole and build a commercial version of the C-69 instead of developing an entirely new aircraft. Building a new aircraft from scratch would result in laying off many employees during the design and tooling stages; and there was surplus tooling and fabricated parts, materials and five partially completed C-69s that could be easily turned into the much-needed airliner.

Choosing to produce the Model L-049 Constellation saved jobs for 15,000 experienced employees, and resulted in a great time saving for Lockheed. This gave them an 18 month advantage over the Douglas DC-6 and Boeing 377 Stratocruiser and an even greater lead on the Republic Rainbow. Deciding to build the Connie paid off for Lockheed for a few

Constellation with 400 cu.ft. "Speedpak" external cargo cell in place.
(Photo: Lockheed)

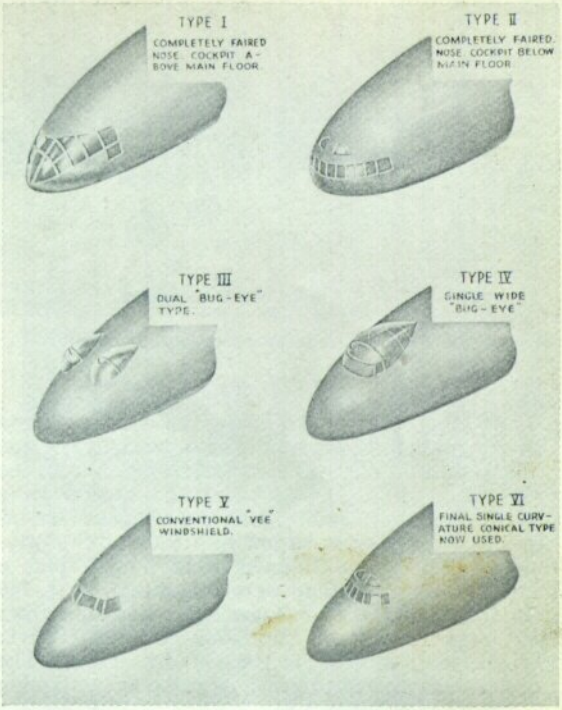
days after V-J day, company President Robert Gross revealed aviation history's largest backlog of commercial aircraft. Orders were now on hand for 103 Constellations valued at $75·5 million, for eight major airlines. *Time* magazine reported in 1945 that "In one hop the Constellation had carried Lockheed to the top of the heap". Lockheed kept multiple assembly lines moving as it turned out P-80s, PV-2s, and L-049 Constellations. TWA accepted delivery of the first of 27 model L-049s in November 1945, and Lockheed delivered nine more by the end of the year. On 11th December, 1945, the Civil Aeronautics Board granted an Approved Type Certificate after the Constellation had passed its performance tests in the record time of 27 flying hours. About this time the War Assets Administration put on a bargain sale, selling four Connies for $20,000, and two more went at $40,000 each. Altogether 19 of the 22 Army C-69s were used by the airlines.

The Lockheed L-049 Constellation went into civilian service for the first time on 3rd February, 1946, when Pan American flew it on the New York Bermuda route. On 6th February, 1946, TWA flew L-049, N86511 on its international routes between Washington and Paris, and first domestic service was started on 15th February, 1946, between New York and Los Angeles. TWA Constellation "Star of Paris", N86511, piloted by Capt. Harold F. Blackburn made the first commercial air link between the United States and France, on 6th February, 1946, the flight taking 19 hours and 46 minutes.

Tragedy stalked the Constellation, for in mid July a *TWA* Constellation took off from the Reading, Pennsylvania Airport on a routine training flight. Nineteen minutes later its cockpit and forward baggage compartment were choked with dense smoke. The L-049 crashed in a hay field, killing five and seriously injuring the sixth. This grounded the L-049 for six weeks until 23rd August, 1946, while

NC90922, American Airlines' "Flagship Copenhagen".
(Photo: Lockheed via Bulban)

Symbolic view of the L-049, with another great transport aircraft in the background. Both the Constellation and the legendary DC-3 revolutionised commercial air operations in their day. (Photo: courtesy Erwin J. Bulban)



Various types of windshield and nose configurations considered during the Constellation's design.

investigators probed for the cause. A short circuit in an electrical fitting had set fire to oil-soaked cabin insulation. The accident investigation indicated that had the crew used a different procedure for clearing the cockpit and cabin of smoke by opening an emergency exit hatch in the passenger cabin instead of the crew entrance door, (which caused the air recirculating system to fill the cockpit with smoke) it would have been possible to clear the air.

This disaster struck Lockheed a hard blow because of keen competition and the shrinking post-war market. Fifty-eight aircraft at an approximate cost of $50 million were grounded.

Long hours were spent putting the modified L-049 back into the air. On its own, Lockheed replaced the Wright fuel injection system with carburretors. However, production lines did not slow down. The last L-049 came off the line for TWA in 1946. At this same time final assembly began on the Model L-649 "Gold Plate" Constellation. First flight was 19th October, 1946, in N101A.

Eddie Rickenbacker, President of Eastern Airlines, accepted delivery of the first of fourteen "Gold Plate" L-649A Constellations which entered service in May 1947, hailing it the "World's Most Advanced". The L-649 had the same airframe as the L-049, but more powerful 2,500 h.p. Wright R-3350-BDI engines and additional fuel tanks. It carried 55 passengers, had 434 cubic feet of cargo space, cruised about 285 miles per hour, and sold for about $650,000. Due to an airline pilots' strike in October 1947, TWA cancelled orders for eight model 049s and a $20 million dollar contract for 18 L-649s.

One interesting development was the "Speedpack". This was a bathtub-like pack that fitted beneath the fuselage adding 395 cubic feet or 8,300 pounds of cargo space for use on short hops or low-seat-density routes.

