UNITED STATES
FEDERAL AVIATION AGENCY

AIR VEHICLE PERFORMANCE CHARACTERISTICS

Volume I-B

GROUND OPERATIONS

FOR·

BUREAU OF RESEARCH & DEVELOPMENT
U S FEDERAL AVIATION AGENCY
Washington 25, D C

BY·

APPLIED SCIENCE DIVISION
FAIRCHILD ENGINE & AIRPLANE CORP
Alexandria, Virginia

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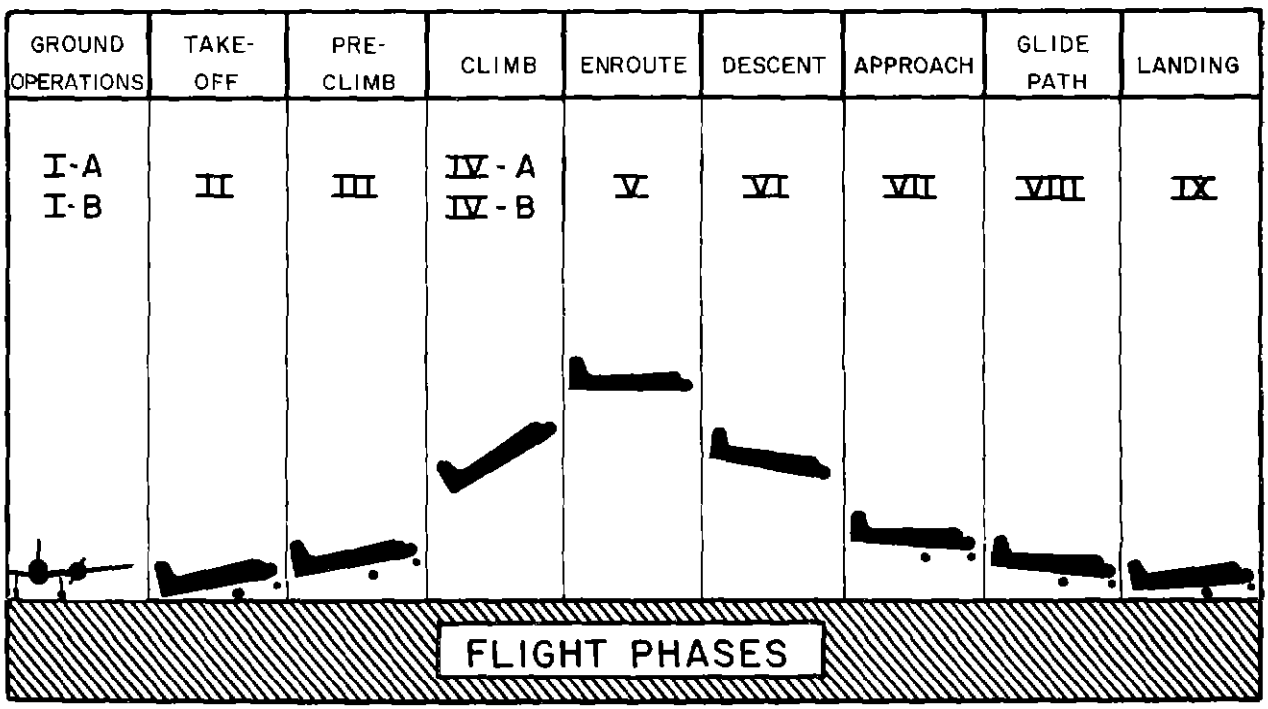
AIR VEHICLE PERFORMANCE CHARACTERISTICS

This is a fourteen volume study,
containing the following

Volume I-A	Ground Operations
Volume I-B	Ground Operations
Volume II	Take-Off
Volume III	Pre-Climb
Volume IV-A	Climb
Volume IV-B	Climb
Volume V	Enroute
Volume VI	Descent
Volume VII	Approach
Volume VIII	Glide Path
Volume IX	Landing
* Volume X-A	Classified Military Aircraft (S)
* Volume X-B	Classified Military Aircraft (S)
* Volume XI	Future Aircraft (S)

* Volumes I-A through IX contain flight phase data on current aircraft, except those classified by the military The latter are in Volumes X-A and X-B, and future aircraft in Volume XI. These three volumes have a security classification of secret.



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AIR VEHICLE PERFORMANCE CHARACTERISTICS

MASTER INDEX

The following is a complete listing of the 122 aircraft reported and their location by volume

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MASTER INDEX - (Cont'd)

AIR VEHICLE PERFORMANCE CHARACTERISTICS

Table of Contents for Volumes I-A through IX

(date of latest revision September 1, 1959)

UNITED STATES FEDERAL AVIATION AGENCY
Bureau of Research & Development Washington 25, D. C.

AIR VEHICLE PERFORMANCE CHARACTERISTICS

Volumes I-A through IX

SECTION 2

COMMERCIAL AIRCRAFT

containing data on

Boeing B-377

Boeing 707-121

Convair 340/440

de Havilland Comet 4

Douglas DC-3 (C-47, R4D)

Douglas DC-4 (C-54)

Douglas DC-6

Douglas DC-6B

Douglas DC-7

Douglas DC-7B

Douglas DC-7C

Fairchild F-27B

Lockheed Electra 188

Lockheed 1049G

Lockheed 1649A

Martin 404

Vickers Viscount 745D

Vickers Viscount 812

(date of latest revision September 1, 1959)

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Bureau of Research & Development Washington 25, D. C

GENERAL DESCRIPTION

The Boeing 377 "Stratocruiser" airplane is a four engine, mid-wing transport, characterized by a thick, twin deck fuselage construction, and high up-swept vertical stabilizer. It is equipped with a fully retractable tricycle landing gear, with power steering on the nose gear The minimum crew consists of pilot, co-pilot, and flight engineer

The airplane is powered by four Pratt and Whitney R-4360-39 or -53 engines, driving four blade, constant speed, full feathering, reverse pitch propellers Limitations of the power plant are as follows

Maximum power (wet) is developed at 52 5 inches manifold pressure at 2, 800 rpm The maximum allowable time at this power setting is five minutes.

Normal power is developed at 49 inches manifold pressure at 2, 800 rpm There is no time limitation at this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 145, 800 pounds
Maximum Take-off 145, 800 pounds
Maximum Landing 130, 000 pounds

Additional information

Basic Operating Weight 91, 000 pounds
Zero Fuel Weight 99, 060 pounds
Fuel (usable) 46, 740 pounds
Footprint Pressure at Maximum Gross Weight Main, inboard, 85 psi - outboard, 100 psi, Nose, 50 psi

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D C power source Emergency starting may be accomplished by the internal 24 volt battery system.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 3 0 to 4 0 minutes
Prepare for taxi 3 0 to 5 0 minutes
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15

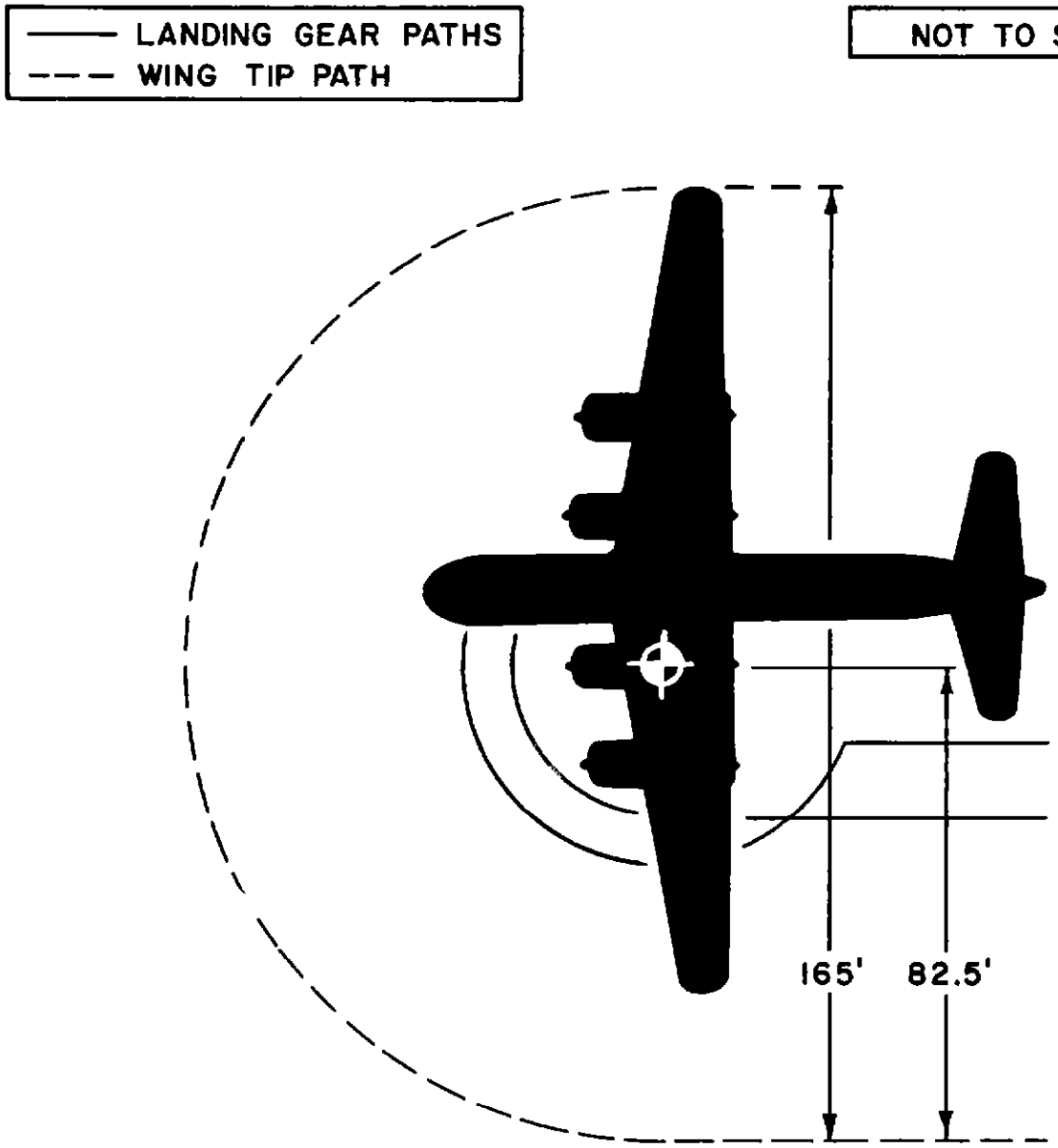
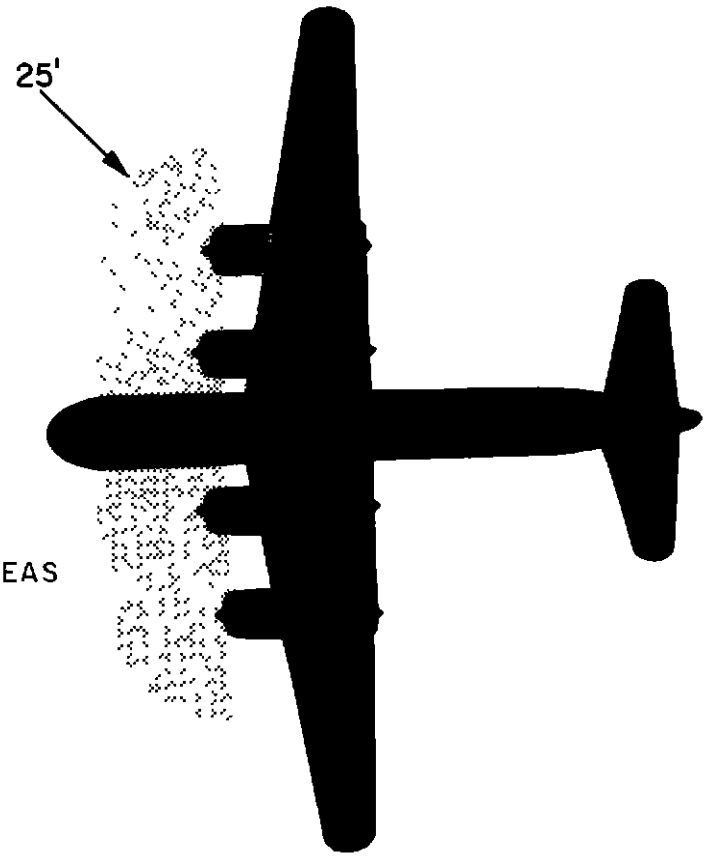


FIGURE 1

DIMENSIONS	
WING SPAN	141'-3"
LENGTH	110'-4"
HEIGHT	38'-3"
TREAD	28'-6"

NOT TO SCALE



DANGER AREAS
FIGURE 2

GENERAL DESCRIPTION

The Boeing "Stratoliner" Model 707-121 is a four engine, jet propelled, low-swept wing transport capable of operating at high speeds and high altitudes It is equipped with a tricycle type retractable landing gear The airplane mission is that of a continental passenger transport, but it is capable of full-load, over-ocean operation A minimum crew of four is required, consisting of pilot, co-pilot, engineer, and navigator

The airplane is powered by four Pratt and Whitney JT3C-6 (J57) turbo-jet engines, employing water injection and rated according to thrust as follows

Wet Take-off Thrust 13,000 pounds (2 5 minute limit)
Dry Take-off Thrust 11,200 pounds (5 0 minute limit)
Normal Rated Thrust 9,500 pounds (No time limit)

Pertinent gross weight limitations of the airplane are as follows
Maximum Ramp 248,000 pounds
Maximum Take-off 246,000 pounds
Maximum Landing 175,000 pounds

Additional information
Basic Operating Weight 118,000 pounds
Zero Fuel Weight. 126,800 pounds
Fuel (usable) 121,200 pounds
Footprint Pressure at Maximum Ramp Weight 235 psi per wheel main gear, 170 psi per wheel nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines may be started using an internal or external pneumatic power source Normal starting is accomplished with an external compressed air supply to start one engine Engine bleed air is then taken from this engine to provide pressurized air for the pneumatic starters of the other engines

The minimum turning radius, dimensions, and danger areas are illustrated in Figures 1 and 2

Time

Start engines 1.3 to 2.0 minutes
Prepare for taxi 0 7 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable· 10

