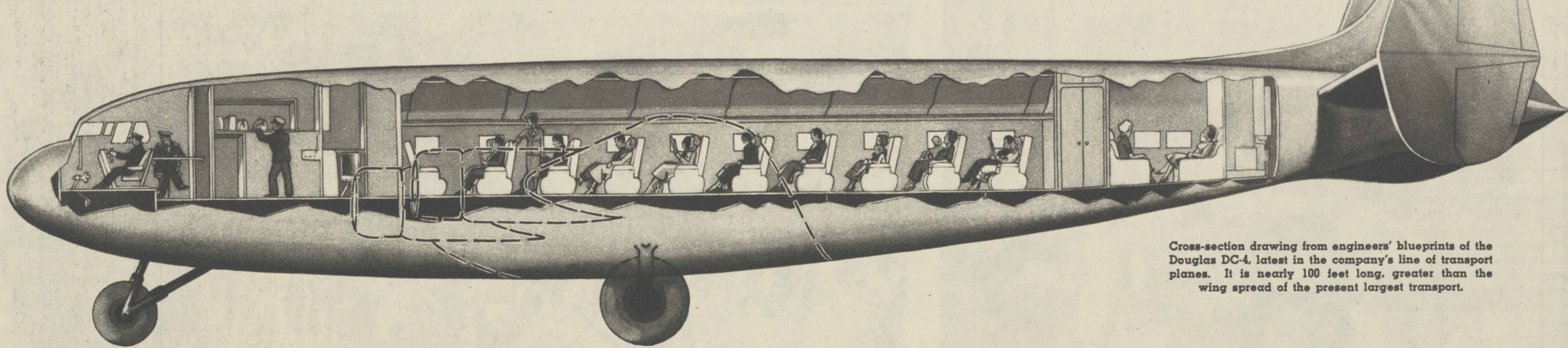


Aviation's Newest Super Ship Takes Form



Cross-section drawing from engineers' blueprints of the Douglas DC-4, latest in the company's line of transport planes. It is nearly 100 feet long, greater than the wing spread of the present largest transport.

Forty-Passenger Plane to Have Tricycle Landing Gear

By WAYNE THOMIS

ACCURATE details of the 60,000-pound Douglas DC-4 transport plane, which will have four engines and carry forty passengers, now are available. The giant ship is being assembled at the Douglas plant in Santa Monica, Cal., and the corps of engineers, who have been living with it for nearly eighteen months, now believe it will be flying by the early days of next year.

Interior and exterior lines and arrangements of the first ship, which is definitely an experimental plane, will follow those of the diagram reproduced here. It will be a low-wing monoplane with a nose wheel instead of a tail wheel and with the two main landing wheels placed well behind the center of gravity. This innovation follows a number of experiments which proved this feature has many advantages.

The machine also will have a triple tail. That is, there will be but one horizontal stabilizer

cabin and two others in the private compartment on the right side at the tail of the fuselage.

Each lower berth will be 28 inches wide and 6½ feet long. These berths also will have beside them a lounging chair in what is virtually a tiny sleeping compartment. The upper berths will be as long and somewhat wider—32 inches—but there will be no lounging chair. This arrangement is reached by staggering the lowers.

The rear compartment can be entirely cut off from the rest of the airplane and has its private lavatory, and upper and lower berths much like those in Pullman car compartments.

The cabin floor hides vast storage compartments for mail and express.

There are no gasoline tanks in the fuselage, as in the Douglas DC-2s and DC-3s now flying the air lines. All the tanks for the DC-4 will be in the wings, between the inboard and outboard engines on each side.

port machines up to this time.

Engines for this giant craft are being supplied by Pratt & Whitney. They are twin-row Hornets—14-cylinder radial air-cooled types with a displacement of 2,180 cubic inches. They have a take-off rating of 1,400 horsepower at 2,500 revolutions a minute using 95 octane fuel and 1,200 horsepower using 87 octane fuel. Normal rating is 1,150 horsepower at 2,350 r.p.m. with 95 octane fuel.

Two of these engines are installed in the leading edges of the wings on each side of the cabin. For the first time in a commercial transport these four engines will bear only the loads of flying the airplane. Special Eclipse engines of four cylinders each are installed behind the inboard engines in each wing to carry all other loads, including those of supplying power for a 110-volt electric light system, radio, vacuum pumps for the numerous gyro instruments in the cockpit, and heat for the galleys.