An Eastern Air Lines Constellation feet above the runway. (Photo: Lockheed via Bulban)

NEW MODELS

In 1947, a boom began in overseas air traffic and Lockheed was there once more with the right airplane at the right time with the L-749. It differed from the L-649 only in having added outer, integral wing tanks, a beefed-up landing gear and a higher take-off capacity, with a gross weight of 102,000 lb. Forty-four of these ocean hoppers were bought plus a number of L-649s that were retrofitted to L-749 standards. Flights were 3,660 miles non-stop from New York to Paris. The L-749 cost $870,000 in 1947-48, and about $1,100,000 by 1950. The Constellation started to prove its value by continuing to "grow".

The L-749A had a strengthened undercarriage, again raising the take-off weight to 107,000 pounds. Seven airlines ordered seventy-four of the 749A.

Constellation production lines almost came to a stop in 1948, but the Air Force placed a life-saving order for the Model L-749 modified with heavy flooring and provisions for removal seats and hospital litters. As C-121A-LO these 10 L-749A Connies became the Military Air Transports Service's "VIP" fleet for Military and Diplomatic officials on long missions. Service serial numbers were 48-609 to 617. Three were designated VC-121A-LO, and included General MacArthur's "Bataan" (48-615), General Eisenhower's "Columbine II" (48-610) and staff transport VC-121B-LO (48-608) "Dewdrop".

General Eisenhower's personal aircraft, a Lockheed VC-121A-LO, Company Serial No. 2602, led a very outstanding life. Its official name was "Columbine II"

TWA's NC86503 "Star of California", seen here at La Guardia, New York. (Photo: Erwin J. Bulban)

but unofficially and affectionately it was called "Gen. Ike's Eagle". Pilot was Major William G. Draper and his picked crew included Major Harkness, Major Puglisi, Capt. Christensen, Sgt. Snider, Sgt. McClane, Sgt. Higgins, and Sgt. Woodward. This crew was stationed in Paris and averaged about 50 hours per month flying time. As NATO Commander, the General flew often and recorded a landing at every major airport in free Europe. Many ocean crossings were also made. Later this plane gained still another unofficial nickname as the "Flying White House" from 1950 to 1954, when it bowed out to Columbine III, a VC-121E. However old 48-610 was not finished, it went back to NATO to be used by General Gunther, then back to Washington for VIP duty until April 1957 when she was declared surplus and acquired by TWA for the Ethiopian Government where she retained her special VIP luxury suite for Haile Selassie I, the Emperor of Ethiopia, as his personal transport. She wore the Lion of Judah and EAL colours and was numbered ET-T-35 until 10th June, 1957 when fire broke out in an inboard engine causing the pilot, Capt. O. (Tex) Slayers to make a belly landing about fifty miles north of Khartoum. All twenty-six passengers and crew survived, but the aircraft was completely burned leaving only the tail section.

When the Russians blocked Berlin leaving only the skyways open, the Lockheed C-121 joined the

Striking head-on view of the Constellation; and (above) an L-1049E of Qantas Empire Airways refuelling at San Francisco International Airport in 1958. (Photos: Lockheed and Bay Aviation Services)

C-54 in an aerial bridge of personnel, coal, food and other supplies into Templehof Airport from West Germany. In the first month seven C-121's chalked up 5·9 million passenger miles carrying supplies from Westover Air Force Base, Massachusetts, to Rhein-Main, Germany.

Later the Navy purchased two L-749A Connies for early warning and picket planes. Originally designated PO-1W they were quickly nicknamed "Po' Ones". Later designation was WV-1. The prototype PO-1W (BuAir No. 124473) made its first flight in June 1949, and as flying radar ships, they proved very successful.

The "Po' Ones" were filled with electronic equipment to fly a radar umbrella for a Navy task force, and were assigned the duty of spotting enemy aircraft and surface vessels. The top dome was for aircraft while the large dome below was for scanning the surface.

Orders from the services added up to more than $350 million worth of business. When the last L-749A rolled off the line Lockheed had produced 232 Constellations including the prototype, and more were on the way.

THE CONSTELLATION GROWS

Growth of the Constellation can almost be told in one airplane, c/n 1961. It started life as the first C-69A (43-10309) civilian registration NX 25800, with R-3350 Engines. The first change was to equip it with Pratt & Whitney R-2800s and redesignate it XC-69E. The original weight was 86,250 pounds. After its hitch in the Army, it was bought by Howard Hughes and later reacquired by Lockheed where engineers lengthened the fuselage 18 ft. 4 in. and it became the prototype L-1049. Now wearing civilian number NX67900 its first flight as L-1049 was 13th October, 1955. Other changes included the Wright R-3350-CA1 Cyclone that delivered 2,700 h.p. on take-off, an increase of 400 h.p. over previous engines. The result was the L-1049 Super Constellation which could carry more passengers (40 per cent. greater payload) at lower cost per seat mile. Take-off weight was 120,000 lbs. As was the case with Model L-649 Eastern Air Lines was the first to buy the 1049 with an order for 10, and TWA followed with a purchase of 14.

With a new paint job, and a big star on the side, c/n 1961 was fitted with the WV-2 "Po' Ones" prototype radar as an aerodynamic test aircraft. Huge tip tanks were also added to her wings. Later it was modified by removing the tank and installing an Allison YT-56 turboprop in the No. 1 position. There was a R3350-CA1 in the No. 2 position and R3350-BD1 engines in the 3 and 4 positions.

The interior of this prototype was once again filled with instruments, miles of wire, linked water tanks, dial gauges and recorders. By this time many of the comforts had been removed including pressurization, heat and sound proofing.

This old airplane was finally pickled for storage after completing engine tests for the Electra. Later Transocean L-749A (F-BHZ1) was fitted with the nose from c/n 1961 and at least part flew again.

