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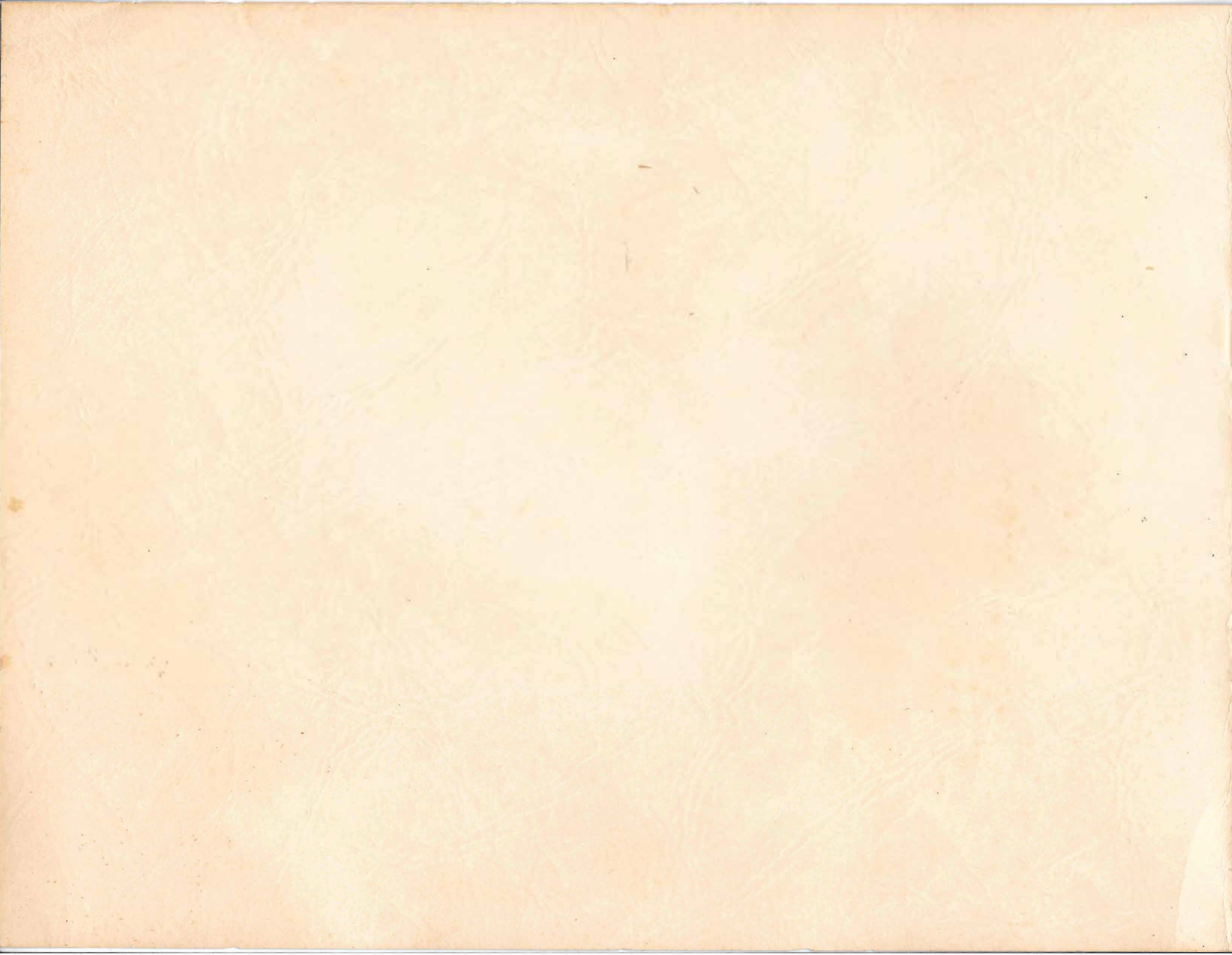
# Cloudster