NOT TO SCALE

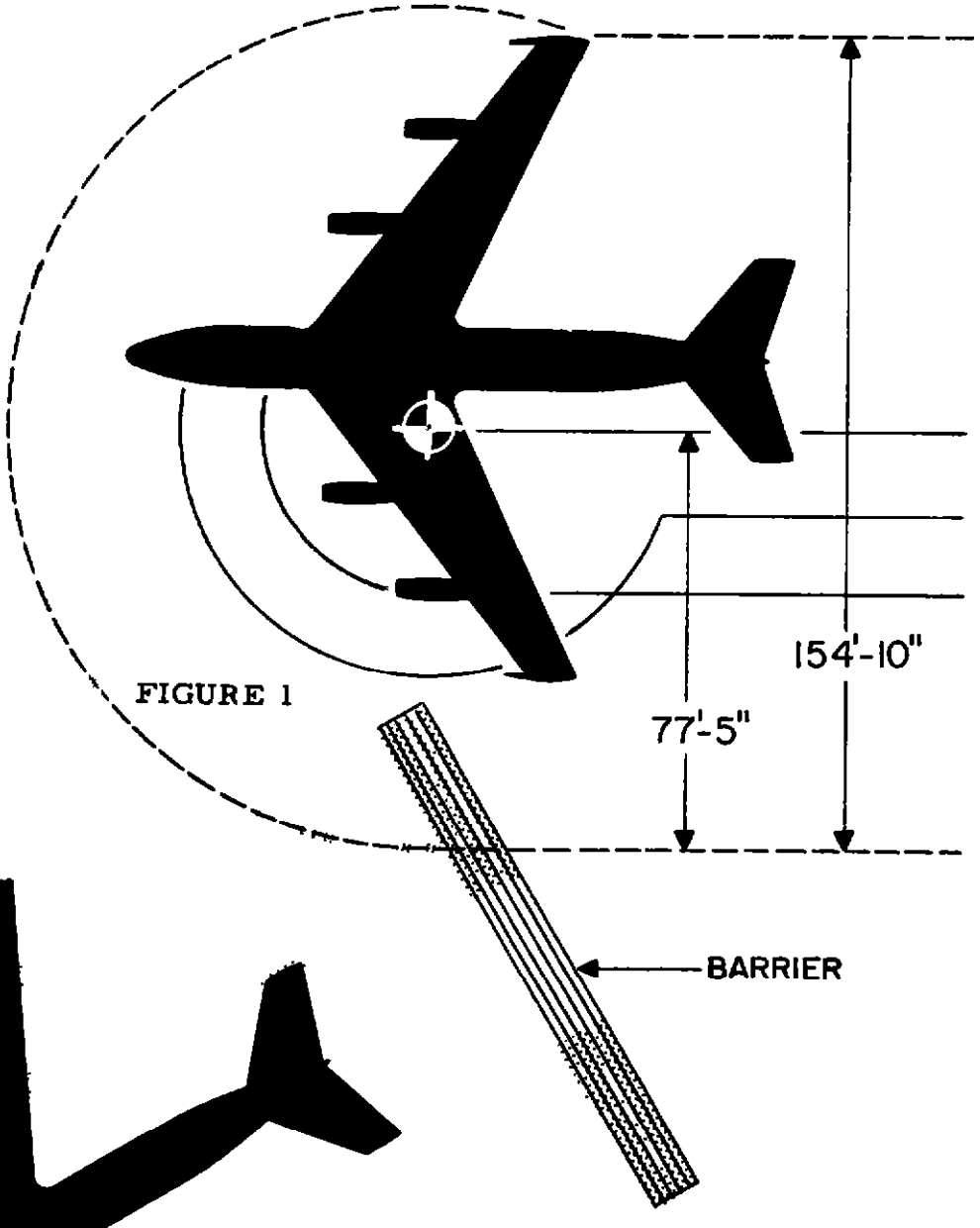


FIGURE 1

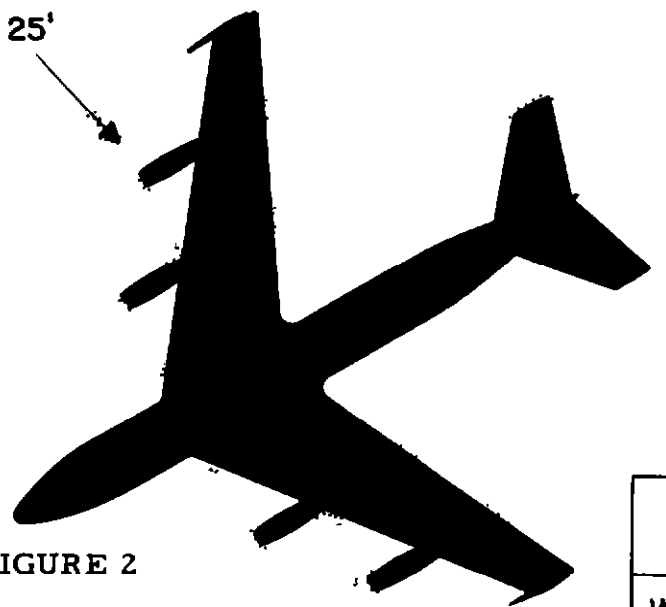


FIGURE 2

DIMENSIONS	
WING SPAN	130'-10"
LENGTH	144'- 6"
HEIGHT	38'- 5"
TREAD	24'- 0"

—— LANDING GEAR PATHS
---- WING TIP PATH

GENERAL DESCRIPTION

The Convair 340/440 is a twin engine, piston driven, low wing, passenger cargo transport designed for airline service. It is equipped with fully retractable tricycle landing gear, with a steerable nose gear The minimum crew required consists of a pilot and co-pilot.

The airplane is powered by two Pratt and Whitney R-2800 CB-16, twin row, eighteen cyclinder, radial engines driving three blade automatic feathering, reversible pitch propellers Limitations of the power plant are as follows

Maximum power (wet) at sea level is developed at 59.5 inches manifold pressure at 2,800 rpm Maximum allowable time for this power setting is two minutes.

Maximum power (dry) at sea level is developed at 53.0 inches manifold pressure at 2,800 rpm. Maximum allowable time for this power setting is two minutes

Maximum except take-off (METO) power is developed at 48.5 inches manifold pressure at 2,600 rpm. There is no time limitation for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 48,108 pounds
Maximum Take-off 48,000 pounds wet
Maximum Landing 47,600 pounds wet

Additional information

Basic Operating Weight 33,766 pounds
Zero Fuel WEight 37,781 pounds
Fuel (usable) 10,327 pounds
Footprint pressure at Maximum Ramp Weight 70 psi main gear, 70 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24-28 volt power source. Emergency starting may be accomplished by the airplane's internal power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2.

Time

Start engines 1.0 to 3 0 minutes
Prepare for taxi 0.5 to 1 0 minute

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable 10

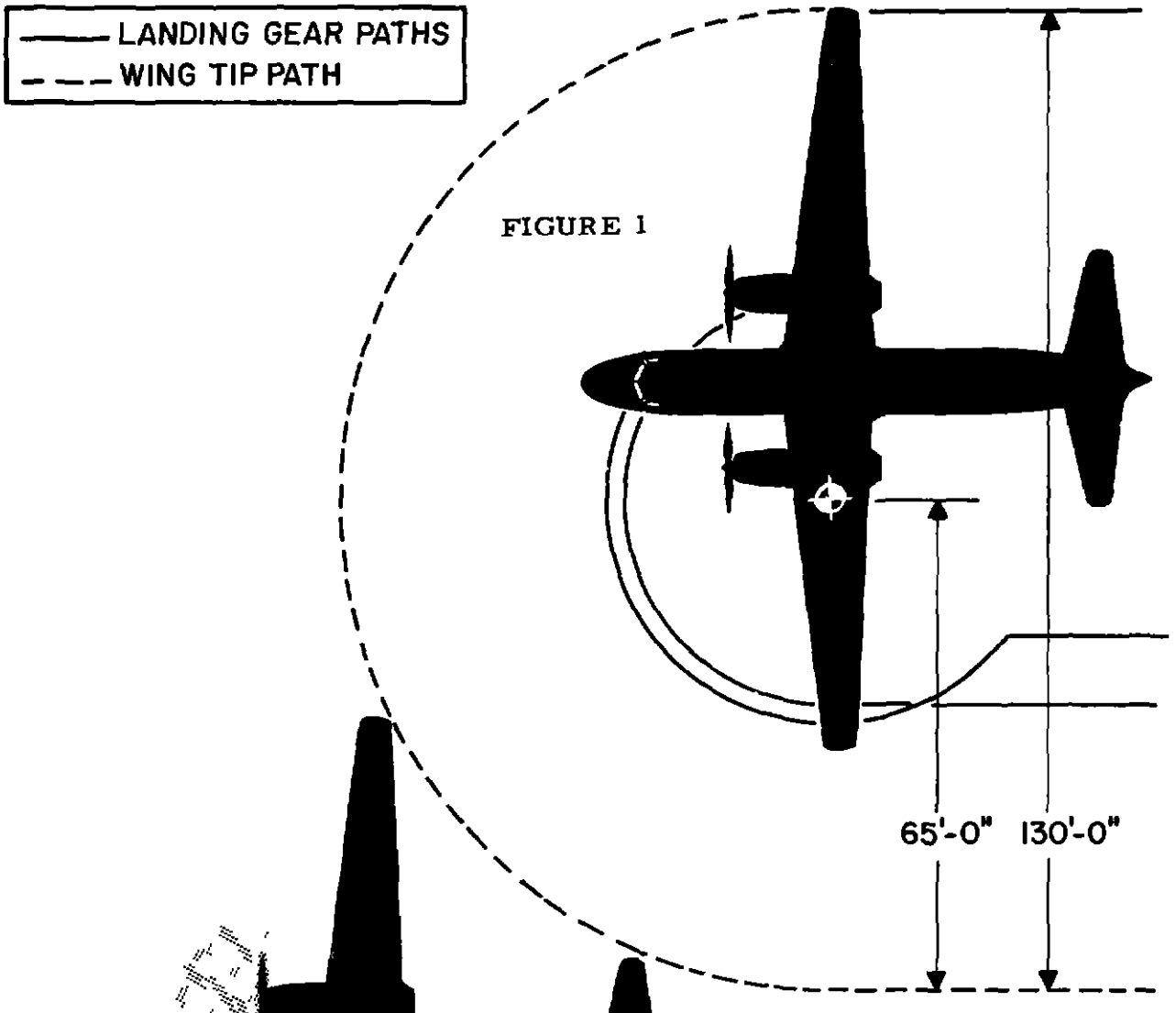


FIGURE 1

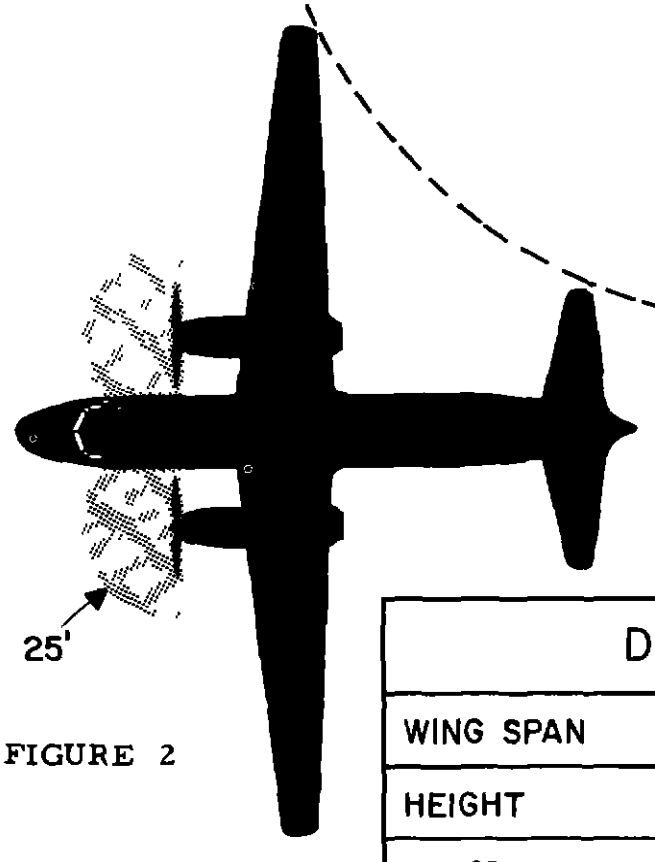


FIGURE 2

DIMENSIONS	
WING SPAN	105' - 4"
HEIGHT	28' - 1.64"
LENGTH	79' - 2"
TREAD	25' - 0"

GENERAL DESCRIPTION

The De Havilland "Comet" 4 airplane is a four engine, low-wing, passenger and cargo turbojet transport, capable of high altitude and medium range flights. The retractable tricycle type landing gear consists of two, tandem dual wheel, main gear assemblies and a steerable, dual wheel, nose gear. The minimum crew required consists of a pilot, co-pilot and flight engineer.

The airplane is powered by four Rolls Royce Avon, RA29, turbojet engines. The engines are rated according to thrust as follows

Maximum rated thrust is 10,500 pounds at 100% rpm The maximum allowable time at this power setting is 5 minutes.

Maximum continuous thrust is 8,875 pounds at 94% rpm There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 152,500 pounds
Maximum Take-Off 152,500 pounds
Maximum Landing 118,500 pounds

Additional information

Basic Operating Weight 72,595
Zero Fuel Weight 91,205 pounds
Fuel (usable) 61,295 pounds
Footprint Pressure at Maximum Ramp Weight. Not available from manufacturer

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 28 volt D. C power source Emergency starting may be accomplished by using the airplane's internal power source.

The minimum turning radius, dimensions, and danger areas are illustrated in Figure 1 and 2.