L-1049

Eastern Air Lines put the first Lockheed L-1049 Super Constellation into commercial service on 15th December, 1951. This was aircraft N6201C which first flew in August of the same year. Eastern

Battered L-049, N2520B of Braniff International, ex- YV-C-AME "Simon Bolivar" of Linea Aeropostal Venezolana; photographed at Love Field, Dallas, Texas in 1958.
(Photo: Mitch Mayborn)

Attractive scheme displayed by a K.L.M. L-1049C, "De Vliegende Hollander"—"The Flying Dutchman".
(Photo: K.L.M. via Bulban)

An L-1049G of TWA and (below) an L-1649 of World Samplers Inc.
(Photos: Mitch Mayborn and Charles D. Thompson)

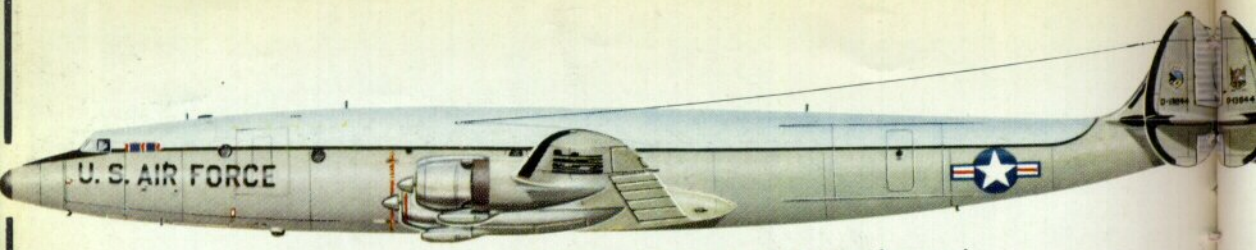
received 14 of the 24 L-1049's built, and used them on their New York to Miami route. The remaining 10 went to TWA to be used on their New York to Los Angeles route starting in September, 1952.

The L-1049 carried 71 first class passengers, or 95 coach, had 728 cu. ft. of cargo space and cruised at 320 m.p.h. On overnight transcontinental flights this aircraft was equipped with 8 berths and 55 first class seats. The L-1049 was powered by 4 Wright Cyclone R-3350-CA1 engines that developed 2,800 h.p. each. The L-1049 sold for about $1,250,000.

Maximum visibility was possible through the installation of rectangular panorama windows. Relocation of windows in relation to seats made for relaxed viewing comfort and increased natural light. Greater protection against frost and fog was obtained by the circulation of more air between the windows' double panes.

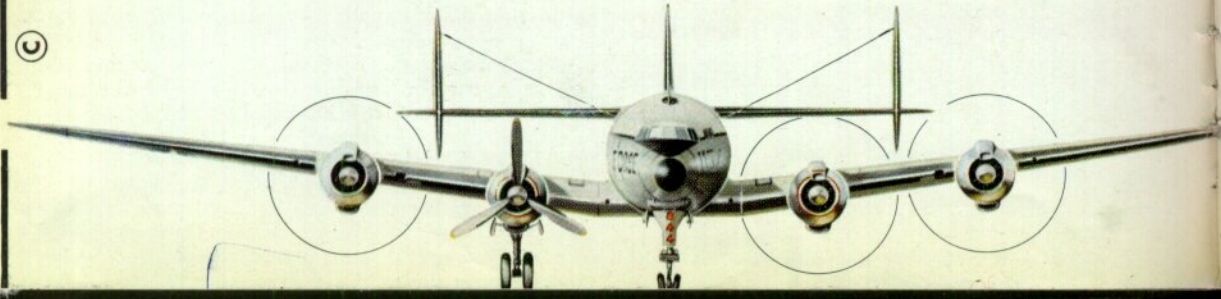
The Lockheed Super Constellation prototype was the first passenger ship with wing tip tanks. It was thought the 600 gallon tanks would give turbo-prop Constellations long range despite engines requiring 50 per cent. more fuel. Inventor was C. L. "Kelly"

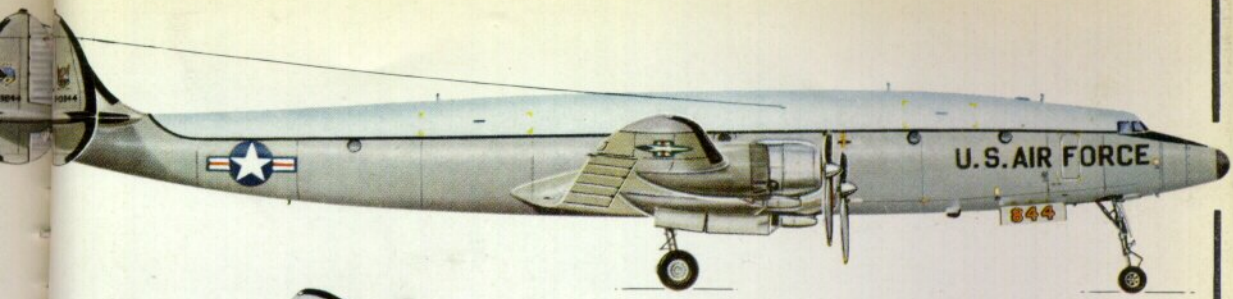
(continued on page 10)



LOCKHEED RC-121, 0-13844, manufacturer's serial 4120, of the 552nd Airborne Early Warning and Control Wing, U.S.A.F. Sacramento, California, 1966.

Insignia of 552nd A.E.W. & C. Wing U.S.A.F.





Outstanding Unit Award

SHIELD of FREEDOM

0-13844

Insignia of Air Defense Command, U.S.A.F.

The Military Air Transport Service acquired large numbers of L-1049F Super Constellations when the Chinese Communists launched their major advance toward Pusan and the Korean War suddenly became deadly earnest; this is an R7V-1 (C-121G) letting down over Diamond Head, Hawaii. (Photo: via Erwin J. Bulban)

Johnson, Chief Research Engineer, and some 550 design improvements were incorporated in this much improved Connie.