by DOUGLAS

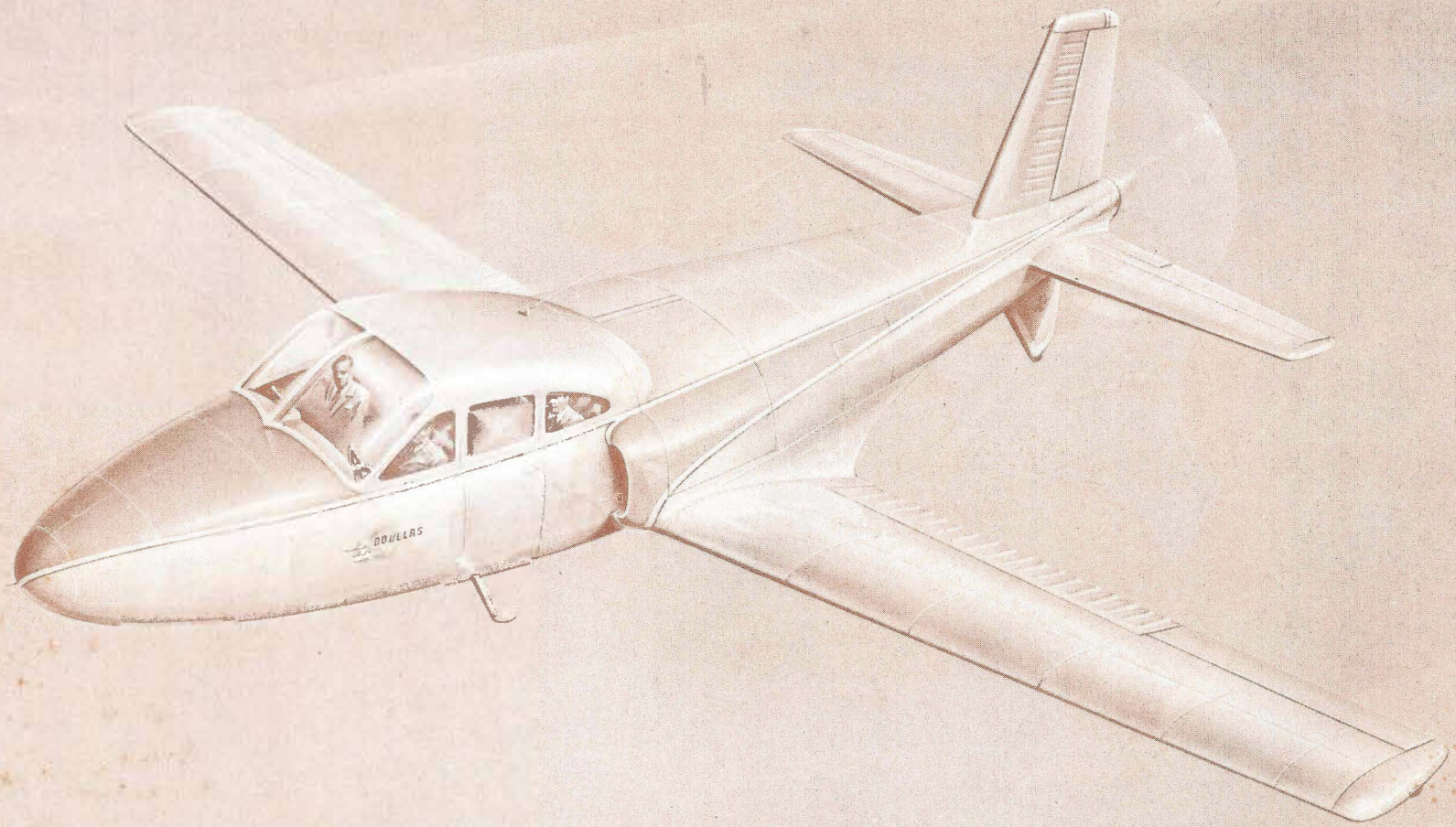


PLEASURE  
CORPORATION  
CHARTER









*CRUNDALL*



To meet the demands for an improved design airplane for pleasure, corporation, and charter flight operations, Douglas presents the **Cloudster**.

Embodying the design and manufacturing experience of years of transport and combat airplane production, the **Cloudster** is a five-place, all metal, low wing monoplane. Incorporating the principle of "centerline thrust," a proven Douglas development, the **Cloudster** offers safety in operation and performance superior to the conventional twin-engine airplane with the ease of operation of a single-engine airplane.

Two Continental E-250 engines, the power plant of the **Cloudster**, are submerged side-by-side in the fuselage aft of the cabin. By means of a gear box the two engines are coupled to a single shaft leading aft to the two-blade constant speed propeller. An over-running clutch and a friction-type clutch installed on each input shaft permit the pilot to control the input of each engine into the power system. By means of these clutches the pilot may lose an engine during take-off and have it freed from the propulsive system without affecting the remaining engine and without moving any control on his part. Once in flight the clutches may be controlled so as to integrally tie the entire propulsion system into one unit. Each engine is individually enclosed in a stainless steel compartment which incorporates fire detection equipment and a selective carbon dioxide fire extinguishing system controllable from the cockpit.

The engine controls are all conveniently centered on a panel adjacent to the pilot. This same panel also incorporates trim controls, and landing gear and flap controls.