Time

Start engines 0.5 to 2.0 minutes
Prepare for taxi 1.0 to 3.0 minutes
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 25
Operationally desirable 15

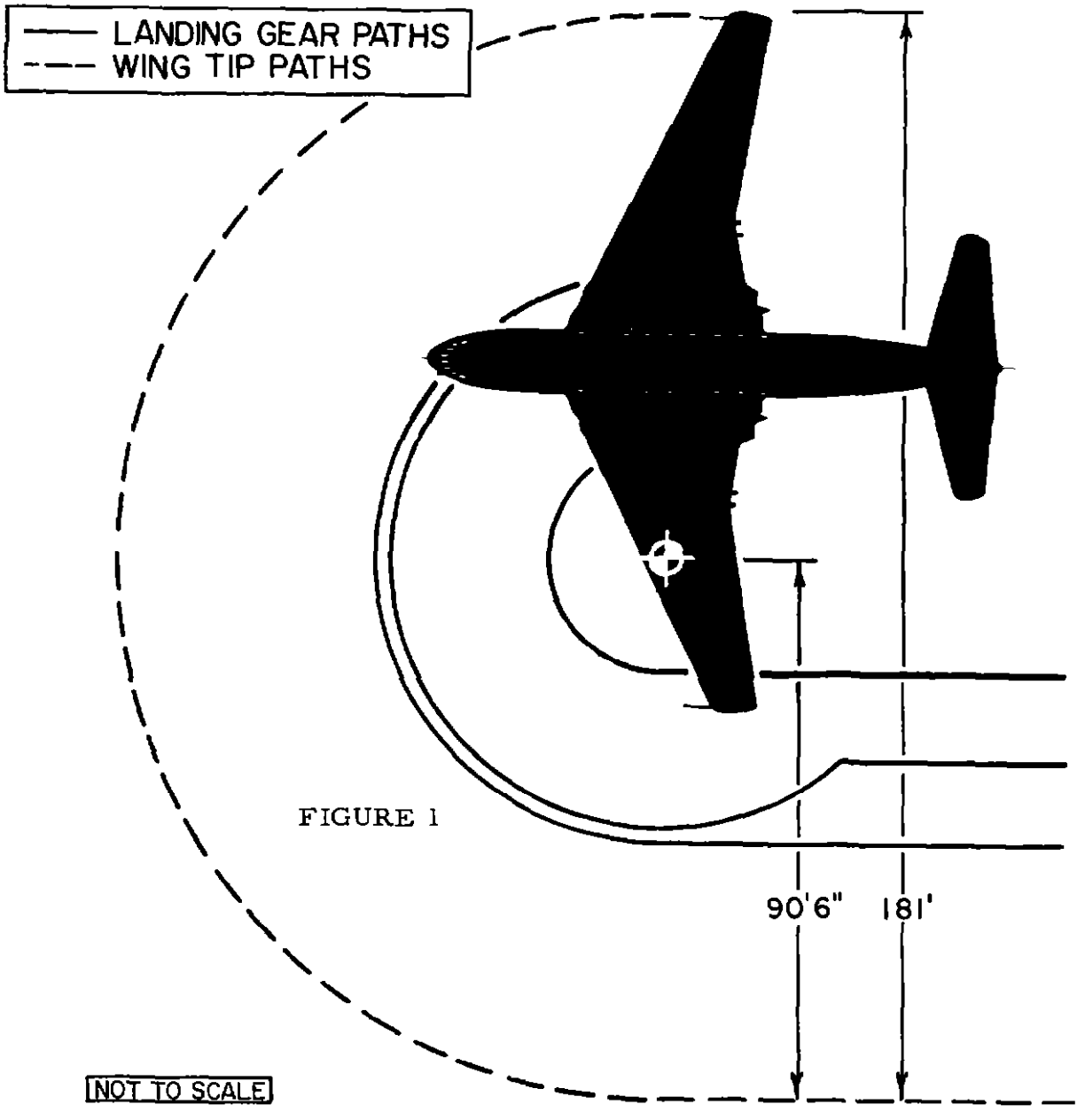


FIGURE 1

DIMENSIONS FEET	
WING SPAN	114'-10"
LENGTH	93'-11"
HEIGHT	29'- 4"
TREAD	28'- 6"

DeHavilland "Comet" 4

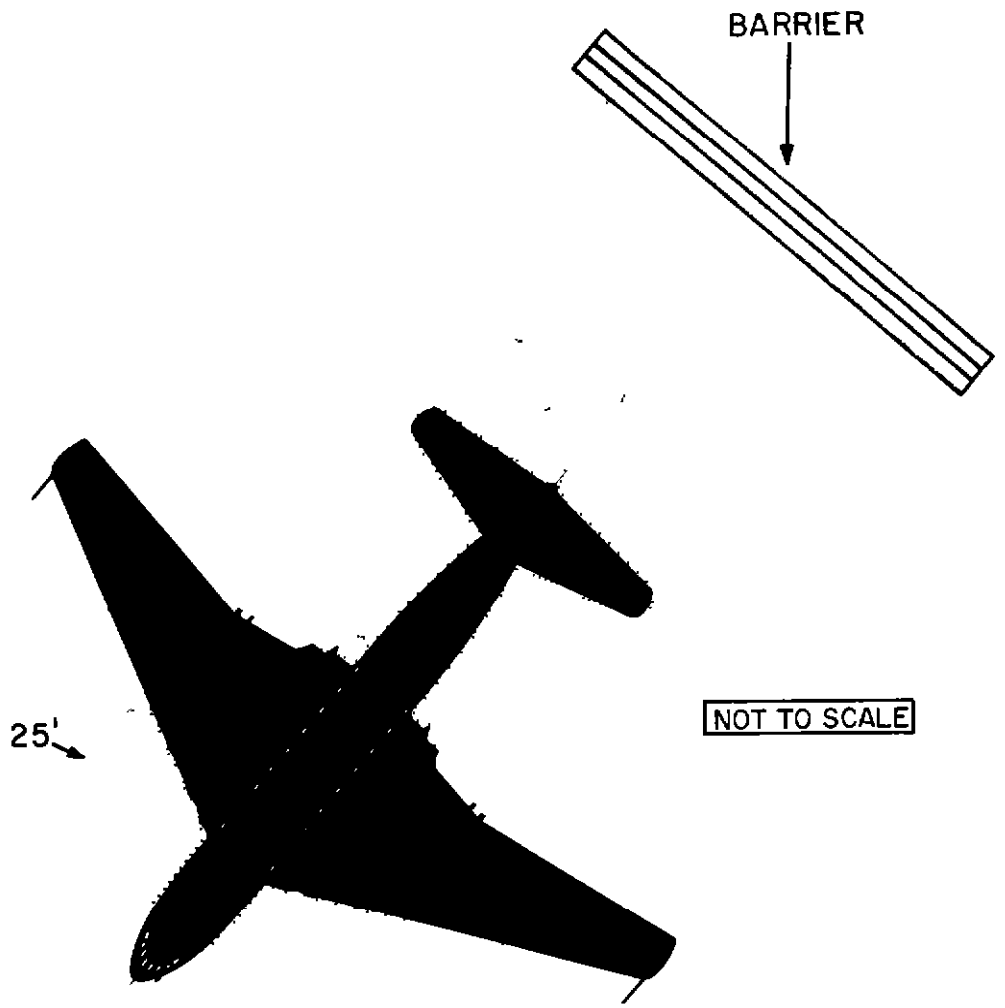


FIGURE 2

GENERAL DESCRIPTION

The Douglas DC-3 airplane is a twin engine, low wing, piston driven, passenger and cargo transport. It is equipped with retractable main gear, and a full swiveling, center locking tail wheel. Steering is accomplished by combined use of engine power and brakes. The minimum crew consists of pilot and co-pilot.

The airplane is powered by two Pratt and Whitney supercharged model (R-1830-9) 14 cylinder radial engines, driving three blade, Hamilton Standard, constant speed, full feathering propellers. Limitations of the power plant are as follows

Maximum power is developed at 48 inches manifold pressure at 2, 700 rpm. The maximum allowable time at this power setting is five minutes.

Maximum except take-off (METO) power at sea level is developed at 43 inches manifold pressure at 2, 550 rpm. There is no time limitation for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 25, 346 pounds
Maximum Take-off 25, 346 pounds
Maximum Landing 25, 346 pounds

Additional information

Basic Operating Weight 18, 600 pounds
Zero Fuel Weight 20, 534 pounds
Fuel (usable) 4, 812 pounds
Footprint Pressure at Maximum Ramp Weight 50 psi main gear, 50 psi tail wheel.

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D. C. power source. Emergency starting may be accomplished by using the aircraft internal 24 volt D. C. power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start Engines 1 0 to 2 0 minutes
Prepare for taxi 0 5 to 1 0 minute
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable 10

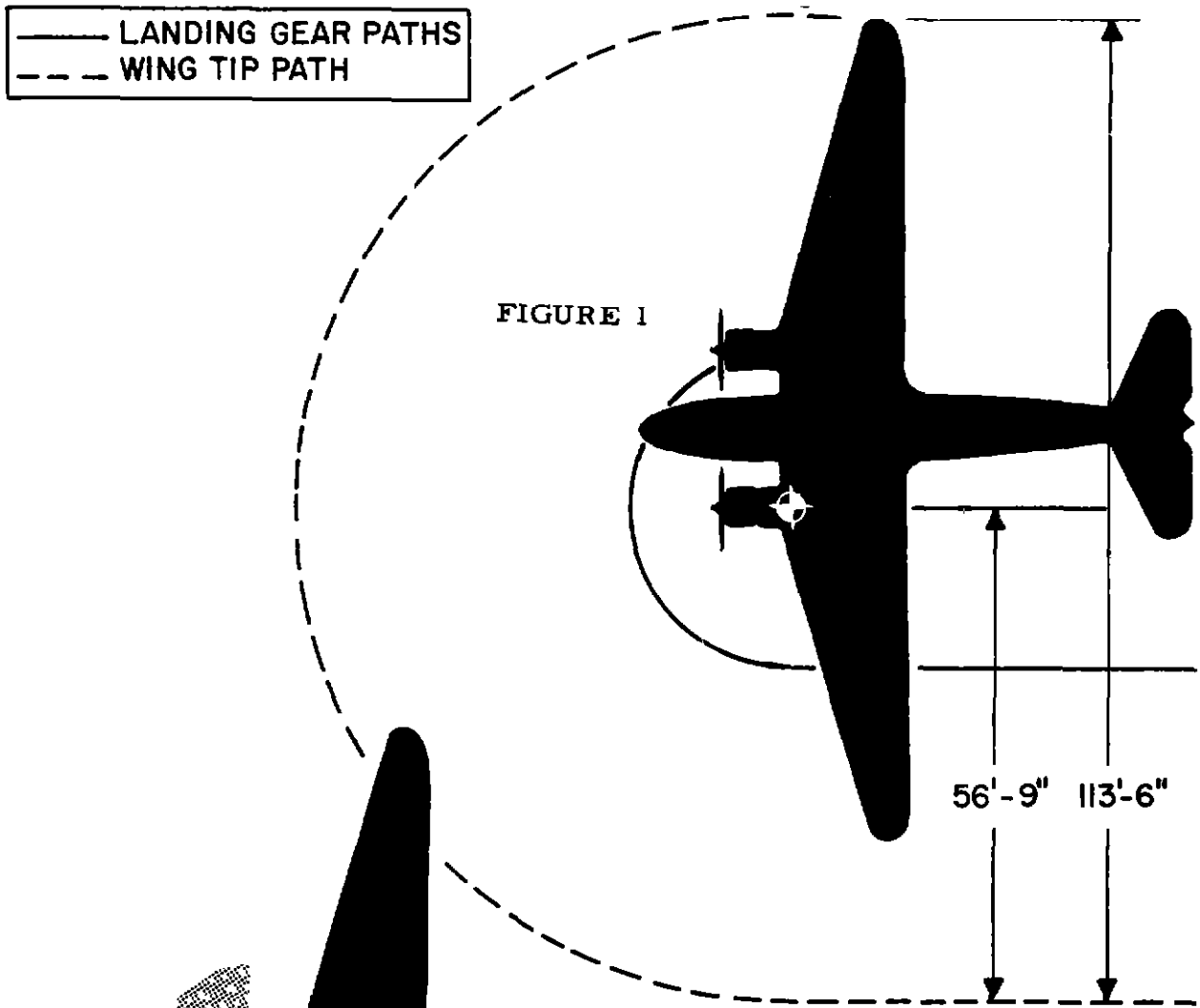


FIGURE 1

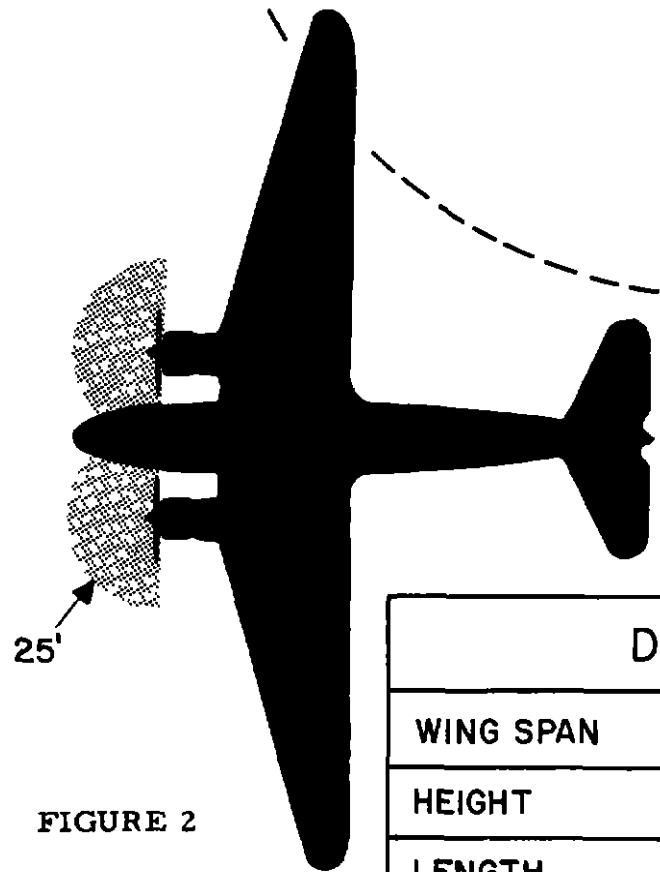


FIGURE 2

DIMENSIONS	
WING SPAN	95' - 0"
HEIGHT	16' - 11 1/2"
LENGTH	63' - 9"
TREAD	18' - 6"

GENERAL DESCRIPTION

The Douglas DC-4 (C-54) airplane is a four engine, low wing aircraft, capable of medium range flight It is equipped with fully retractable tricycle landing gear The mission is that of a short or medium range passenger or cargo transport A minimum crew of two is required, consisting of a pilot and co-pilot.

The airplane is powered by four Pratt and Whitney Model R-2000 (D-5) 14 cylinder, two-row, air-cooled, radial engines Limitations of the power plant are as follows

Maximum power (1, 450 hp) is developed at 50 inches manifold pressure at 2, 700 rpm - Operation at this power setting is limited to two minutes

Maximum except take-off (METO) power (1, 100 bhp) is developed at 38 5 inches manifold pressure at 2, 500 rpm There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 73, 300 pounds
Maximum Take-off 73, 000 pounds
Maximum Landing 63, 500 pounds

Additional information

Basic Operating Weight 41, 500 pounds
Zero Fuel Weight 51, 800 pounds
Fuel (usable) 21, 500 pounds
Footprint Pressure at Maximum Ramp Weight 75 psi main gear, 55 psi nose

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D C power source Emergency starting may be accomplished by using the internal 24 volt battery

The minimum turning radius, dimensions and the danger areas are illustrated in Figures 1 and 2.