L-1049B

Foreseeing a need for a large fleet of aircraft to carry troops and cargo across the Pacific, the Navy ordered the Constellation in several versions of the L-1049B including the R7V-1, C-121J transports, WV-2, EC-121K AEW stations, WV-2E, EC-121L with dorsal "saucer" radome, the WV-2Q, EC-121M and WV-3 and WC-121N weather stations. The first in this series, the R7V-1 first flew 3rd November, 1952.

The Air Force also placed orders with Lockheed for the L-1049B as C-121C transports, RC-121C and D AEW stations and YC-121F, which was initially to have been the YC-134LO. President Eisenhower's "Columbine III" was a VC-121E (U.S.A.F. No. 53-7885) delivered 31st August, 1954. The L-1049B Constellations were powered by four R-3350-DA1 turbo cyclone engines of 3,250 h.p. each. The R7V-1 carried a crew of four and 106 passengers or equivalent load of freight. It was also fitted as an air ambulance with tiers of stretchers and it cruised at 340 m.p.h. The WV-2E/EC-121L carried a nine ton radome and support pylon on top of the fuselage just to the rear of the wing. The first WV-2E was delivered to the Navy in 1958 with 3,700 lbs. of lead in the forward baggage compartment. Much of this ballast was replaced by electronic equipment as it was delivered from the manufacturers.

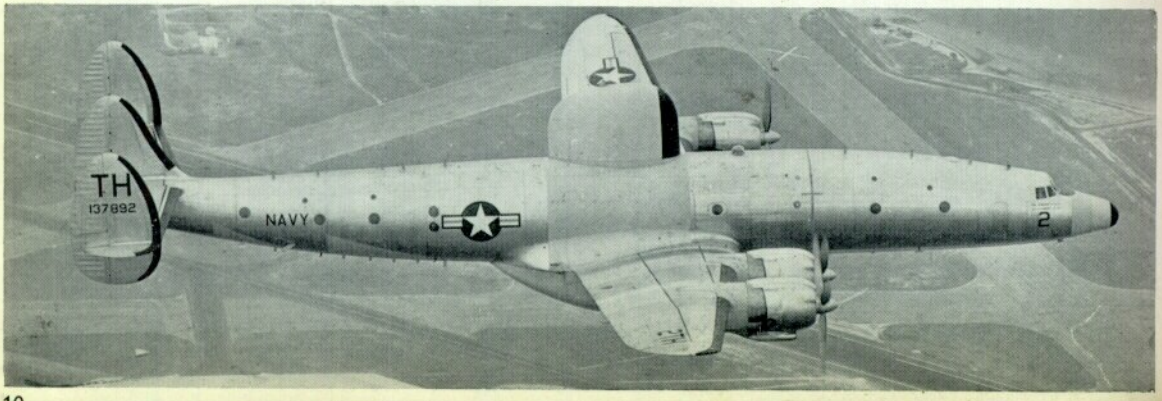
The National Aeronautics and Space Administration operates two Super Constellations out of the Goddard Space Center, Maryland. They have the numbers 20 and 21, and are manufacturers' c/n 4143 and 4159, ex-U.S.A.F. service numbers 54-4065 and 54-4076 respectively. They are unique in that they bear neither "N" number or military number.

The U.S. Navy gave their Lockheed Constellations names according to their duty, and so the EC-121K is called the Warning Star. About half of the cabin is occupied by the CIC, an assembly of radar scopes, control consoles, ECM equipment, communications gear, status boards and other CIC equipment for early warning duties. The Warning Stars are also unofficially called "Willy Victor" for their former U.S. Navy designation WV-2. These "Willy Victors" are very much like a ship as there are bunks for men off duty and a galley for hot meals and many spare parts for inflight repairs to electronic equipment.

The Super Constellation EC-121K's are also known as "Sleek Storm" seekers and "Hurricane Hunters". In this configuration the Constellation carries a crew of 28 to 30 men. The radar used covers an area of some 196,000 square miles with one sweep.

There are two EC-121K working out of NAS Patuxent River by the names of "Paisano Dos" and "Kiwi Special", mapping the ocean. "Paisano Dos"

Lockheed WV-2's on Airborne Early Warning duties with the U.S. Navy carry relief crews for long ocean patrols. The aircraft carry spares for inflight repairs to equipment and are self-sufficient to a remarkable degree. (Photo: via Erwin J. Bulban)



Nose detail and general view of VC-121A, serial 48-608A, photographed in September 1958 at Love Field, Dallas, Texas. (Photos: Mitch Mayborn)

is used on long range missions while "Kiwi Special" handles the shorter ones. Before getting "Paisano Dos" the same organization's "Willie Victor" WV-2 was named "El Paisano" after the Southwestern (U.S.) bird formally known as a Chapparel or road runner.

Another EC-121K goes by the name of "El Coyote" and is stationed at NATC Patuxent River. This is in the tradition of WWII when many aircraft bore names of cartoon characters, since the coyote and roadrunner are a well known cartoon team in the U.S.A.

Specially modified Lockheed Super Constellation aircraft of the Hurricane Hunter's Squadron are based at Naval Station, Roosevelt Roads, Puerto Rico. Airborne Early Warning Squadron four (VW-4) under the command of Cdr. Sidney R. Overall are engaged in what has been called the most dangerous flying in the world. The VW-4 insignia includes the Gold Aerographer's Mark, the Red and Black flag symbolizing the Hurricane, and a Blue Eye which represents the storm's centre. A large grey cloud over blue water with high waves stands for all kinds of weather. VW-4 operates eight Lockheed WC-121N aircraft. In addition to main base at NAS Roosevelt Roads, a detatchment is stationed at NAS Jacksonville, Florida. By mid-season 1958 all the PV-2's had been phased out and replaced by EC-121K Super Constellations.