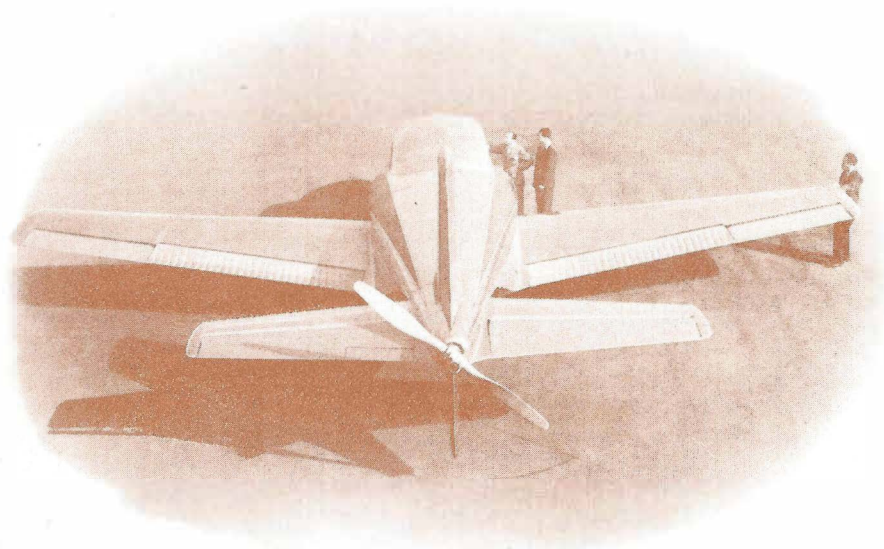
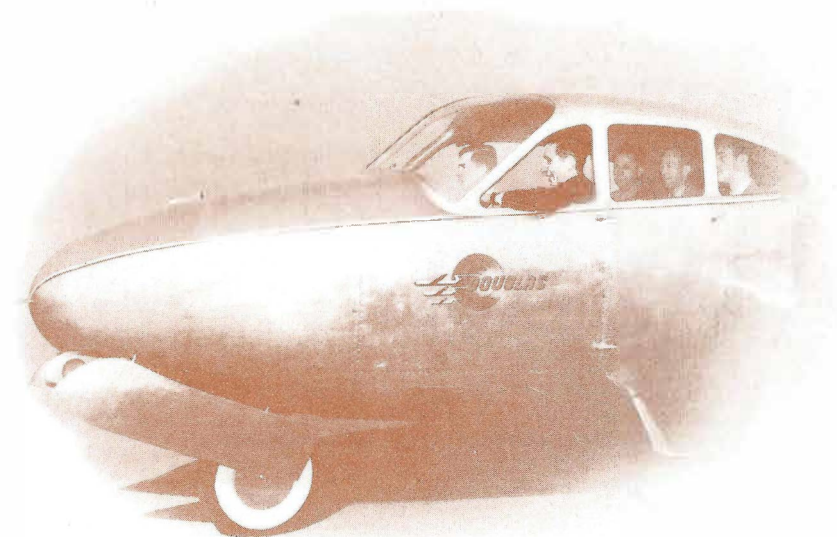
The all metal wing of the **Cloudster** incorporates fuel tanks, landing gear, landing light, flaps and ailerons. The two cell-type fuel tanks have a capacity of 60 gallons each. The all metal wing flaps are similar to the NACA 2B design. The ailerons are of metal structure, fabric covered.

The retractable tricycle landing gear with its very wide tread permits safe maneuvering on the ground. This feature, together with the steerable nosewheel, affords ground handling characteristics comparable to those of an automobile.

Electrical, radio, and instrument equipment is ample and in accordance with good practice and Civil Air Regulations. Two 25-ampere hour generators (one on each engine) furnish 12-volt direct current for the necessary lighting, radio, and instrument and navigation equipment. In addition to the usual instrument, navigation, and interior lights, a 180-candlepower retractable landing light is installed in the left-hand outer wing. The General Electric AS-1B transmitter receiver radio is mounted in the instrument panel on the left-hand side convenient to the pilot. As an additional feature a loud speaker is installed in the ceiling of the cabin between the front and rear seats. The instruments in the **Cloudster** are in complete compliance with the Civil Air Regulations Part O3.

The flight controls of the **Cloudster** are of the push-pull wheel type with rudder pedals. Dual controls are provided to permit the right-hand seat occupant to fly the airplane.

The cabin, being situated forward of the wing, affords the passengers in the rear seat visibility of the landscape equal to that heretofore only possible for pilots. In addition the large area plexi-glass windshield provides extreme angle of vision for the pilot. The absence of the propeller forward of the cockpit offers the ultimate in safety by also improving pilot vision. The wide windows immediately aft of the windshield of shatterproof glass are openable to allow visibility during take-off, landing, or taxiing in inclement weather.





# Data and Dimensions

Airplane Model Designation.....	Cloudster
Maximum Take-Off Weight.....	5,100 Lb.
Maximum Landing Weight.....	5,100 Lb.
Empty Weight.....	3,336 Lb.
Useful Load.....	1,764 Lb.

## WING

Span.....	39 Ft. 9 $\frac{3}{4}$ In.
Root Chord.....	96 In.
Tip Chord.....	47.17 In.
Area.....	235.2 Sq. Ft.
Dihedral Angle.....	.6°
Sweepback Angle (at 35% Chord).....	0°
Angle of Incidence—Root (with Zero Lift Line).....	5 $\frac{1}{2}$ °
Angle of Incidence—Tip (with Zero Lift Line).....	1 $\frac{1}{2}$ °
Airfoil Section.....	Douglas S-17
Aspect Ratio.....	6.7
Aileron Area Including Tabs (Aft of Hingeline).....	14.4 Sq. Ft.
Aileron Span.....	5 Ft. 8 $\frac{5}{8}$ In.
Flap Area (Total).....	40 Sq. Ft.
Flap Span (Each Side).....	9 Ft. 7 $\frac{3}{16}$ In.
Flap Movement.....	45° Full Down

## HORIZONTAL TAIL SURFACES

Area — Total (Gross).....	70.8 Sq. Ft.
Span.....	18 Ft. 4 In.
Stabilizer Area.....	31.7 Sq. Ft.
Elevator Area Incl. Tab (Aft of Hinge Line).....	23.7 Sq. Ft.

## VERTICAL TAIL SURFACES

Area — Total (Gross).....	31.2 Sq. Ft.
Upper Stabilizer Area.....	16.4 Sq. Ft.
Rudder Area — Total Incl. Tab (Aft of Hinge Line).....	9.3 Sq. Ft.