As much as 250 horsepower has been taken away from the effective power transmitted to the propellers of engines in other commercial ships, where such accessories as will be operated by the Eclipse engines were actuated off the main engines. It was decided that in the DC-4 the motors would turn their own magnetos and pump their own fuel but perform no other functions.

The Eclipse engines are buried

in the wings but cooled by air led through special ducts for this purpose.

At the maximum forward point in the fuselage nose is the roomy, comfortable pilots' and captain's office. There the controls, switches, dials, and instruments necessary in the flying of the giant plane are placed. Without a doubt the cabin of the DC-4 will be the best from the flying standpoint of any in an airplane manufactured in the United States.

Pilots from Pan American Airways, United Airlines, American Airlines, Transcontinental and Western Air, and Eastern Airlines went out to the Douglas factory and sat in the giant mock-up of the DC-4. These men arranged and rearranged the instruments until they were exactly as they wished them to be.

The final result, to the mind of the writer at least, is ideal. The flight instruments are duplicated for first and second pilots. These groups are placed exactly in front of the two seats. From the ceiling down the instrument panel to the floor run the numerous engine instruments in quadruple series, since the same indi-

cators are provided for each of the four engines.

The flight and engine groups are separated. The throttles, mixture controls, propeller controls, etc., are on a mount between the two seats. There also is a master control for the gyro-pilot which probably will fly the big airplane most of the time it is in the air.

This master control is a knob which can be actuated like the stick in small airplanes but in addition can be twisted to the right or left to control the rudder pick-offs of the gyro-pilot as well. In other words, the pilot with one hand can instantly make any adjustment he desires in the gyro-pilot.

Radio switches for the eight separate units are on the ceiling, and the units themselves are placed in a cabinet on the right side of the cockpit behind the second pilot's seat.

A third seat which may be occupied by a commander, who will give orders but never touch a control, a special radio navigator, or an engine specialist, is included. This sliding seat moves through an arc of about 140 degrees from a small table, upon which charts may be spread, to



A Douglas observation plane, model for the first commercial Douglas, the DC-1, also in scale to the DC-4. It was approximately 32 feet long and carried two persons and mail or baggage.

a position exactly between the two pilots' chairs.

Directly behind the cockpit is a lavatory for men and a dressing room. Then comes the galleys, which will be completely equipped to turn out hot meals. Behind this the main cabin begins. At the rear of the main cabin is a cloak closet and an aisle leading to the women's dressing room on the left and the compartment on the right.

The wings of this plane are attached nearly midway in the length of the fuselage. It is a definite step in the direction of the flying wing which engineers predict will be the ship of the future. The root of the wing is 25 feet in width, but the gleaming metal airfoils taper sharply to a pointed tip.

The sweep-back, typically

Douglas in outline, is along the leading edge. The trailing edge is nearly straight.

The whole ship, of course, is constructed entirely of metal—duralumin spars being used throughout. The cabin will be more completely soundproofed than any previous commercial ship, and for once the soundproofing will be extended into the pilots' cabin, hitherto a neglected spot.

While no radically new features are incorporated in this ship, the engineers have overlooked no known formula to improve its speed, control, and safety. One of the features regarded most favorably is the nose wheel and the placing of the main wheels behind the center of gravity.

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Tests with smaller ships have proved that the tricycle gear virtually will eliminate all tendency to ground loop. This is true because the center of load, which is at the CG, or center of gravity, leads the main landing wheels rather than pushing forward from behind them. Thus when the ship lands in a cross wind or with considerable drift the load tends to straighten the ship into the track of its motion in the air rather than attempting to swing the tail around to get ahead of the landing gear, as in the case of planes with landing wheels ahead of the CG.

With a nose wheel also, extremely fast landings will be possible without danger. Once on the ground, brakes can be applied without hazard of a nose-over. The ship always is in flying position. This means that passengers in berths will not be cocked at a crazy angle when the ship is on the ground. Furthermore, the initial push needed to get it rolling for takeoff should be less.

This giant plane will carry enough gasoline to enable it to fly for 1,500 miles, with a reserve supply enough for another 500 miles. Thus transport operators will be able to cross the continent with one stop should this be desirable. Cruising speed will be about 200 miles an hour, with a top speed of about 225 miles an hour. It must be able to land with full load at sea level at a speed not greater than 65 miles an hour. To provide for this, flaps have been installed extending from inner margins of ailerons beneath the fuselage.