L-1049C

Lockheed flew the first Lockheed L-1049C Super Constellation, PA-TFP, 17th February, 1953, and KLM put it in service on the Amsterdam—New York route in August. Trans World Airlines followed suit with the L-1049C on 19th October, 1953. Eight other airlines put the L-1049C in service to bring the total number produced to sixty. The four-engine L-1049C was a significantly improved version of the

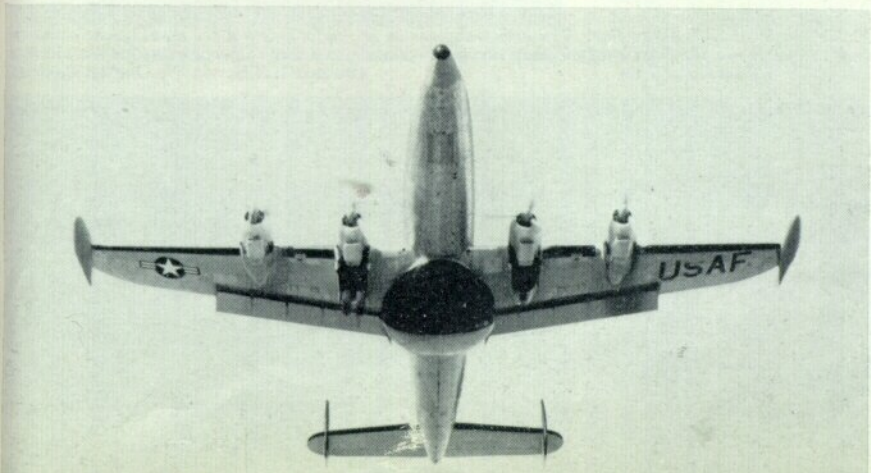
original Super Constellation, the L-1049 which Eastern had first put into service only two years earlier, as it had more powerful R-3350-DA1 Wright Turbo-Cyclone engines that increased its speed by about 10 miles per hour; and a new wing with greater strength which upped the take-off weight. The Turbo-Cyclone R-3350-DA1 developed 3,250 h.p. utilizing exhaust gases driving a turbine; and the engine, with its 20 per cent gain in h.p. gave a new lease on life to piston engines. The Constellation with the new engine pushed ahead of its competitor the DC-6 on transcontinental routes, making possible non-stop West to East operations for the first time. The L-1049C cruised at about 330 m.p.h. and sold for about $1,500,000.

L-1049D

Seaboard and Western put the first Lockheed Super Constellation cargo versions of the L-1049D in service, the first aircraft, N6501C, flying in September, 1954. Over 36,000 lbs. of freight could be carried and loaded through two large cargo doors both fore and aft.

L-1049E

Eighteen Lockheed Super Constellations were built as L-1049E. However, most of the L-1049E were converted to L-1049G while still on the assembly lines. Leonard K. Schwartz, director of commercial sales for Lockheed reported that seven airlines with



"Bulging Beulah"; an RC-121D picket aircraft of the U.S.A.F.'s 551st A.E.W. & C. Wing based at Otis A.F.B., Massachusetts, in 1955.

A Pacific Missile Range "Willy Victor" EC-121D takes off from Pt. Mugu on a frequency interference control mission prior to a satellite launching. This study gives an impression of the massive radar bays. (Photo: U.S.N. via Bulban)

38 planes on order took advantage of the company's offer to change the aircraft on the production lines. Five airlines used the L-1049E, the first, YV-C-AMS for L.A.V. flew 6th April, 1954.

L-1049F

When the Chinese Communists reinforced the North Koreans and chased Allied troops out of Pyongyang and Seoul towards a beachhead at Pusan, the American Congress approved four supplemental appropriations to the 1951 budget to help build the nation's air strength. This resulted in a large Constellation order to improve the Military Air Transport Service's long-range transport capability. Thirty three Model 1049Fs were delivered to the Air Force as C-121C and the U.S. Navy ordered a similar transport. However 32 of the Navy Constellations went to the Air Force as C-121G. The few remaining with the Navy were designated C-121J.

The C-121C accommodated a maximum of 106 passengers or 40,000 lbs. cargo. Normal load for the C-121C was 75 passengers or 47 litter patients.

One C-121J (R7V) named the "Phoenix", (Bu Air No. 1311624) was especially equipped to catch insects in flights from New Zealand to Antarctica. The complicated trap was designed so that the bugs would not be killed, and was built by Lockheed in Christchurch, N.Z. Josef Sedlack, an entomologist from Bernice Bishop Museum in Hawaii, was in charge of the project. C-121 aircraft are now in wide use by the Air National Guard Squadrons.

L-1049G

Northwest Airlines placed the first Lockheed 1049G Super Constellation into commercial service in January, 1955. The Super G had the same airframe as the L-1049C, but used higher powered versions of the Turbo-Cyclone compound piston engines. The Super G had Curtiss-Wright R-3350-DA3 turbo compound engines which developed 3,250 h.p. The L-1049G was designed for long-range service. It carried 71 first class passengers (or 95 coach) and cruised at 330 m.p.h. Six hundred U.S. Gallon tip tanks could be installed to boost range.

Ninety-nine Super G were delivered to 16 different airlines. KLM used the Super G's on its Tokyo-Sydney routes. TWA had their Super G Constellations equipped with weather surveillance radar. The first Super G flew 17th December, 1954 and less than a year later on 1st November, 1955 were in TWA's international service on the Washington-London run.

L-1049H

The L-1049H Super Constellation first flew 20th September, 1956 as VH-EAM, and was later delivered to Qantas. The L-1049H was a "cargo-convertible-to-passenger" version of the L-1049G Super Constellation, with a fuselage especially stressed and designed for cargo loads upwards of 20 tons. Conversion from cargo to 94 passenger (crew of 9) configuration was accomplished by adding cabin racks, sidewall lining, lavatories, buffets and other facilities.