## FUSELAGE

Overall Length.....	35 Ft. 4 $\frac{1}{2}$ In.
Overall Height.....	6 Ft. 10 In.
Height of Vertical Tail with Airplane in Static Position.....	12 Ft. 0 In.
Maximum Width.....	.89 In.
Maximum Depth.....	64 $\frac{3}{4}$ In.

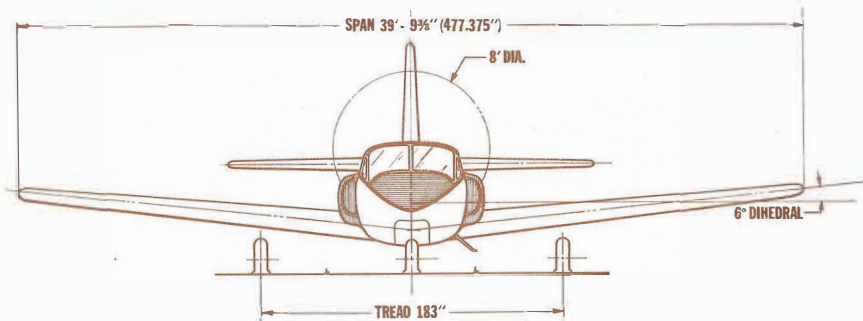
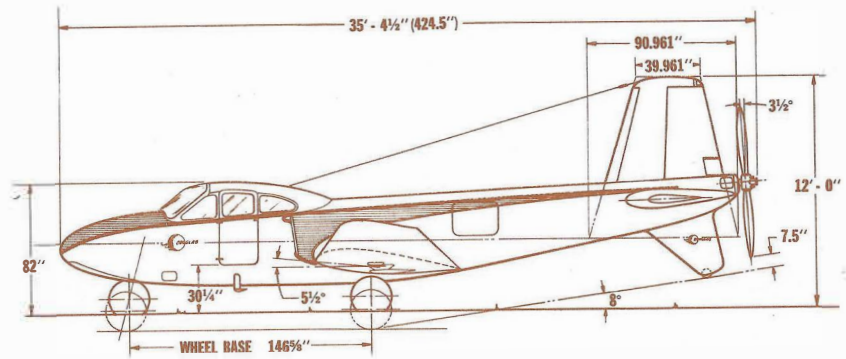
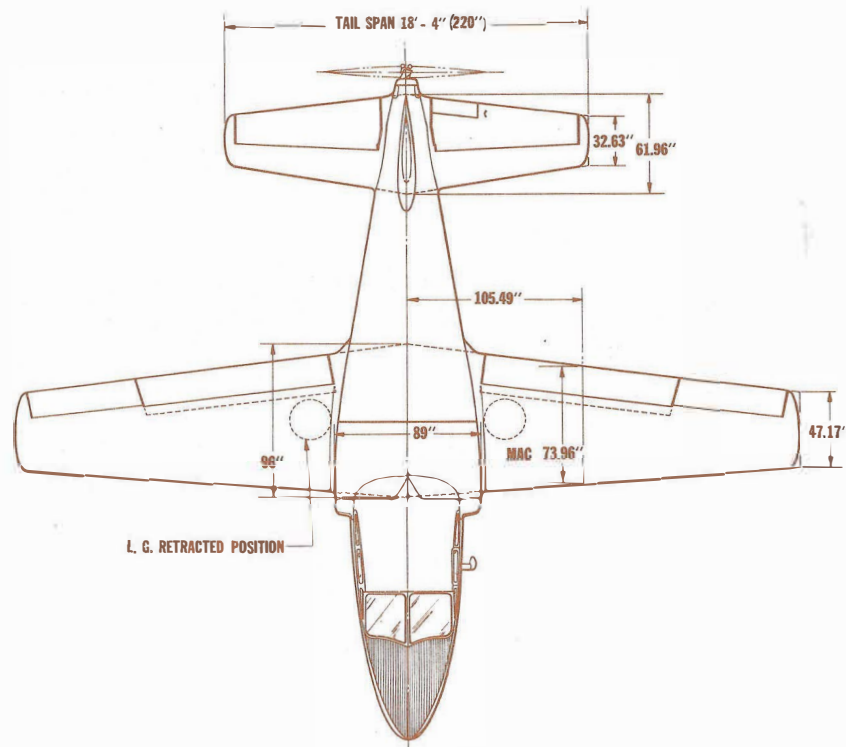
## POWER PLANT

Engine Model and Manufacturer.....	Continental E-250
Take-off Horsepower.....	250 BHP
Rated Horsepower.....	250 BHP
Propeller Diameter.....	8 Ft.
Fuel Tank Capacity.....	120 U. S. Gal.
Oil Tank Capacity.....	7 U. S. Gal.