Time

Start engines 2 to 5 minutes
Prepare for taxi: 1 minute
Pre-take-off functional check 2 to 3 minutes (part of this check is accomplished during taxi)

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable: 15

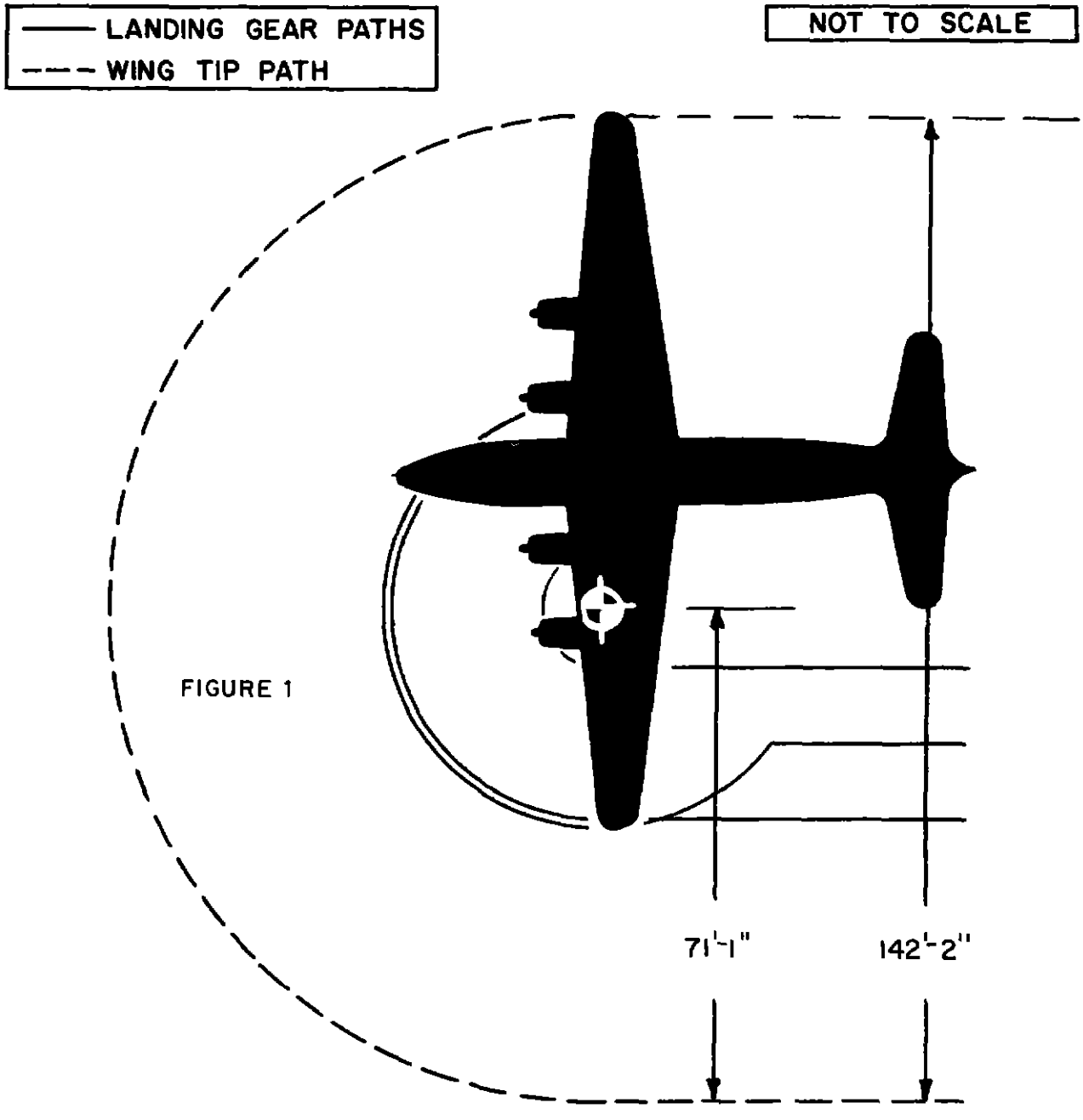
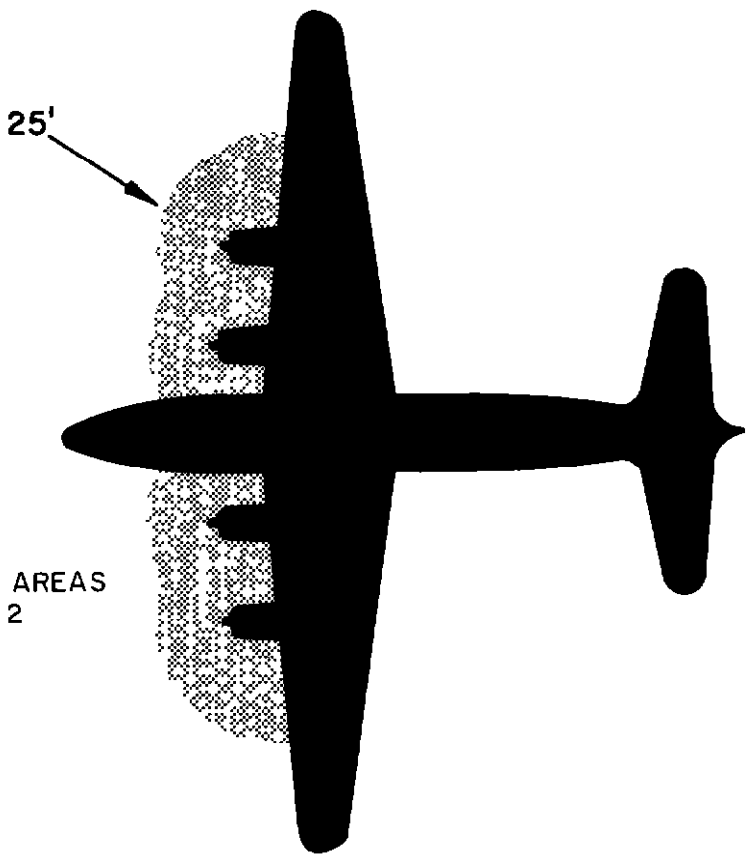


FIGURE 1

DIMENSIONS	
WING SPAN	117'-6"
HEIGHT	27'- 7"
LENGTH	93'-10"
TREAD	24'- 8"

NOT TO SCALE



DANGER AREAS
FIGURE 2

GENERAL DESCRIPTION

The Douglas DC-6 airplane is a four engine, low wing, medium range commercial transport It has a retractable, tricycle type landing gear and a steerable nose wheel A minimum crew of three is required consisting of a pilot, co-pilot, and flight engineer.

The airplane is powered by four Pratt and Whitney R2800-CB16, eighteen cylinder engines driving three blade, full feathering, reversible pitch, constant speed propellers Operating limitations of the power plant are as follows

Maximum except take-off (METO) power of 1, 800 bhp is developed at 48 5 inches manifold pressure at 2, 800 rpm using auto-rich mixture at sea level. There is no time limit at this power setting

Pertinent gross weight limitations of the airplane are as follows
Maximum Ramp 95, 416 pounds
Maximum Take-off 95, 200 pounds
Maximum Landing 80, 000 pounds

Additional information
Basic Operating Weight 56, 500 pounds
Zero Fuel Weight 69, 916 pounds
Fuel (usable) 25, 500 pounds
Footprint Pressure at Maximum Ramp Weight 102 psi main gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D C power source. Emergency starting may be accomplished by the internal 24 volt D C power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 2 0 to 4.0 minutes
Prepare for taxi 0.5 to 1.0 minute
Pre-take-off functional check is performed during taxi.

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable 10

Douglas DC-6

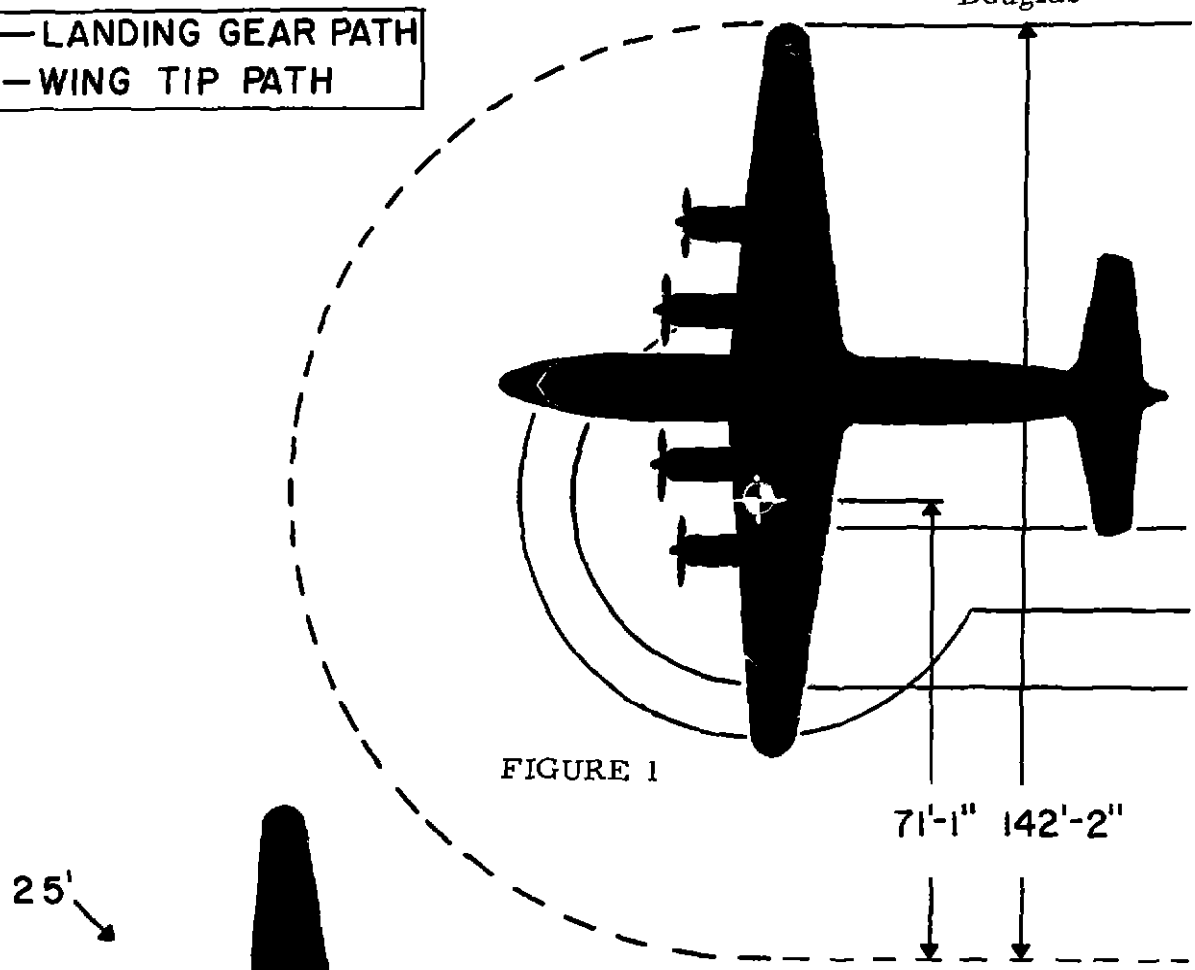


FIGURE 1

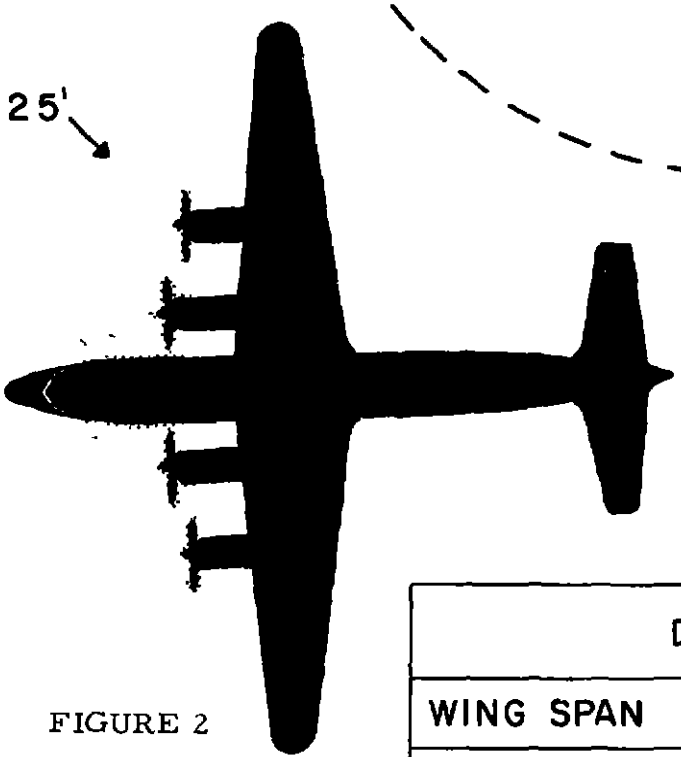


FIGURE 2

NOT TO SCALE

DIMENSIONS	
WING SPAN	117'- 6"
HEIGHT	28'- 8"
LENGTH	100'- 7"
TREAD	24'- 8"

GENERAL DESCRIPTION

The Douglas DC-6B airplane is a four engine, low wing, long range commercial transport It is equipped with a fully retractable, tricycle landing gear and a steerable nose wheel A minimum crew of three is required, consisting of a pilot, co-pilot, and flight engineer

The airplane is powered by four Pratt & Whitney R2800-CB17, eighteen cylinder engines driving three blade, full feathering reversible pitch, constant-speed propellers Limitations of the power plant are as follows

Maximum power is developed at

Blower	bhp	Crankshaft rpm	Altitude	Manifold Pressure (Inches)
Low	2,500	2,800	Sea Level	62 0
High	1,900	2,600	10,000	50 5

The power settings above are limited to two minutes operation

Maximum continuous power (or METO power) is developed at

Blower	bhp	Crankshaft rpm	Altitude	Manifold Pressure (Inches)
Low	1,900	2,600	Sea Level	51 5
High	1,750	2,600	10,000	51.5

There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 107,240 pounds
Maximum Take-Off 107,000 pounds
Maximum Landing 88,200 pounds