Fifty-three L-104H's were built and flown by more than thirteen airlines. The last L-1049H built, N6925C, went to Flying Tiger Air Lines in November, 1958. By December, 1959, Flying Tiger utilized their fleet of 14 Lockheed L-1049H's, 12 hours a day with load factor of 84 per cent. The L-1049H main cargo compartment was 1,883 feet long, the length of two

The C-121J "Phoenix 6" at N.A.F. McMurdo Sound, Antarctica. The husky-dog teams in the foreground are an eloquent comment on the development of transport over the years; in the final analysis they are more reliable and less vulnerable in this terrain than any man-made device. (Photo: U.S.N. via W. George Roberts)

boxcars, with 593 cubic feet of cargo space. Below deck there was additional cargo space.

On 13th December, 1957 TWA claimed a record for lbs. of mail carried overseas in one day. TWA flew 61,000 lbs. to Europe including 23,000 lbs. of Christmas mail to Army personnel in Frankfurt, Germany, in an all "mail" Lockheed Super H Constellation.

L-1249A

(YC-121F, C-134LO Turbo-Prop Test Bed)

On 1st September, 1954 a 5,500 h.p. Pratt & Whitney T-34 Turbine prop-jet engine, harnessed to 4 Hamilton Standard propellers on a Super Constellation R7V-2, made its first flight. Lockheed had a contract for two R7V-2 (Bu Air Nos. 131660 & 131661) for the U.S. Navy and two YC-121F-LO (U.S.A.F. Nos. 53-8157 & 53-8158) for the U.S. Air Force. The YC-121 was originally to have been the C-134-LO.

The L-1249A was capable of cruising at 440 m.p.h. carrying 16 ton loads across the continent nonstop in less than 6 hours. It could fly the Atlantic, New York-Gander-London with one stop in 8 hrs. 45 min. or fly the Hawaii-California run in well under 6 hours. The four Hamilton Standard Turbo Hydromatic propellers were 15 feet in diameter and the blades were 2 feet wide. On takeoff, the engines turned over at 11,000 r.p.m. while the props were geared down to 1,000 r.p.m.

The L-1249A's maximum take-off weight was 150,000 pounds and its service ceiling was 35,800 feet. Fuel supply including two 600 gallon wing tip tanks was 8,750 gallons. The Constellation had come a long way since 1944.

L-1249H

C. L. Johnson, chief engineer at Lockheed Aircraft Corporation's California Division reported that the cabin supercharger system had been modified to use pressurization from the engines. Each engine developed 70 PSI while the cabin pressurization system only required 27 PSI for full actuation.

L-1249A

The L-1249A (R7V-2/YC121F-LO) saw only limited service as did two other T-34 powered aircraft, the Douglas JYC-121B and the Boeing JYC97J. The only aircraft using this power plant to go into production was the Douglas C-133.

L-1649A

The L-1649A Super Constellation Starliner first flew 11th October, 1956. Trans World Airlines introduced the first L-1649A Starliner into commercial service on 1st June, 1957. This last development of the Super Constellation differed primarily in having an entirely new wing of thinner section, engines mounted five feet further from the cabin, and the span was increased to 150 ft. Fuel capacity was 9,610 U.S. gallons.

Forty-three L-1649 were built and forty-two served with TWA, Air France, Lufthansa, *Trek* Airways, Condor Flugdienst and World Airways. The L-1649A Starliner had a greater range than the Douglas DC-7C but the introduction of the jet airliners cut production short.

The L-1649A Starliner, with its Curtiss-Wright R-3350-EA2 3,400 h.p. engines was the largest piston engine type passenger liner produced by any U.S. manufacturer. It carried 58 first class passengers (or 75 coach) had 593 cubic feet cargo space, and cruised at 340 m.p.h. with a maximum speed of 377 m.p.h. at 18,600 ft.

The L-1649A sold for about $2,500,000.

The Starliner set many new records as a result of the new wing which had been designed for maximum speed and range. Among these were Burbank to Paris; Burbank to Hamburg; Los Angeles to London; New York to Athens: and London to San Francisco. The flight from Burbank to Paris was accomplished in 16 hours 21 min. Carrying 58 to 62 passengers in the luxury configuration or up to 92 tourist style; the L-1649A features an extremely low cabin sound level because of the engine locations. TWA and Lockheed's sound proofing tests developed a quiet Super G Constellation. Changes included 900 extra pounds of insulation, reduction of propeller throb below audible level by synchrophasing the Hamilton Standard propellers and using relatively low revolutions per minute that slowed the blade tip speed considerably. Even during take-off a normal conversation could be carried on by a person in the noisiest section opposite the engines.

Among the many airlines ordering the Constellation were;

U.S.A.—Capital Airlines, Delta C & S Airlines,

B.O.A.C. Constellation G-AHEN "Baltimore"; and (above) L-1049C, c/n 4501, delivered to K.L.M. as PH-TFP on 20th December 1953.
(Photos: B.O.A.C. via Bulban and Lockheed via the author)

Eastern Air Lines, Northwestern Orient Airlines, Pan American World Airways, Seaboard & Western, TWA-Trans World Airlines.

North and South American—Avianca (Colombia), Cubana (Cuba), LAV (Venezuela), Panair do Brasil, Trans-Canada Air Lines, Varig (Brazil).

Europe—Air France, B.O.A.C. (Great Britain), Deutsche Lufthansa (Germany), Iberia (Spain), KLM (Holland), Portugal.

Asia & Africa—Air India, El Al Israel, Pakistan International, Thai Airways (Thailand), and South African Airways.

Australia—Qantas Empire Airways.

EARLY DEVELOPMENT AND STRUCTURE

The Lockheed Constellation was developed from a canard design in the late 1930's having horizontal controls in the nose. This design aroused much interest but no orders. Next development was the Excalibur built in mockup in 1938-39 as a four engine airliner with twin-tails. Wind tunnel tests of the Excalibur indicated it could carry 24 passengers plus crew at 241 m.p.h. At that time Lockheed's customer, Pan American Airways wanted the Excalibur larger and faster to carry 34 passengers plus crew at 300 m.p.h.