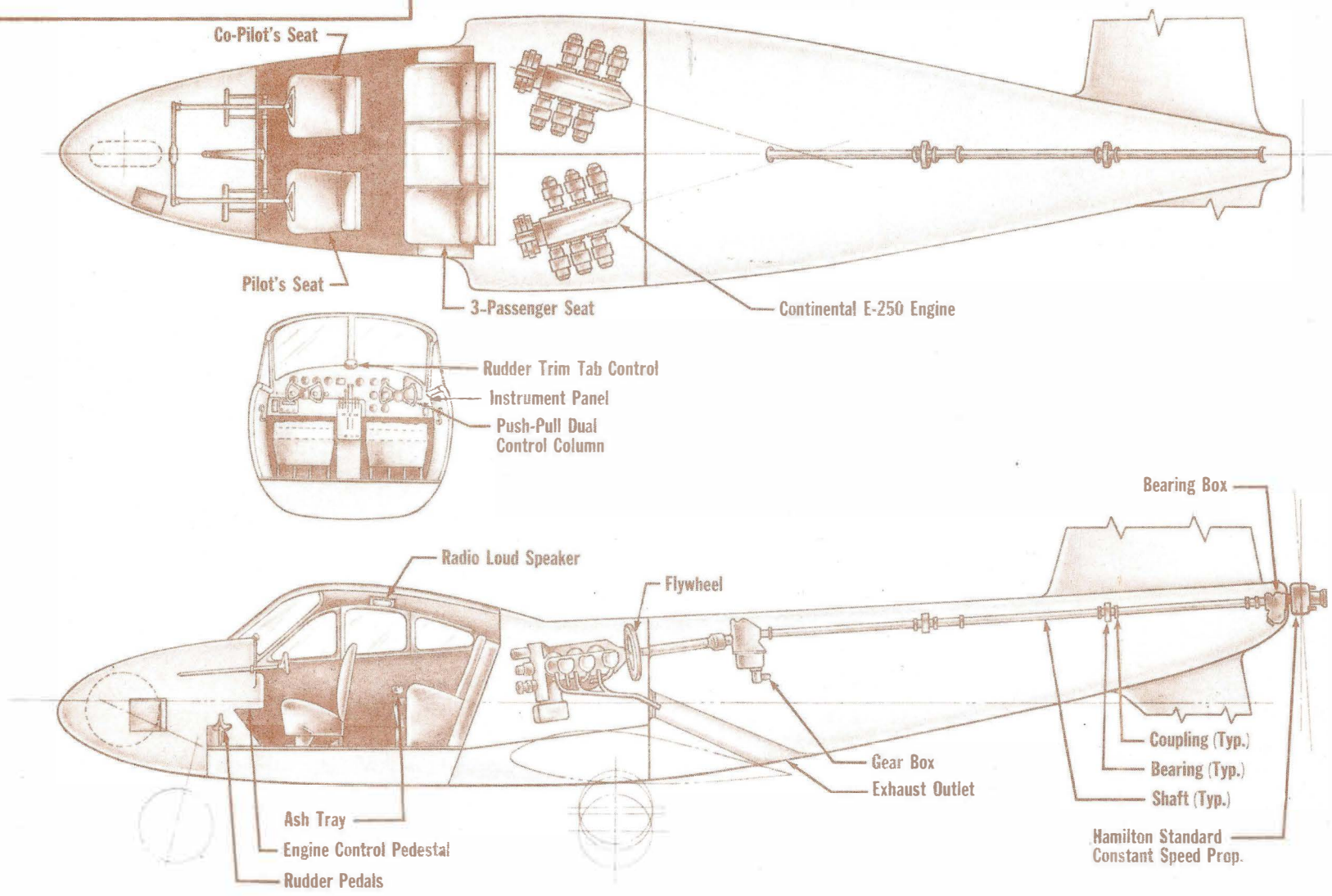
## LANDING GEAR

Size Tire—Main Gear.....	7.50 x 10
Size Tire—Nose Gear.....	7.50 x 10
Landing Gear Tread.....	15 Ft. 3 In.
Wheel Base.....	12 Ft. 2 $\frac{5}{8}$ In.
Minimum Turning Radius (Inside Wheel).....	4 Ft. 5 $\frac{5}{8}$ In.