Additional Information

Basic Operating Weight 63,900 pounds (cargo)
67,600 pounds (passenger)
Zero Fuel Weight 74,804 pounds
Fuel (usable) 32,436 pounds
Footprint Pressure at Maximum Ramp Weight 116 psi main gear, 68 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D. C. power source Emergency starting may be accomplished by the internal 24 volt D C power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start Engines 2. 0 to 4 0 minutes
Prepare for taxi 0 5 to 1 0 minute
Pre-Take-Off Functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15

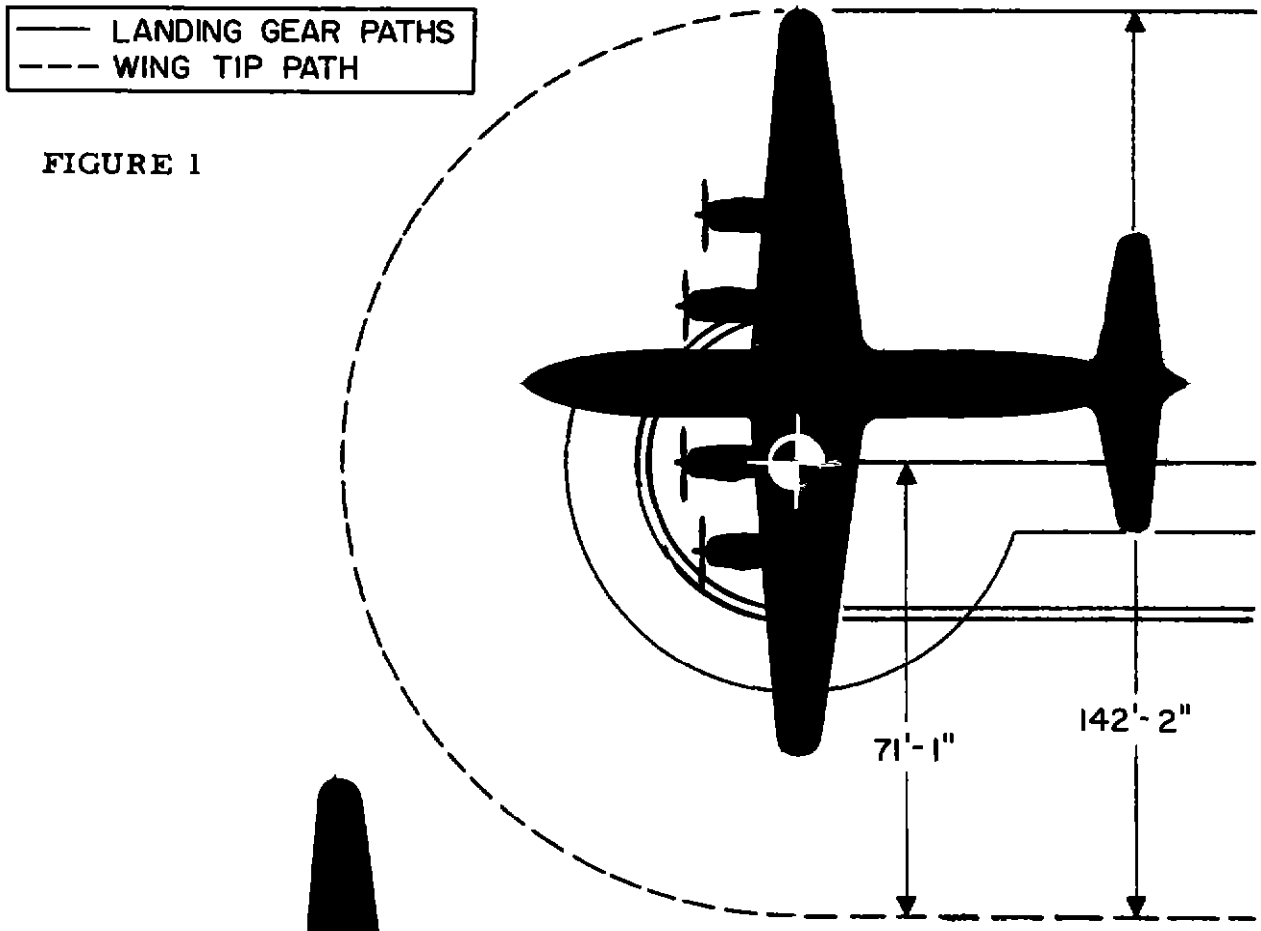


FIGURE 1

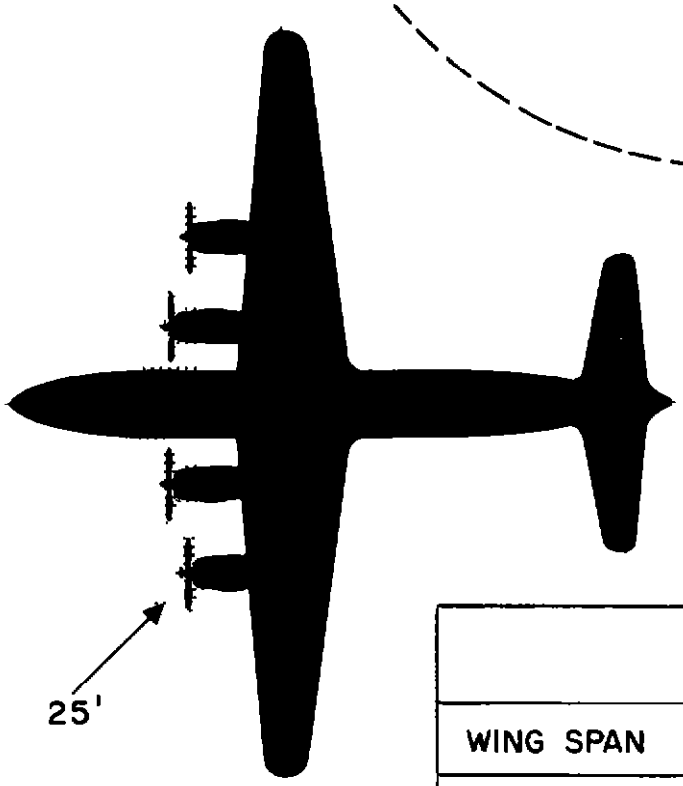


FIGURE 2

DIMENSIONS	
WING SPAN	117' - 6"
LENGTH	105' - 7"
HEIGHT	28' - 8"
TREAD	24' - 8"

GENERAL DESCRIPTION

The Douglas DC-7 airplane is a four engine, low wing, long range commercial transport It has a fully retractable, tricycle type landing gear with a steerable nose wheel. The minimum crew consists of a pilot, co-pilot, and flight engineer.

The airplane is powered by four Wright R-3350-18DA1 turbo compound engines, driving four blade, full feathering, reversible pitch propellers. Limitations of the power plants are as follows

Maximum (take-off) power (3, 250 bhp) is developed at 56. 5 inches manifold pressure and 2, 900 rpm The time limit at this power setting is 2 0 minutes.

Maximum except take-off (METO) power (2, 600 bhp) is developed at 47. 5 inches manifold pressure and 2, 600 rpm. There is no time limitation for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp· 122, 200 pounds
Maximum Take-off 122, 200 pounds
Maximum Landing 97, 000 pounds

Additional information

Basic Operating Weight 66, 300 pounds
Zero Fuel Weight 89, 130 pounds
Fuel (usable). 33, 070 pounds
Footprint pressure at Maximum Ramp Weight 125 psi main gear, 85 psi nose gear.

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D C power source Emergency starting may be accomplished by the internal (24 volt D. C) power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 2 0 to 4 0 minutes
Prepare for taxi 0 5 to 1 0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15

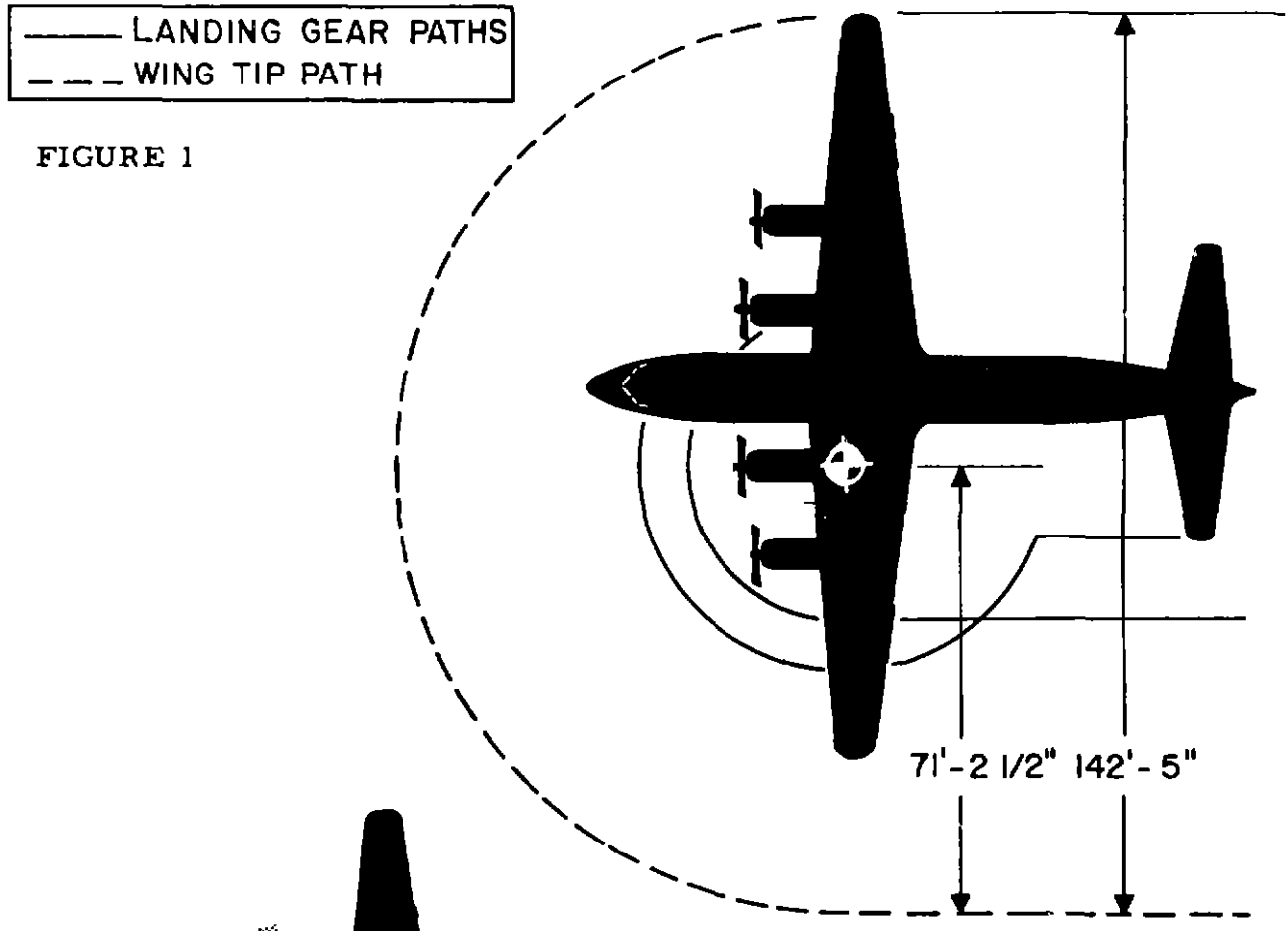
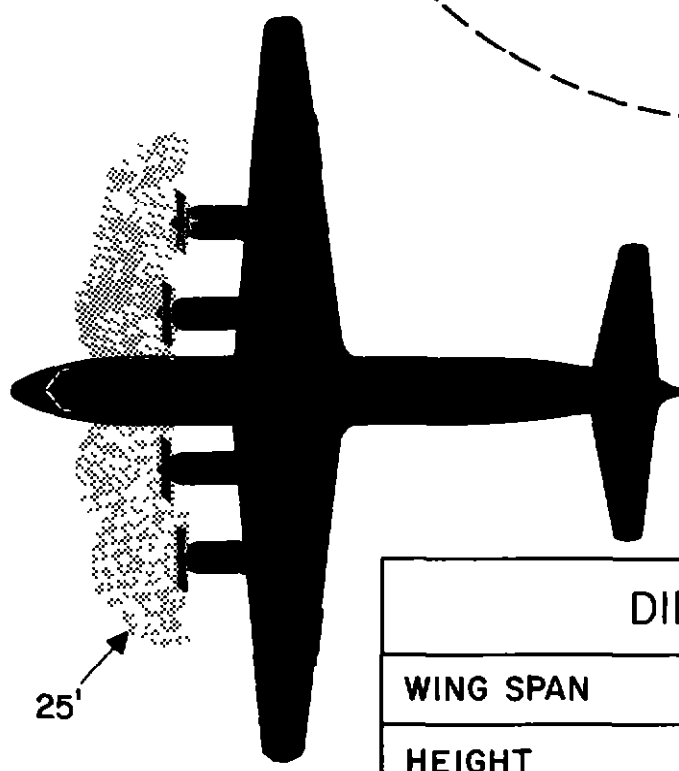


FIGURE 1



NOT TO SCALE

FIGURE 2

DIMENSIONS	
WING SPAN	117' - 6"
HEIGHT	28' - 9"
LENGTH	108' - 0"
TREAD	24' - 8"

GENERAL DESCRIPTION

The Douglas DC-7B airplane is a land based four engine, low wing, passenger or cargo transport, capable of long range, high altitude flights. The airplane is equipped with a retractable, tricycle type landing gear Nose gear steering and main wheel brakes are operated hydraulically The minimum crew required consists of pilot and co-pilot

The airplane is powered by four Wright turbo-compound, radial engines, Model (R-3350) each driving constant speed, automatic feathering and reversible propellers Limitations of the power plant are as follows

Maximum power (3,250 bhp) is developed at 2,900 rpm, at 56 5 inches manifold pressure Maximum allowable time for this power setting is two minutes.