With scaled up wings of the Lockheed Lightning P-38 and improved Lockheed-Fowler Flaps from the Lockheed Model 14 and Hudson, the designers began.

The extremely large flap in the design, the problem of ample elevator control during landing and aileron control with two engines out on one side was one obstacle. Also, powerful engines on a relatively small airplane required some attention be given to the problem of rudder controls. In experiments Lockheed found that a multiple vertical tail had definite advantages over a single vertical tail. However, the triple tail necessitated a high location for the horizontal surface, and hydraulic power boost for all controls was employed.

The unusual Constellation fuselage shape was necessary to reduce the length of the nose gear, which was already very long due to the large propeller diameter. The mean camber line of the fuselage was dropped for the forward section of the fuselage. To reduce drag at the maximum lift drag ratio, a slight downward curvature was employed behind the wing. The fuselage shape corresponded roughly to the mean flow line over the wing at cruising speed resulting in a decrease in drag. The camber line at the rear of the fuselage was raised to gain sufficient ground clearance for the multiple vertical tail. Many windshield designs were considered resulting in six different major studies.

Type I. The nose section was a completely faired cockpit above the main floor level. However, it was dropped due to poor vision and little better wind tunnel test results.

Type II. A completely faired nose cockpit below main floor. Due to the larger fuselage nose which compromised drag, and other faults, such as danger in a water or gear-up landing it was dropped.

Type III. Small "Bug Eye" for pilot and co-pilot (as was employed on the early Douglas C-74 Globemaster). It was discarded due to added drag, control difficulty, instrument arrangement and crew "claustrophobia" on long flights.

Type IV. One large "Bug Eye" for pilot and co-pilot; was not used due to poor drag and pressurization structural loads.

Type V. Conventional "Vee" windshield was dropped because of the large fuselage size.

Type VI. The final and adopted type, was a conical cockpit at a point above the airplane, made up of numerous small panels. This arrangement provided vision angles equal to those on a DC-3.

The windshield had an opening panel for clear vision and an experimental defrosting system utilizing infra-red rays.

The cockpit was designed for a crew of four, including a flight engineer. Torque meters and flow meters were installed on all engines to obtain closer

Ground, detail and flying views of the R7V-2 version, powered by Pratt and Whitney T-34 turbo-props; when it appeared in September 1954 this 440 m.p.h. machine became the fastest prop-driven transport in the world.

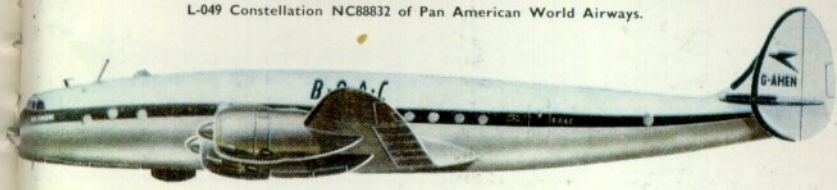
(Photos: Lockheed)

L-049 Constellation N9412H (ex-F BAZA of Air France, ex-N9409H of T.W.A.) operated by Las Vegas Hacienda Hotel Inc. of Las Vegas, Nevada, 1961.

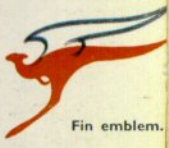
Fuselage emblem of NC8883

L-049 Constellation NC88832 of Pan American World Airways.

Centre fin marking of G-AHE



L-049 Constellation G-AHEN of British Overseas Airways Corporation.



Fin emblem.

L-1049E Super Constellation, VH-EAE "Southern Moon" of Qantas Empire Airways, Australia, 1958.

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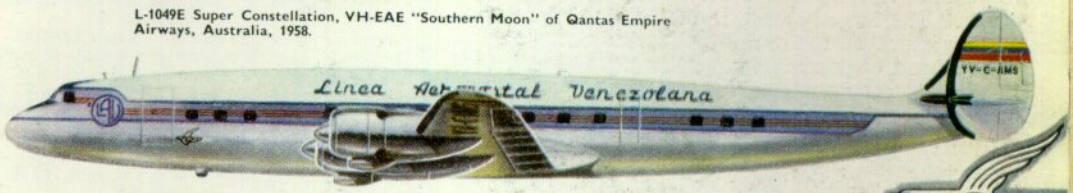


L-1049E Super Constellation, YV-C-AMS of Linea Aeropostal Venezolana, 1954.

L.A.V. fuselage emb

L-1049G Super Constellation of Trans World Airlines, 1959.

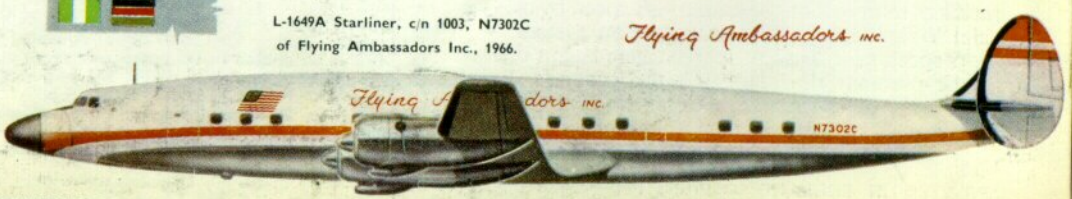
L1049B, c/n 4159, ex-54-4076, operated by National Aeronautics and Space Administration, Goddard Space Centre, Maryland, 1965.

N.A.S.A. emblem.

Flags on nose of NASA 21; left to right, Tasmania, Portugal, Trinidad: Madagascar, Australia, Brazil: South Africa, Spain, Great Britain: Nigeria, Kenya.

L-1649A Starliner, c/n 1003, N7302C of Flying Ambassadors Inc., 1966.

Flying Ambassadors INC.



power and fuel flow control with the resultant savings in consumption on long flights.

Complete fire protection, fire warning devices and fire extinguishers were provided to all four engines. The wing structure was compartmented and vented, particularly around fuel tank areas.