# 3-View Diagram



# Inboard Profile





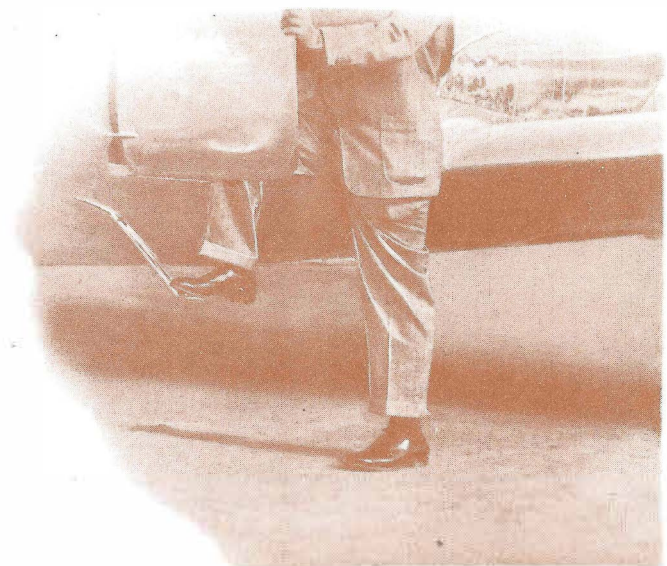
# Interior Appointments

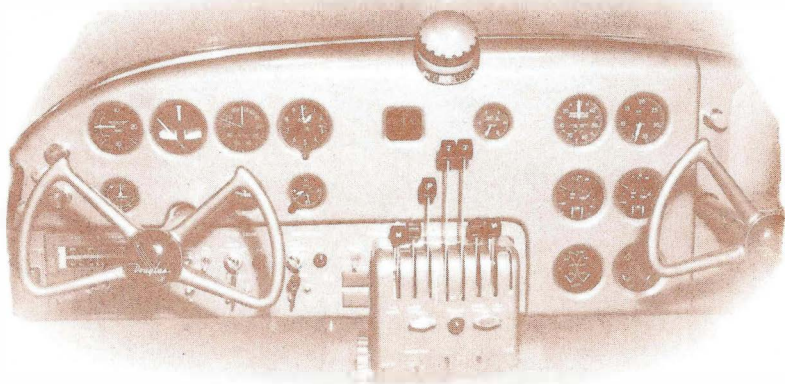
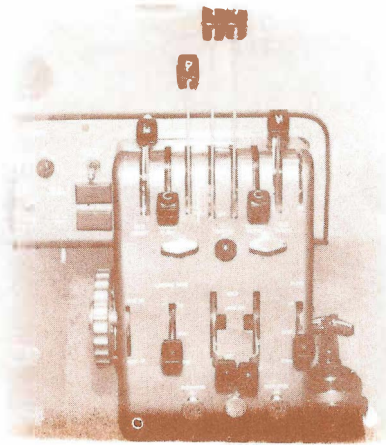
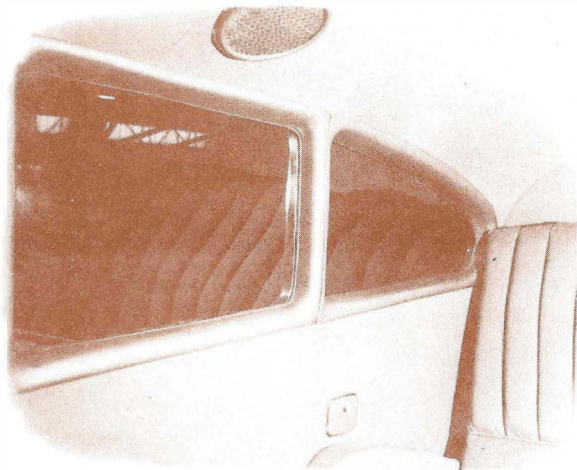
In the styling of the interior of the **Cloudster** smartness and luxury with simplicity has been the keynote; soft gabardine fabric with matching accessories, lending an air of quiet comfort.

The sedan-type seat at the rear for three passengers is of spring and foam rubber construction. The three-section seat back may be tipped forward for access to three small compartments for coat and small luggage storage.

The pilot's seat is also of spring and foam rubber construction and adjustable fore and aft. The passenger seat adjacent to the pilot is of identical design but is not adjustable.

Entering the **Cloudster** is as natural as the daily function of entering an automobile. The wide entrance door and the streamlined step approximately 15 inches off the ground makes entrance a simple act.





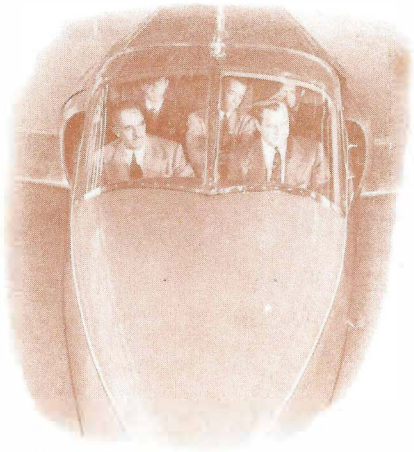
To provide heat and sound insulation the **Cloudster** cabin has been lined with glass wool. In addition to this flameproof material the seat and interior lining upholstery fabric is flameproofed, another **Cloudster** safety feature.

Pleasant air temperature in the cabin is provided by muff heaters on each engine exhaust. A controlled mixing valve permits selection of desired air temperature. The Anemostat-type air outlet is located beneath the pilot's and right-hand forward seats. Air is exhausted through grills located on the front face of the rear seat base.

A baggage compartment of ample size to accommodate passenger's luggage is located aft of the engine compartments and is accessible from the ground. Suitable straps are provided to retain the luggage during flight to prevent its shifting or damage. This compartment, having a capacity of 20 cubic feet, can withstand a load capacity of 250 lbs.

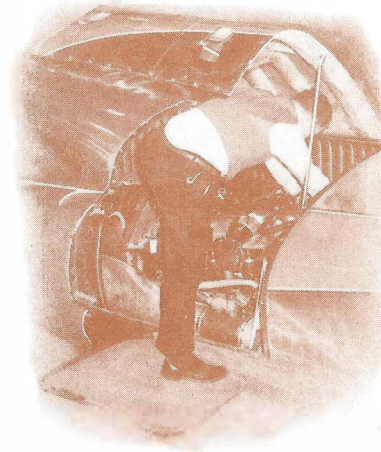
The instrument panel and the control pedestal carry out the motif of simplicity and harmony. A mask, with the instruments and lights recessed, is used to carry out the interior lines and prevent glare in the pilot's eyes during night operations. The control pedestal of matching color scheme has been designed to harmonize and yet retain its functional use. Care has been taken to eliminate projections which would damage clothing in entering the forward seats.