(Acme photo.) Donald Willis Douglas, president of the aircraft company bearing his name, which is producing the new superliner in California.

and one set of elevators, but there will be three vertical fins and three rudders. This was a compromise arrangement adopted in order to provide exceptional control at slow speeds and to avoid the construction of one enormous vertical fin which would have towered more than 35 feet into the air.

The wing span on this first machine will be 138 feet 3 inches. The fuselage, which already has been completed save for the interior furnishings, will be 97 feet 7 inches long. These are stupendous dimensions for an airplane. The largest commercial airliner flying in the United States today has a wing spread of only 95 feet.

On its tricycle landing gear the giant ship will stand 24 feet 6½ inches above the ground. The two main landing wheels will be 65 inches, or 5 feet 6 inches, in diameter, and the nose wheel will be 3 feet 8 inches in diameter. The entrance to the cabin will be 9 feet 6 inches off the ground when the ship is at rest.

The cabin alone will be 7½ feet high, 9 feet 9½ inches wide, and more than 66 feet in length. There will be a double row of lounge chairs down each side of an 18-inch aisle in the main cabin. The chairs nearest the windows on each side will be 28 inches wide; those nearest the aisle will be 25 inches wide.

They will be so constructed that when arranged for night flights 24 persons can rest in comfortable beds in the main

The Story of the Ku Klux Klan

(Continued from page three.)

membership fee of \$10, according to stories told by former klansmen, \$4 went to the local solicitor who signed up the candidate, \$1 went to the state officer, 50 cents went to the district officer, and \$4.50 went to supreme headquarters in Atlanta. From this it can be seen that when the Klan eventually numbered its members in millions it was by no means a small enterprise.

Members of the old Klan made their own robes, but those of the new Klan sent to Atlanta for them. They were manufactured there and were sold for \$6.50 each to individual members of the organization. Some of the robes of the officers cost even more, since they were more elaborate.

Even though Imperial Wizard Simmons' new secret society had started out well it failed to maintain its early gains. Early in 1920 it was threatened with financial disaster. It had to be pepped up, so there stepped into the picture Edward Young Clarke and Mrs. Elizabeth Tyler, who had been connected with a publicity association and had been successful in drives for funds for various organizations, including the Anti-Saloon league. Clarke, as head of the propaganda department, entered upon a campaign to peddle the Klan to the public.

From the time that Clarke

took over the rôle of rescuer, which was in June, 1920, until the organization's activities were investigated by congress in October, 1921, a period of little more than a year, Klan membership grew from a very few thousand to almost 100,000. Its appeal not being sectional, as was that of the first Klan, the organization began to spread out to many parts of the country.

The investigation by congress was the result of a wave of lawlessness that was sweeping the country. Four killings and a long list of floggings and other brutalities were attributed either directly or indirectly to the Klan. Headquarters of the Klan denied that the organization was connected in any way with these crimes. The exposed, instead of halting the expansion of the organization, seemed to have little or no effect at all. It is believed by some actually to have increased favorable interest in the Klan.

At any rate the Klan continued to grow, and in localities where it was strong it began to dictate public, and in some cases private, morals. The idea of upholding "white supremacy" and protecting womanhood, as advocated by Imperial Wizard Simmons, seemed to take hold even in localities where the whole population was white and where sacred rights of womanhood were in no way threatened. Animosity directed toward foreigners and

others added fuel to the fire, the light of which attracted thousands to the Invisible Empire.

Hooded riders were active in districts that never before had seen a night rider. Fiery crosses were flaming from many a hill-top. The Klan grew and grew, until by 1923 it was estimated that it had a membership of two and a half million.

In the meantime, in a house in a woods near Stone Mountain, Georgia, in May, 1922, one Hiram Wesley Evans, a Texas dentist, was sworn in as imperial kligrapp, or grand secretary, of the Klan. At a klavocation on the following Thanksgiving he became imperial wizard, supplant-

ing in that office the founder, Simmons. Under Evans' leadership the organization reached the height of its power in 1925. He is reported to have said that at that time the Klan had more than a million and a half members actually on its rolls, and that about four million others "wandered through its back door, half of whom never were reported to headquarters."

In the elections of 1922, 1924, and, to a certain extent, 1926, the Klan concentrated its powers at the polls so effectively that it was able to elect in several states United States senators, representative, and state officials, and to control local politics. Hugo L. Black was elected to the senate from Alabama in 1926, the same year that the Invisible Em-



David C. Stephenson, former grand dragon of Indiana, who was sent to prison for murder.



Edward Young Clarke, who rescued the Klan from financial ruin in 1920.