One very interesting feature during the development of the engine installation was an effort to obtain minimum drag by reversing the flow of air through the cowling. The air entered through the wing leading edges and flowed from the rear of the engine to exhaust behind the large prop spinner at the front of the engine. Wind tunnel test proved the drag reduction was small.

Wind tunnel tests were performed at the University of Washington, Lockheed Aerodynamic Laboratory, California Institute of Technology and NACA's High Speed Tunnel; conventional type wings from the Lockheed P-38 Lightning with a span of 123 feet, were adopted over several different wings including laminar flow types. Thermal deicing was chosen over rubber boots. Passageways in wings permitted the engineer to reach all engines in flight.

Experience from another "star" was drawn upon for cabin pressurization, by using the knowledge gained from the first American pressure cabin aircraft, Lockheed's XC-35. This was the Air Corps version of the first Electra.

Cabin pressurization with refrigeration as well as air conditioning to reduce humidity and fumes was incorporated in the basic design. Dual superchargers, driven directly by the engines, provided capacity for full cabin pressurization in the event of the failure of either. The large percentage of the air recirculated greatly improved the overall pressurization.

Lockheed engineers borrowed another "star", the Lockheed Ventura, and equipped it with Constellation power plants, the Wright R-3350-35, for flight tests. It was promptly christened the "Ven-Tellation" for obvious reasons. While some called it "Ven-Tellation" others called it "Sweater-Girl".

The "Ven-Tellation" was found to have a very similar performance to the Constellation and was therefore ideally suited for engine test. When Lockheed completed the Constellation test programme, the Wright engine company bought the aircraft for further development of the engine. A complete engine installation change record was set at 27½ minutes.

The Constellation was designed so that an engine fire could be confined for 30 minutes within the stainless steel engine nacelles and cowlings without causing serious damage, and had sixteen thermostatic couplings in each nacelle for fire warning.

By using the "Ven-Tellation" many engine problems were worked out. With four 2,200 h.p. 18 cylinder steel crankcase Curtiss-Wright Duplex Cylinder R-3350-35 engines the Constellation was to be used by the Army at a gross weight of over 90,000 lb. In civil use the maximum weight was to be around 86,000 lbs.

The Hamilton Standard Hydromatic Propellers turned less than half of the crankshaft speed by using a special Wright designed gear reduction system.

Two speed gear-driven superchargers began operation the moment the plane left the ground. Fully 75 per cent. of the Constellation's interior fuselage surface and 10 per cent. of its wings were spot welded.

L-749A, VT-DAS "Himalayan Princess" of Air India; and (below) L-749 N114A of Eastern Air Lines at Tampa, Florida in May 1952. (Photos: Mitch Mayborn)

SPECIFICATIONS

L-749

Dimensions: Span, 123 ft. 0 in.; Length 95 ft. 1¼ in.; Height 23 ft. 0 in. Wing area 1,650 sq. ft.
Weights: Empty, 56,590-57,160 lb.; loaded 105,000 lb.
Engines: Four Curtiss-Wright GR3350-BD1 eighteen cylinder each rated at 2,500 h.p.
Performance: Maximum speed 347 m.p.h. at 18,000 ft. cruising speed at (60% power) 298 m.p.h.

C-121C

Dimensions: Span, 123 ft. 5 in.; Length 116 ft. 2 in.; Height 24 ft. 9 in.; Wing area, 1,654 sq. ft.
Weights: Empty, 73,133 lb.; loaded 133,000.
Engines: Four Curtiss-Wright R-3350-34 turbo compound air cooled radial engines rated at 3,250 h.p.
Performance: Maximum speed 376 m.p.h. at 20,000 ft. maximum crusing speed 331 m.p.h. at 23,000 ft.; typical cruising 260 m.p.h.

L-1049G

Dimensions: Span 123 ft. 0 in.; Length 113 ft. 7 in.; Height 24 ft. 9 in.; Wing area 1,650 ft.
Weights: Empty, 73,016 lb.; loaded 137,500 lb.
Engines: Four Curtiss-Wright R-3350-DA3 fifteen cylinder air cooled rated at 3,250 m.p.h.
Performance: Maximum speed 370 m.p.h. at 20,000 ft.; maximum cruising 355 m.p.h. at 22,600 ft.; maximum range 5,840 miles.

RC-121/EC-121

Dimensions: Span, 123 ft. 5 in.; Length 116 ft. 2 in.; Height 27 ft.; Wing area 1,654 sq. ft.
Weights: Empty, 80,611lb. ; loaded, 143,000 lb.
Engines: Four Curtiss-Wright R-3350-93 air cooled radial engines rated at 3,650 h.p.
Performance: Maximum speed 295 m.p.h.; patrol speed 240 m.p.h.; endurance 18 hrs. at 25,000 feet; approx. range 4,400 miles.

L-1049H

Dimensions: Span 123 ft.; Length 113 ft. 7 in.; Height 24 ft. 9 in.; Wing area 1,650 sq. ft.
Weights: Empty 70,686; loaded 140,000 lb.
Engines: Four Curtiss-Wright 988 TC18EA6 eight cylinder air cooled each rated at 3,400 h.p.
Performance: Maximum speed 346 m.p.h. at 19,400 ft.; cruising speed 327 m.p.h. at 32,600 ft.

L-1649A STARLINER

Dimensions: Span 150 ft. 0 in.; Length 113 ft. 7 in.; Height 23 ft. 5 in.; Wing area 1,850 sq. ft.
Weights: Empty equipped 85,262 lb.; loaded, 156,000 lb.
Engines: Four Curtiss-Wright R-3350-EA2 eighteen cylinder air cooled turbo compound rated at 3,400 h.p.
Performance: Maximum speed 372 m.p.h. at 18,600 ft.; maximum cruising, 342 m.p.h. at 22,600 ft. range with spec. limit 5,000 miles; range with maximum fuel load 6,320 miles plus reserves.

4274

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