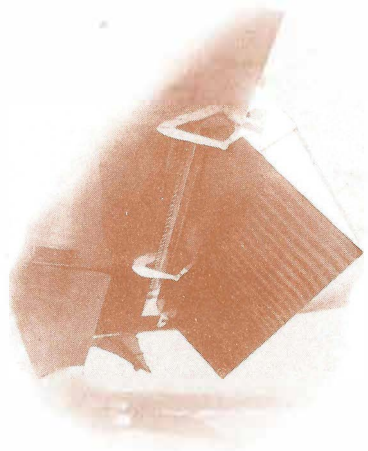


The wide unobstructed plexi-glass windshield not only affords unimpaired view for the pilot but even affords the passengers in the rear seat enjoyable forward vision. The shatterproof glass side window at the pilot's position may be lowered by a conventional crank to permit vision on the ground during inclement weather.

## Other Features



Rapid access to the engine compartments is made possible by a large hinged door for each compartment. These doors, approximately 48 in. by 60 in. may be easily removed for major overhaul of the engines. By means of this rapid access feature, inspection and line maintenance may be accomplished with a minimum of time and without the necessity of ladder or workstands. Adequate walkway structure is provided in the wing to insure against damage.



The single-slot wing flaps of the **Cloudster** permit a stalling speed of 68 miles per hour at maximum weight and 63 miles per hour at 4,500 pounds. Based on NACA design criteria, the flaps afford high lift for take-off and landing without any detrimental effect on the airplane's controllability. Being of all metal construction, they are impervious to reasonable damage by flying stones, etc. during take-off and landing.

The **Cloudster** has the advantages of many previous transport, executive, and combat airplane designs, and incorporates the "know-how" of all of these to become an airplane capable of any task assigned to it, from pleasure jaunts and business trips to charter service, with the ultimate in comfort and safety.

# Weight and Balance Performance

## Gross Weight Loading

Item	Quantity	Weight
Pilot .....	1 .....	170 Lb.
Passengers.....	4 .....	680
Baggage .....		135
Fuel .....	120 Gal.....	720
Oil .....	5 Gal.....	38
Residual Fuel and Oil.....		21

<i>Total Useful Load</i>	1,764
<i>Weight Empty</i>	3,336
<i>Gross Weight</i>	5,100

## Balance Limits:

13.0% MAC to 28.0% MAC

## Loadability:

1. From one to five persons may be loaded in the airplane without adversely affecting the balance.
2. Baggage at 27 lbs. per person may be stowed in the baggage compartment.
3. The fuel C.G. is between the balance limits (at 18.7% MAC), therefore does not adversely affect the balance.

## Performance

Take-off Distance (Over 50 Ft. Obstacle).....(Ft.) .....	1,840
Landing Distance (Over 50 Ft. Obstacle).....(Ft.) .....	1,750
V <sub>stall</sub> (at Landing Weight)..... (MPH) .....	65

## Rated Power Operation

BHP .....	250
RPM .....	3,100
High Speed at Sea Level.....(MPH) .....	226
Rate of Climb at Sea Level.....(Ft/Min) .....	1,500
Service Ceiling (at Max. G.W.).....(Ft.) .....	22,200
Absolute Ceiling (at Max. G.W.).....(Ft.) .....	23,000

## Maximum Cruise Power Operation

Altitude .....	(Ft.) .....	6,000
BHP .....		187.5
RPM .....		2,930
V <sub>cr</sub> (at ½ Fuel Weight).....(MPH) .....		217
Endurance .....	(Hrs.) .....	3.73
Range (Absolute) .....	(Mi.) .....	810

## Reduced Power Operation

Altitude .....	(Ft.) .....	6,000
BHP .....		150
RPM .....		2,720
V <sub>cr</sub> (at ½ Fuel Weight).....(MPH) .....		201
Endurance .....	(Hrs.) .....	4.72
Range (Absolute) .....	(Mi.) .....	950