Maximum except take-off (METO) power (2,650 bhp) is developed at 2,600 rpm, at 47 5 inches manifold pressure This is maximum continuous power. There is no time limitation for this power setting

Normal rated power (1,910 bhp) is developed at 2,400 rpm, at 41 0 inches manifold pressure. There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp. 126,000 pounds
Maximum Take-off 126,000 pounds
Maximum Landing 102,000 pounds

Additional information

Basic Operating Weight 72,000 pounds
Zero Fuel Weight 88,016 pounds
Fuel (usable) 37,984 pounds
Footprint Pressure at Maximum Ramp Weight 125 psi main gear; 85 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D C power source Emergency starting may be accomplished by a self-contained battery system

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines. 2 0 to 3 0 minutes
Prepare for taxi 0 5 to 1 0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable: 15

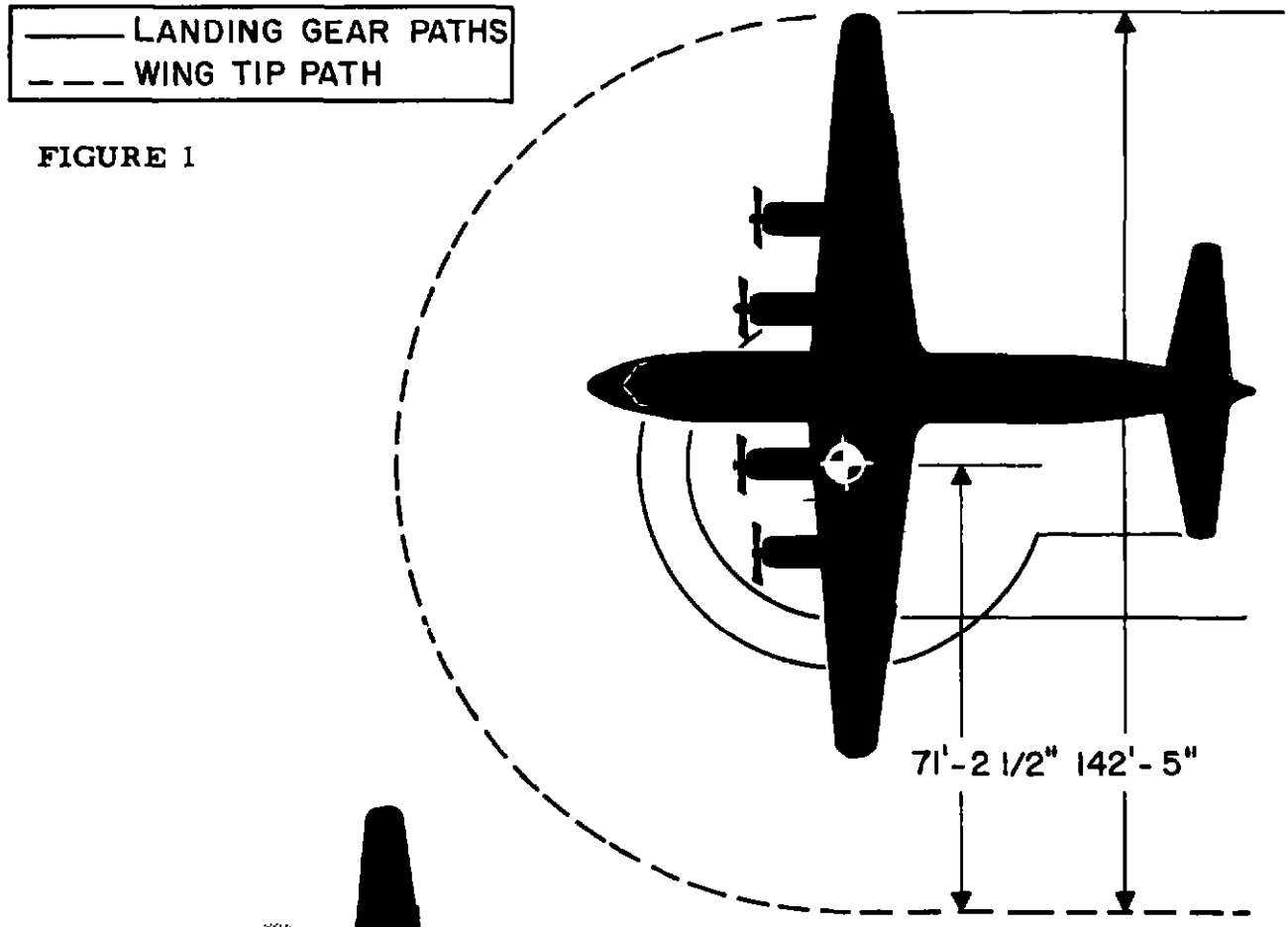
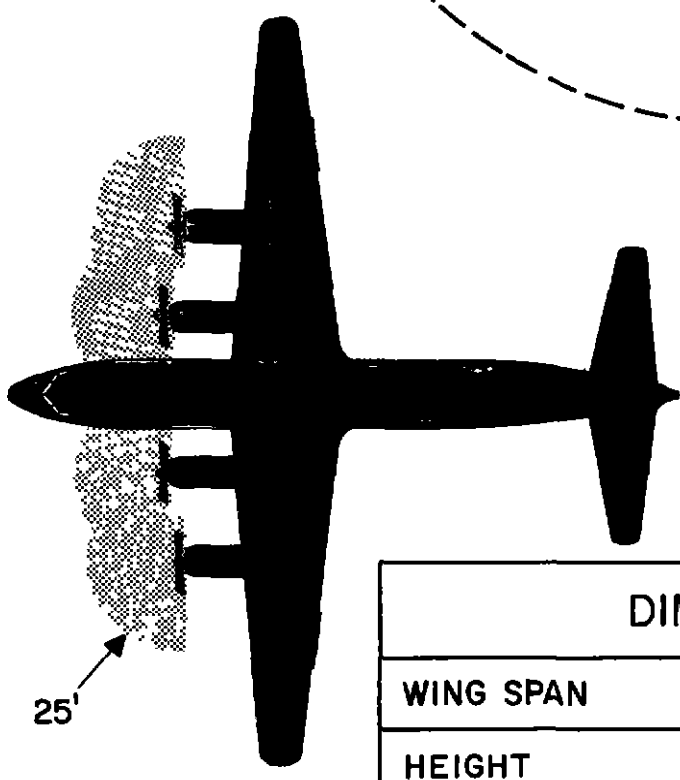


FIGURE 1



NOT TO SCALE

FIGURE 2

DIMENSIONS	
WING SPAN	117' - 6"
HEIGHT	29' - 2"
LENGTH	108' - 10"
TREAD	24' - 8"

GENERAL DESCRIPTION

The Douglas DC-7C "Seven Seas" airplane is a four-engine, propeller-driven, low wing, long range passenger and cargo transport A fully retractable, tricycle type landing gear is employed. A minimum crew of three is required, consisting of a pilot, co-pilot, and flight engineer

The airplane is powered by four Wright turbo-compound, radial engines model R-3350 driving four blade, automatic feathering, constant speed, reversible pitch propellers Limitations of the power plant are as follows

Maximum power is developed at

	Brake Horsepower	Crankshaft rpm	Altitude
Low ratio	3,400	2,900	Sea level
Low ratio	3,400	2,900	4,000 feet
High ratio	2,550	2,600	16,700 feet

The above power is restricted to 5.0 minutes operation by the manufacturer, but is limited by FAA to 1 5 minutes

Maximum except take-off power (METO) is developed at

	Brake Horsepower	Crankshaft rpm	Altitude
Low ratio	2,800	2,600	Sea level
Low ratio	2,850	2,600	4,300 feet
High ratio	2,450	2,600	17,900 feet

Cruise power (recommended maximum) is developed at

	Brake Horsepower	Crankshaft rpm	Altitude
Low ratio	1,910	2,400	11,600 feet
High ratio	1,800	2,400	20,600 feet

There is no time limitation for METO and cruise power settings.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp: 143,000 pounds
Maximum Take-off 143,000 pounds
Maximum Landing 111,000 pounds

Additional information

Basic Operating Weight 66,306 pounds
Zero Fuel Weight 96,056 pounds
Fuel (usable) 46,944 pounds
Footprint Pressure at Maximum Ramp Weight 125 psi main gear, 70 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 28 volt D. C. power source. Starting may also be accomplished by using the airplane's internal power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 0 5 to 2.5 minutes
Prepare for taxi 0.5 to 1.0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15

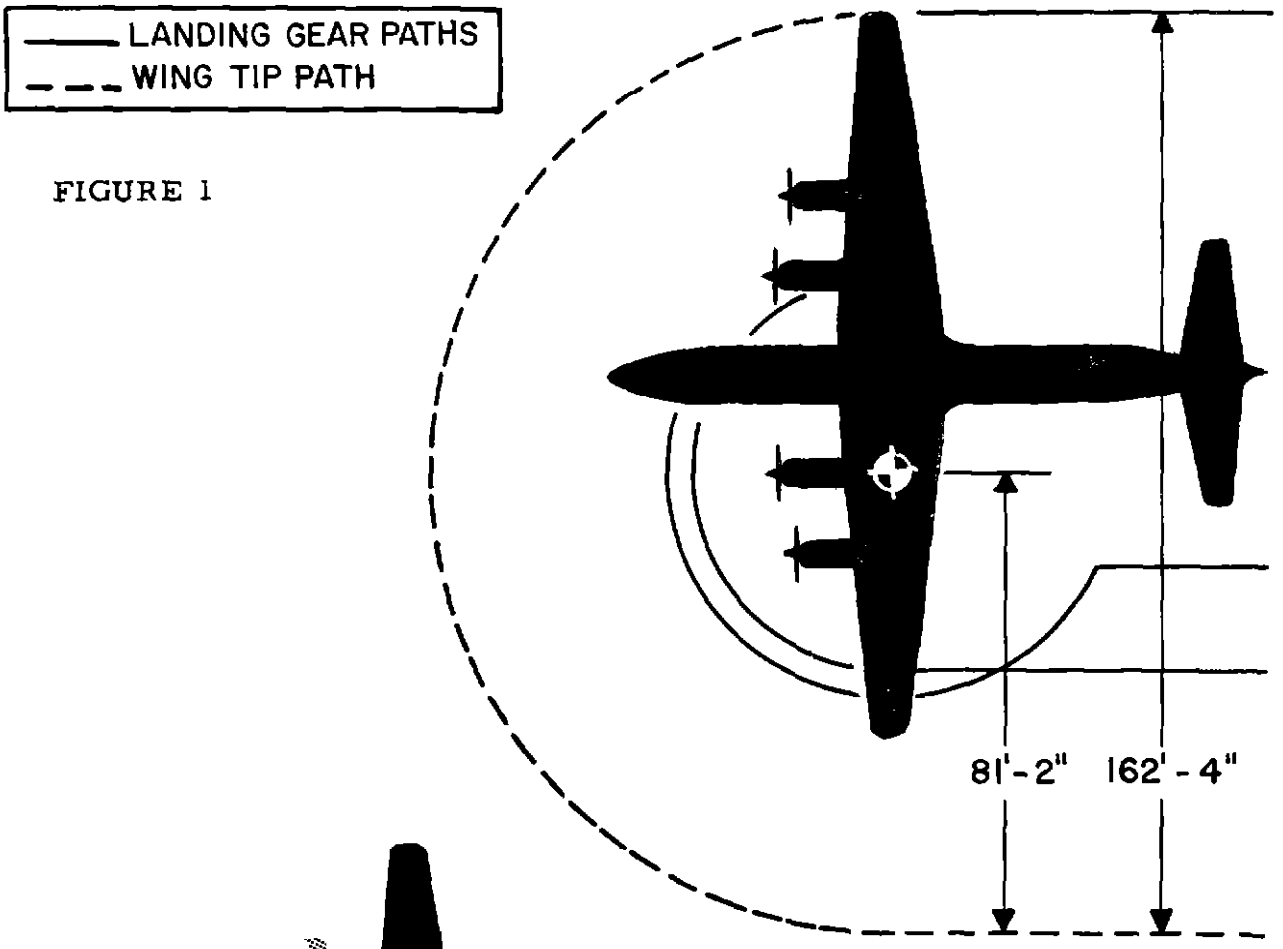
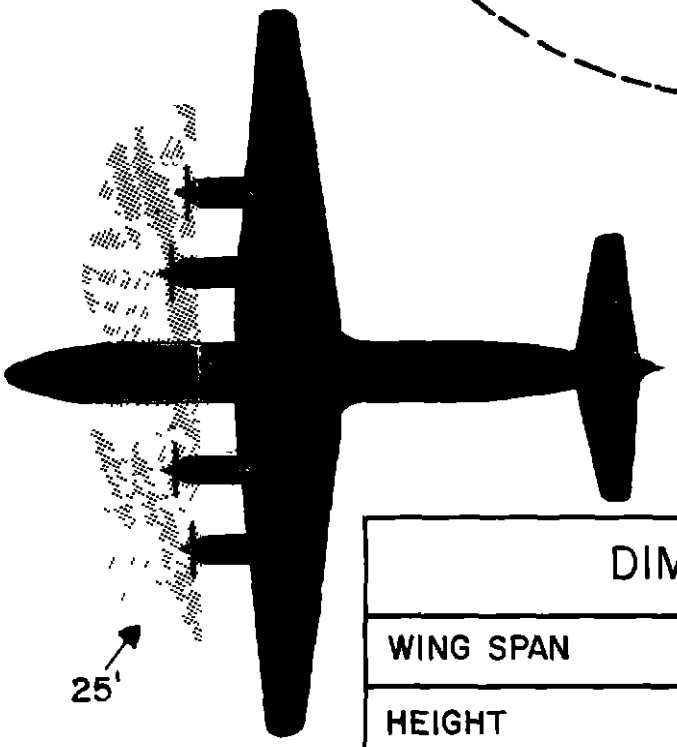


FIGURE 1



NOT TO SCALE

FIGURE 2

DIMENSIONS	
WING SPAN	127' - 6"
HEIGHT	31' -10"
LENGTH	112' - 3"
TREAD	34' - 8"

GENERAL DESCRIPTION

The Fairchild F-27B "Friendship" airplane is a land based, twin engine, propjet, high wing, passenger transport It is equipped with fully retractable tricycle type landing gear with power steering on the nose gear The minimum crew required consists of one pilot and one co-pilot The F-27 has the same performance characteristics as the F-27B The maximum gross weight of F-27B is 525 pounds greater than that of the F-27.

The airplane is powered by two Rolls-Royce, Dart 511, turbine engines, driving four blade, variable pitch propellers Limitations of the power plant are as follows

Maximum power (wet) is developed at 14, 500 rpm at maximum JPT of 595 degrees Centigrade The maximum allowable time for this power setting is 5 minutes

Maximum continuous power is developed at 14, 200 rpm at maximum JPT of 570 degrees Centigrade There is no time limit for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 36, 225 pounds
Maximum Take-off 36, 225 pounds
Maximum Landing , 34, 000 pounds

Additional information

Basic Operating Weight 23, 811 pounds
Zero Fuel Weight 27, 541 pounds
Fuel (usable) 8, 684 pounds
Footprint Pressure at Maximum Ramp Weight 80 5 psi main gear, 50 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D. C power source Emergency starting may be accomplished by use of the internal power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 1 0 to 2 0 minutes
Prepare for taxi 0 3 to 0 5 minute
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15

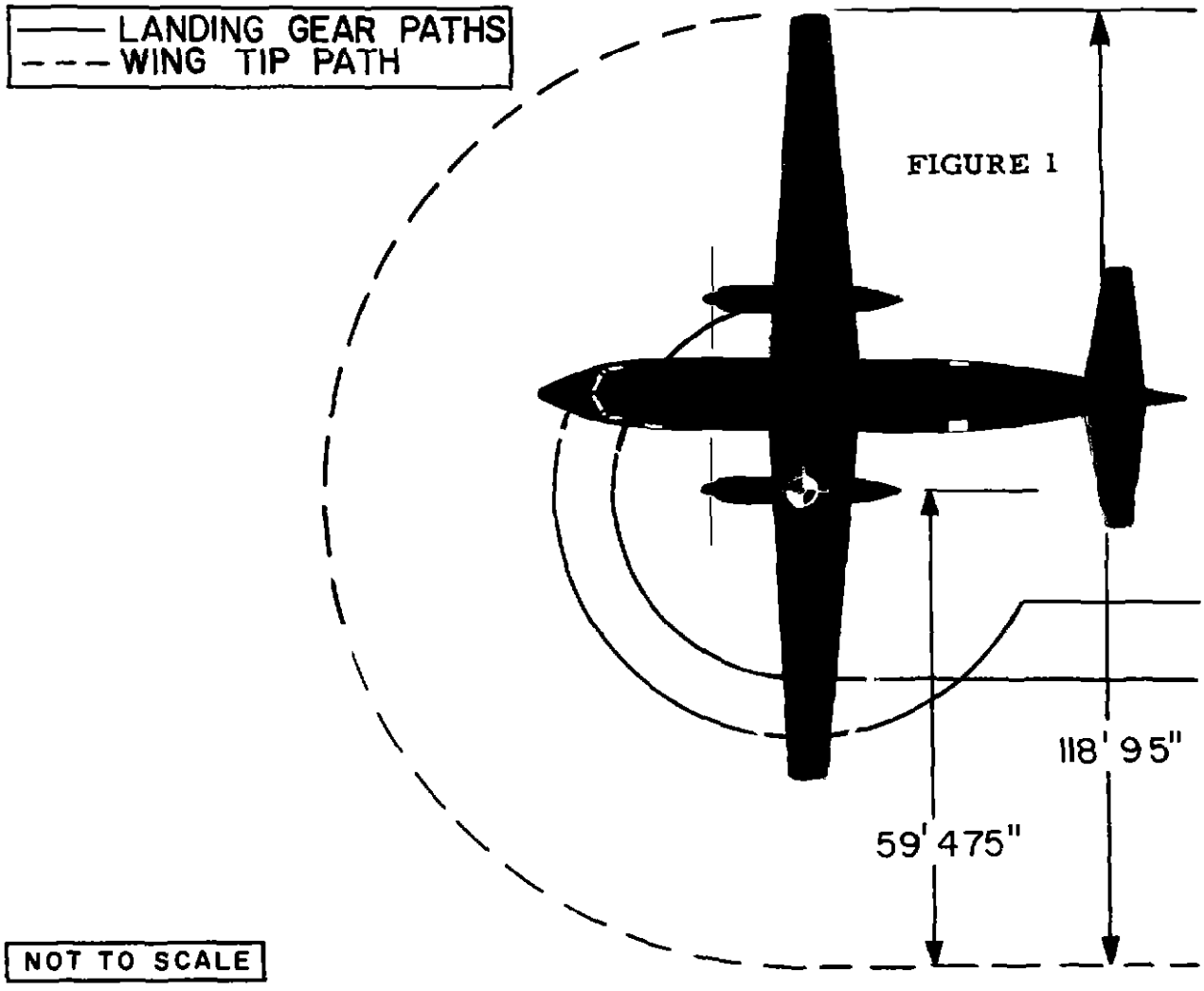


FIGURE 1

DIMENSIONS		NORMAL GROUND CLEARANCE	
WING SPAN	95' - 2"	PROP TIPS	2'- 10"
LENGTH	77'-153"	FUSELAGE	2' - 2"
HEIGHT	27'- 6"	DOOR OPENING	3' - 11"
TREAD	23'- 75"	TAIL SKID	6' - 3"

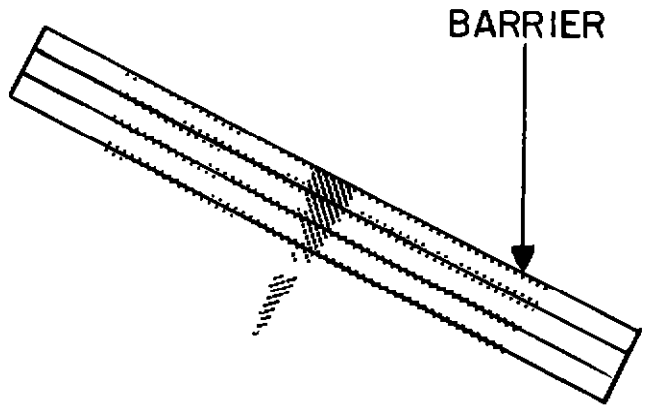
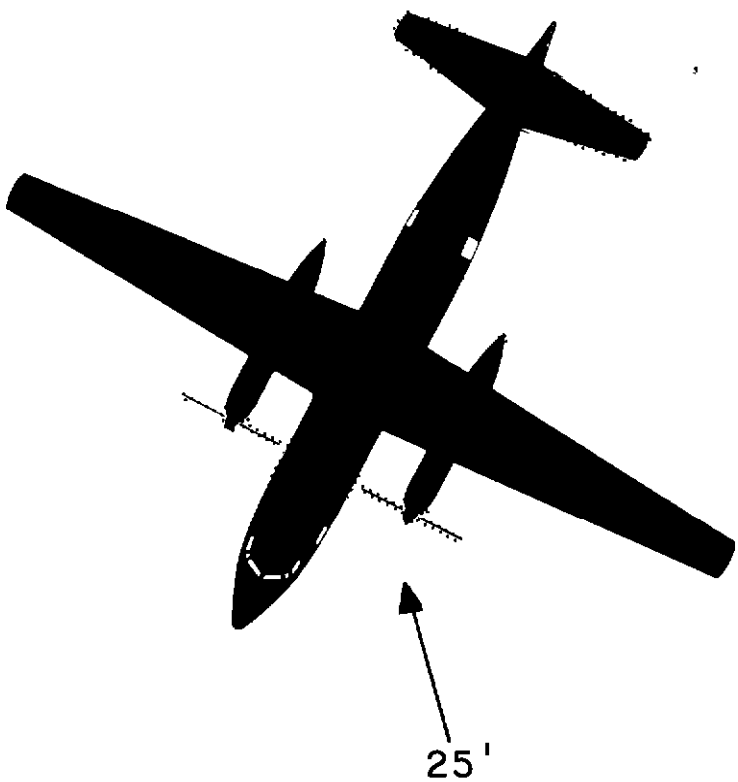


FIGURE 2



NOT TO SCALE

GENERAL DESCRIPTION

The Lockheed Electra Model 188 is a four engine, turbo-prop, low wing, medium range air liner, designed for high speed transportation of personnel and cargo and capable of high altitude flight Distinguishing features are the dual wheel tricycle gear, the semi-monocoque fuselage, and over-the-wing engine tailpipes The minimum crew consists of a pilot, co-pilot and flight engineer

The airplane is powered by four Allison 501-D-13A axial-flow, turbo-prop engines, equipped with four blade, full feathering, reversible pitch turbo-hydro-mechanical propellers Limitations of the power plant are as follows

Maximum rated eshp is 4,000 at 100% maximum rated temperature and 13,960 rpm The maximum allowable time at this power setting is 5 minutes

Maximum climb power is at 94% maximum rated temperature There is no time limit for this power setting

Maximum cruise power is at 90% maximum rated temperature There is no time limit for this power setting

Maximum continuous power is at 96 5% maximum rated temperature There is no time limit for this power setting, but it should be used only in emergencies

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 113,000 pounds
Maximum Take-off 113,000 pounds
Maximum Landing 95,650 pounds

Additional information

Basic Operating Weight 56,000 pounds
Zero Fuel Weight 76,016 pounds
Fuel (usable) 36,984 pounds
Footprint Pressure at Maximum Ramp Weight 138 psi main
80 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by compressed air Compressed air may be obtained from any one of three sources· an integral air bottle system, an external gas turbine compressor, or bleed air from an operating engine

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 3.0 to 5.0 minutes
Prepare for taxi 3 to 5 seconds
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 40
Operationally desirable 20

Lockheed Electra 188

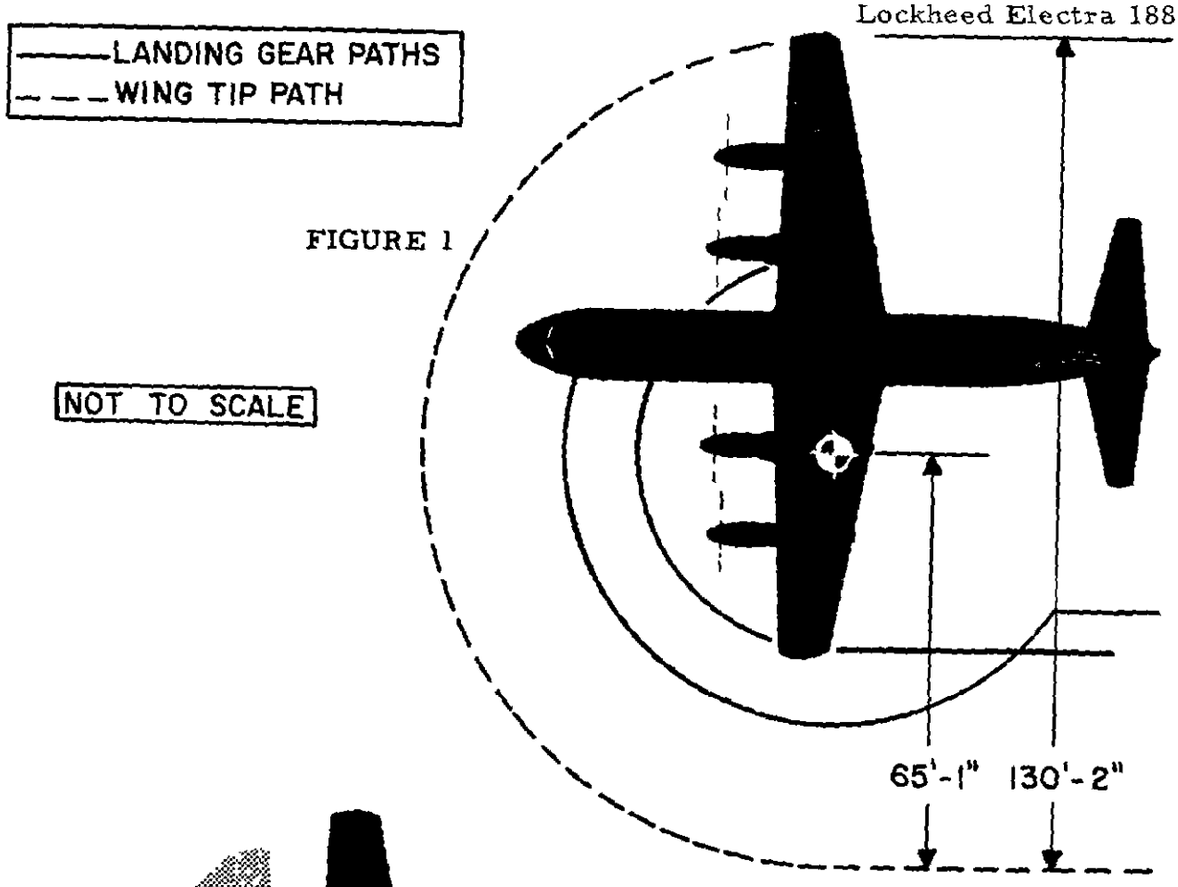


FIGURE 1

NOT TO SCALE

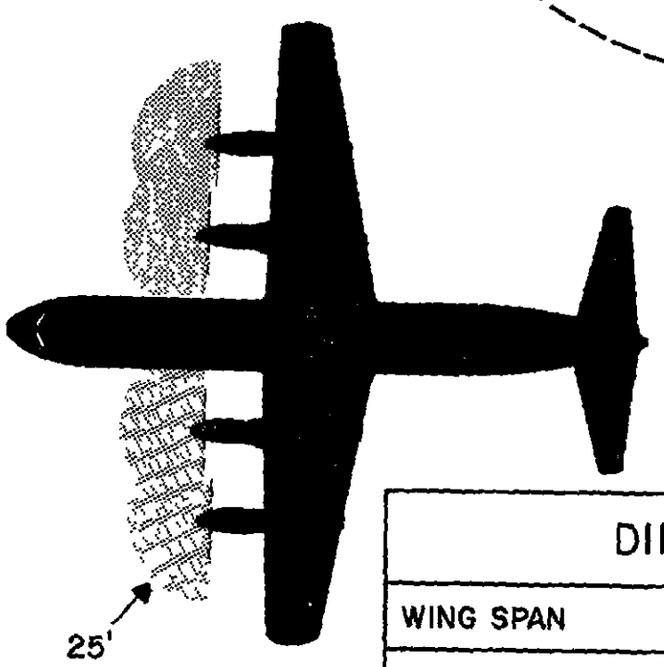


FIGURE 2

DIMENSIONS	
WING SPAN	99' - 0"
HEIGHT	32' - 9.2"
LENGTH	104' - 6.5"
TREAD	31' - 2"

GENERAL DESCRIPTION

The Lockheed 1049G "Super Constellation" is a four engine, piston driven, low wing passenger and cargo transport, characterized by three vertical stabilizers It is equipped with fully retractable tricycle landing gear with power steering on the nose gear The minimum crew required consists of two pilots and a flight engineer. The Lockheed models 1049, 1049C, 1049D, 1049E, and 1049H are similar in configuration and performance to the 1049G

The airplane is powered by four supercharged Wright, turbo-compound model (988 TC 18) EA-3 (or-6), 18 cyclinder radial engines, driving three blade constant speed, full feathering reversible pitch propellers Limitations of the power plant are as follows

Maximum power is developed at 56 5 inches manifold pressure at 2, 900 rpm. The maximum allowable time at this power setting is two minutes

Maximum except take-off (METO) power is developed at 49 inches manifold pressure at 2, 600 rpm. There is no time limitation for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 137, 500 pounds
Maximum Take-off 137, 500 pounds
Maximum Landing 113, 000 pounds