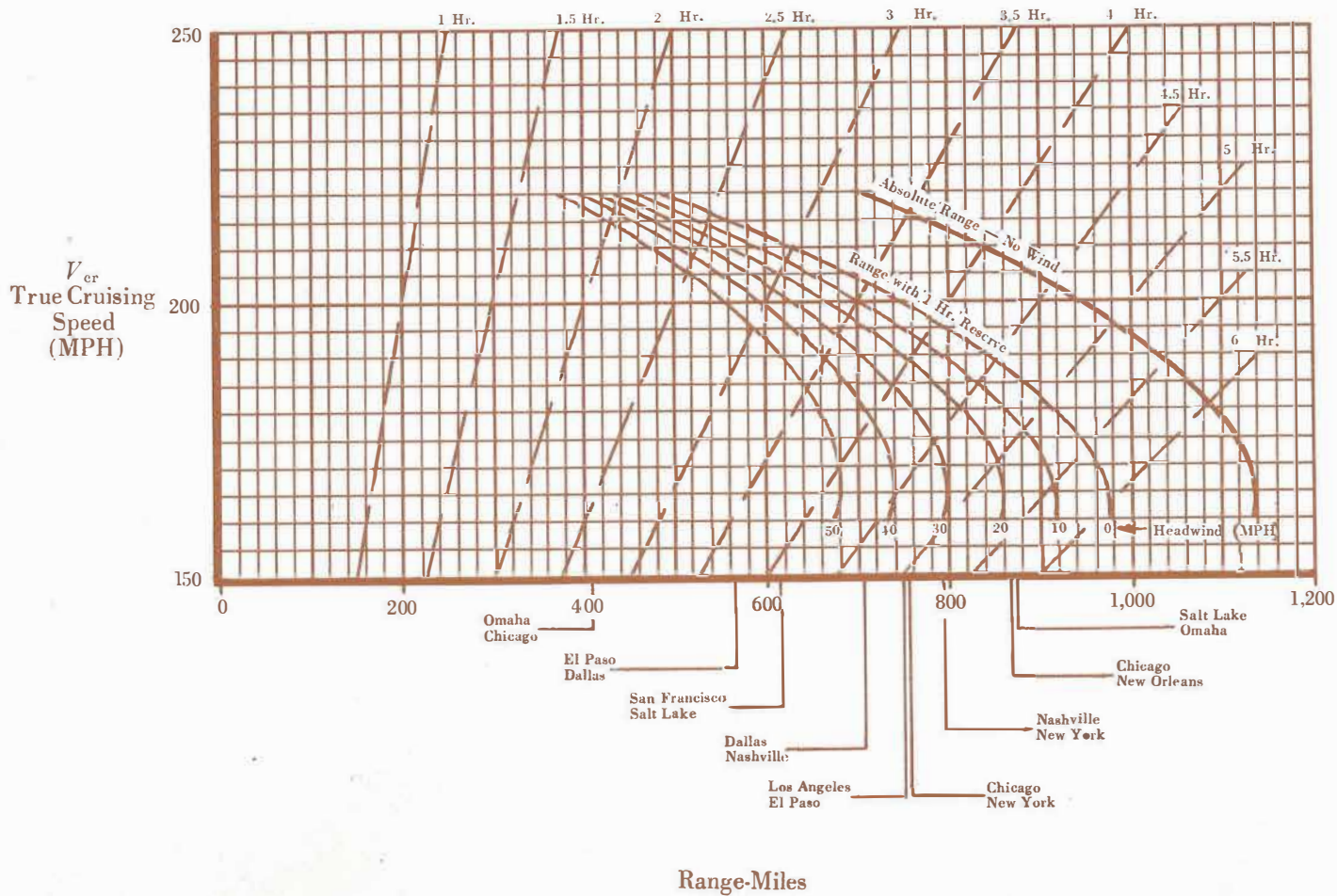


Varying Conditions of Headwind  
Flight at 6,000 Feet Standard Altitude

Initial Weight: 5100 pounds.

Note: At a given speed add 25 miles range for each decrease of 500 pounds in initial weight.

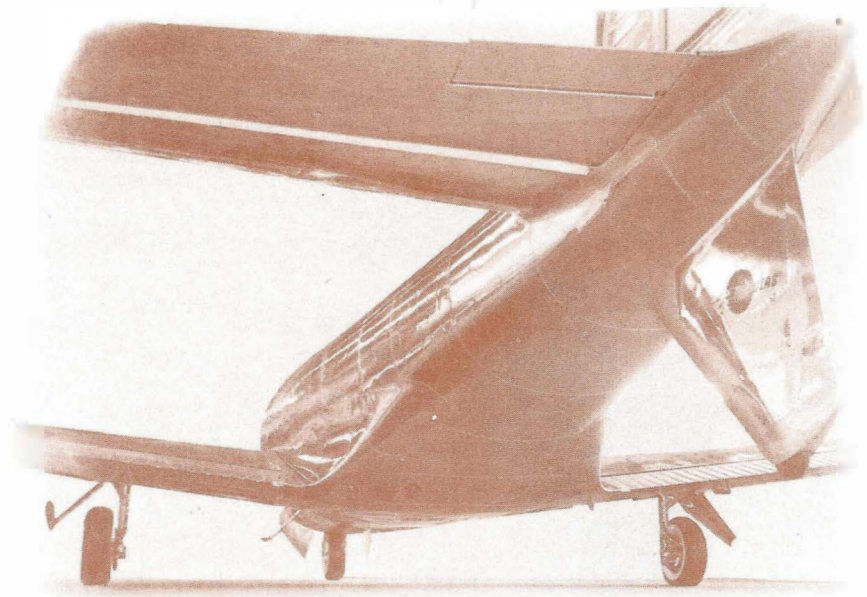
# Range vs. Speed



Example for use of chart:

Assume a flight of 700 miles against a reported 20 MPH headwind and carrying 1 hour reserve fuel.

- Step 1. Enter curve at 700-mile range point.
- Step 2. Project upward to 20-MPH headwind line.
- Step 3. Reading to left indicates true cruising air speed (approximately 196 MPH).
- Step 4. Projecting to the right from the intersection in Step 2, to an intersection with the 0 headwind line, and interpolating on the time consumed curve, indicates the time for flight (approximately 4 hours). It should also be noted that this last intersection with the 0 headwind line gives the air miles traveled in flight (approximately 780 miles).







**Report No. SM-12051**

**Prepared by:**

**Engineering Department  
Douglas Aircraft Co., Inc.  
Santa Monica, California**