Additional information

Basic Operating Weight 82, 500 pounds
Zero Fuel Weight 103, 500 pounds
Fuel (usable) 34, 000 pounds
Footprint Pressure at Maximum Ramp Weight 105 psi main gear; 65 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started with an external 24 to 28 volt D. C. power source However, in emergencies, starting may be accomplished by using the external power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 1.0 to 3 0 minutes
Prepare for taxi 0 5 to 1.0 minute
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15

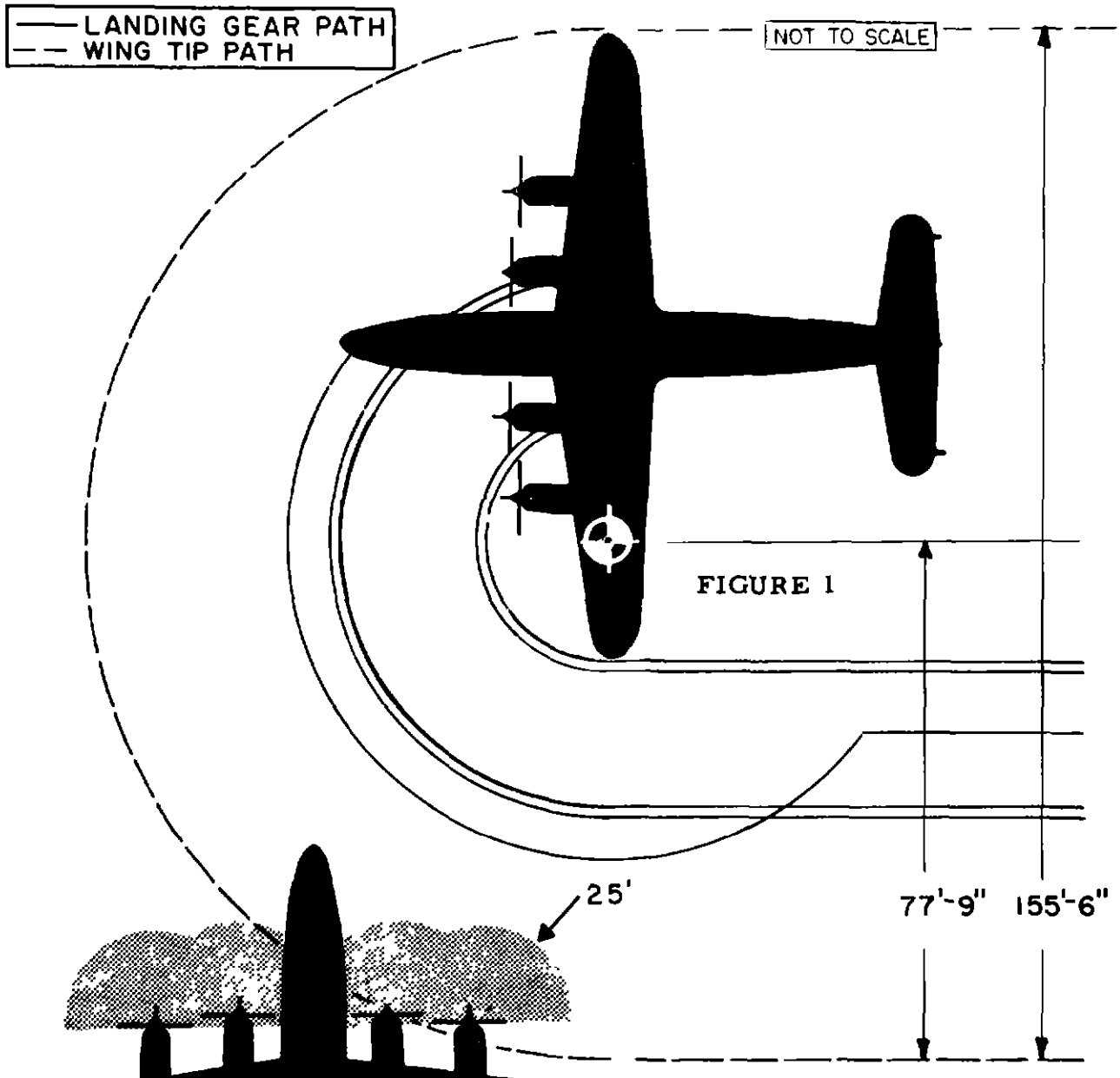


FIGURE 1

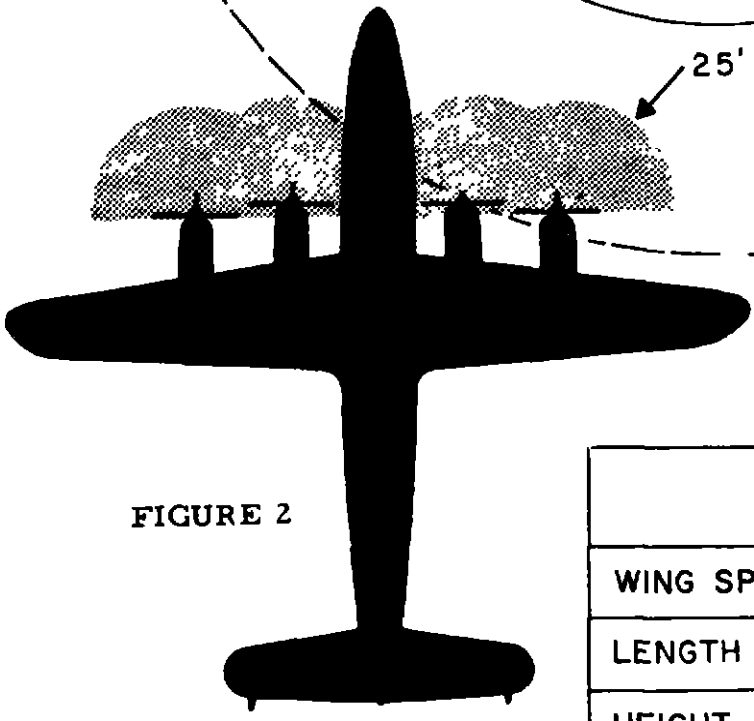


FIGURE 2

DIMENSIONS	
WING SPAN	123'-0"
LENGTH	113'-7"
HEIGHT	24'-9"

GENERAL DESCRIPTION

The Lockheed 1649A "Starliner" airplane is a four engine, piston driven, low wing passenger and cargo transport, characterized by three vertical stabilizers It is equipped with fully retractable tricycle landing gear with power steering on the nose gear. The minimum crew required consists of two pilots and a flight engineer.

The airplane is powered by four Wright, supercharged turbo-compound, model (988TC18) EA-2, 18 cylinder radial engines, driving three blade constant speed, full feathering, reversible pitch propellers Limitations of the power plant are as follows

Maximum power is developed at 58 5 inches manifold pressure and 2, 900 rpm The maximum allowable time for this power setting is 2 75 minutes

Maximum except take-off (METO) power is developed at 51 inches manifold pressure and 2, 650 rpm There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 160, 000 pounds
Maximum Take-off 160, 000 pounds
Maximum Landing 123, 000 pounds

Additional information

Basic Operating Weight 93, 200 pounds
Zero Fuel Weight 101, 410 pounds
Fuel (usable) 58, 590 pounds
Footprint Pressure at Maximum Ramp Weight 140 psi main gear, 75 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D. C power source Emergency starting may be accomplished by the internal power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 2 0 to 3 0 minutes
Prepare for taxi 0 5 to 1 0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Minimum 20
Operationally desirable 15

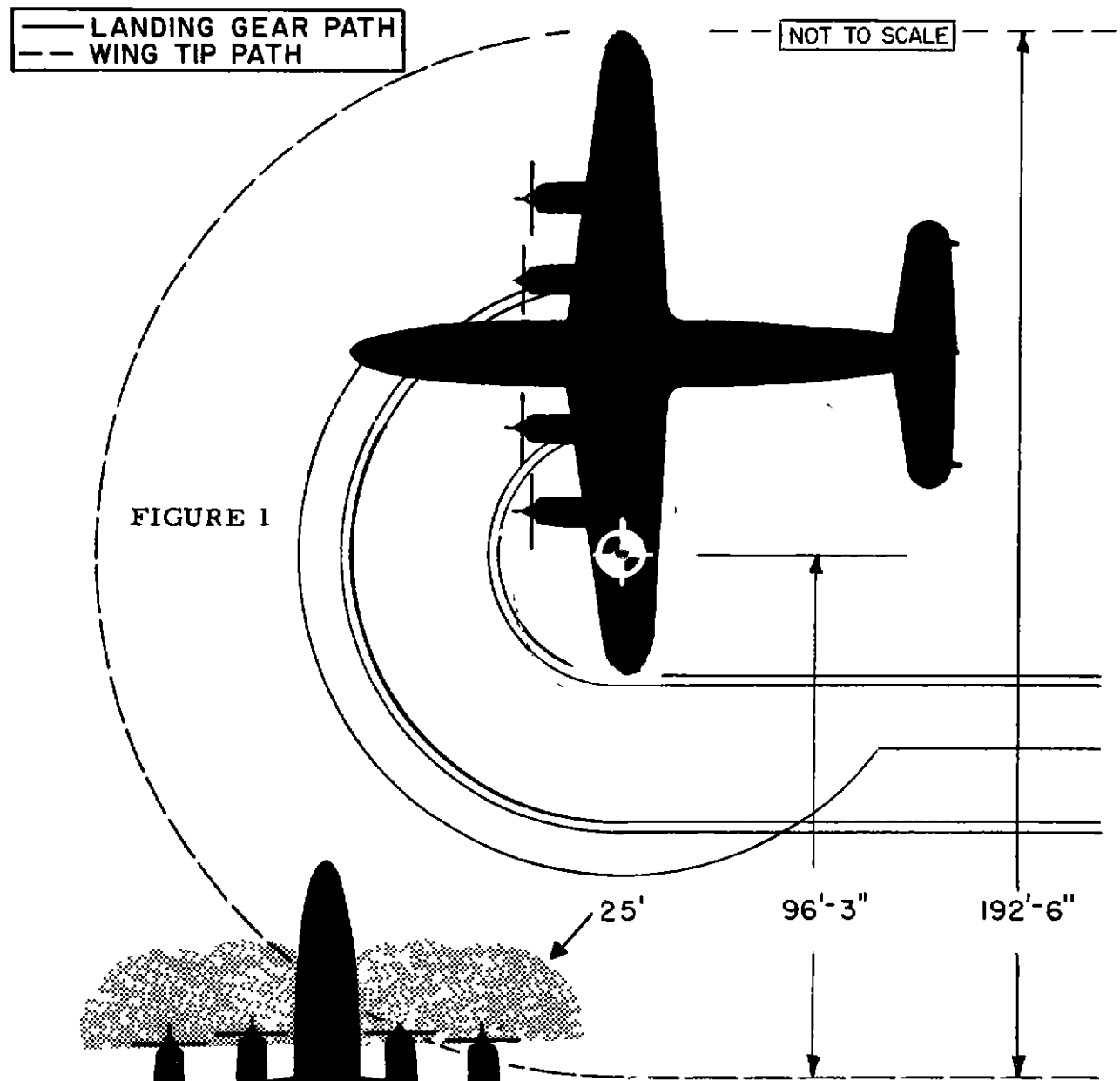


FIGURE 1

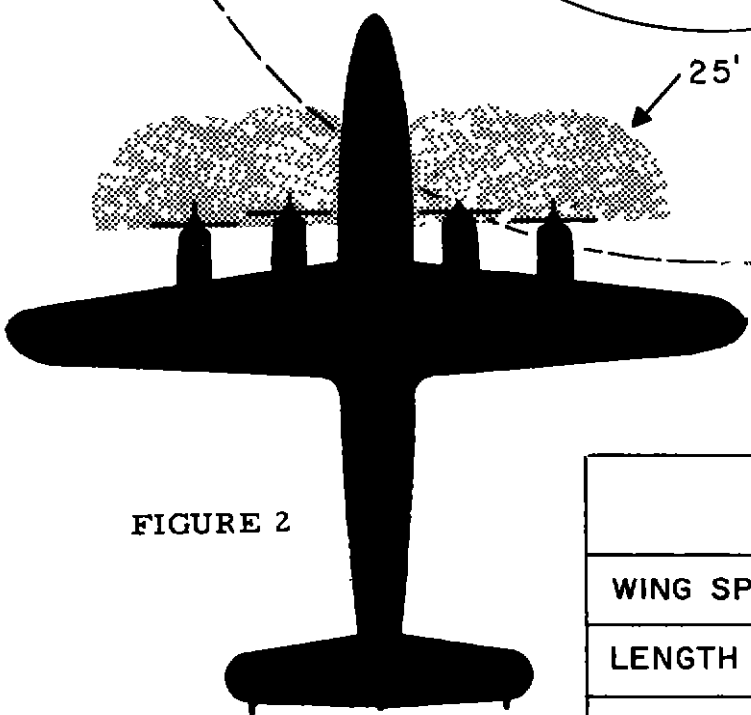


FIGURE 2

DIMENSIONS	
WING SPAN	150'
LENGTH	113' - 7"
HEIGHT	23' - 5"

GENERAL DESCRIPTION

The Martin "404" airplane is a piston engine, low wing, pressurized, commercial transport designed for airline service. It is equipped with fully retractable tricycle landing gear, with a steerable nose gear. The minimum crew of two required consists of a pilot and co-pilot

The airplane is powered by two Pratt & Whitney R-2800-CB-3, twin row, eighteen cylinder radial engines, driving automatic feathering, reversible pitch, three blade propellers Limitations of the power plant are as follows

Maximum (wet) power is developed at 59 5 inches manifold pressure and 2, 800 rpm

Maximum (dry) power is developed at 55 0 inches manifold pressure and 2, 700 rpm

The maximum allowable time at the above power settings is two minutes

Maximum except take-off (METO) power at sea level is developed at 48 5 inches manifold pressure and 2, o00 rpm There is no time limit for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp. 44, 900 pounds
Maximum Take-off 44, 900 pounds
Maximum Landing. 43, 000 pounds

Additional information

Basic Operating Weight 31, 900 pounds
Zero Fuel Weight 36, 680 pounds
Fuel (usable) 8, 220 pounds
Footprint Pressure at Maximum Ramp Weight 62 psi main gear, 69 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D C power source Emergency starting may be accomplished by the internal 28 volt D. C power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 1 0 to 3 0 minutes
Prepare for taxi 1 0 to 2 0 minutes

Speed (knots IAS during taxi)

Maximum. 20
Operationally desirable 10

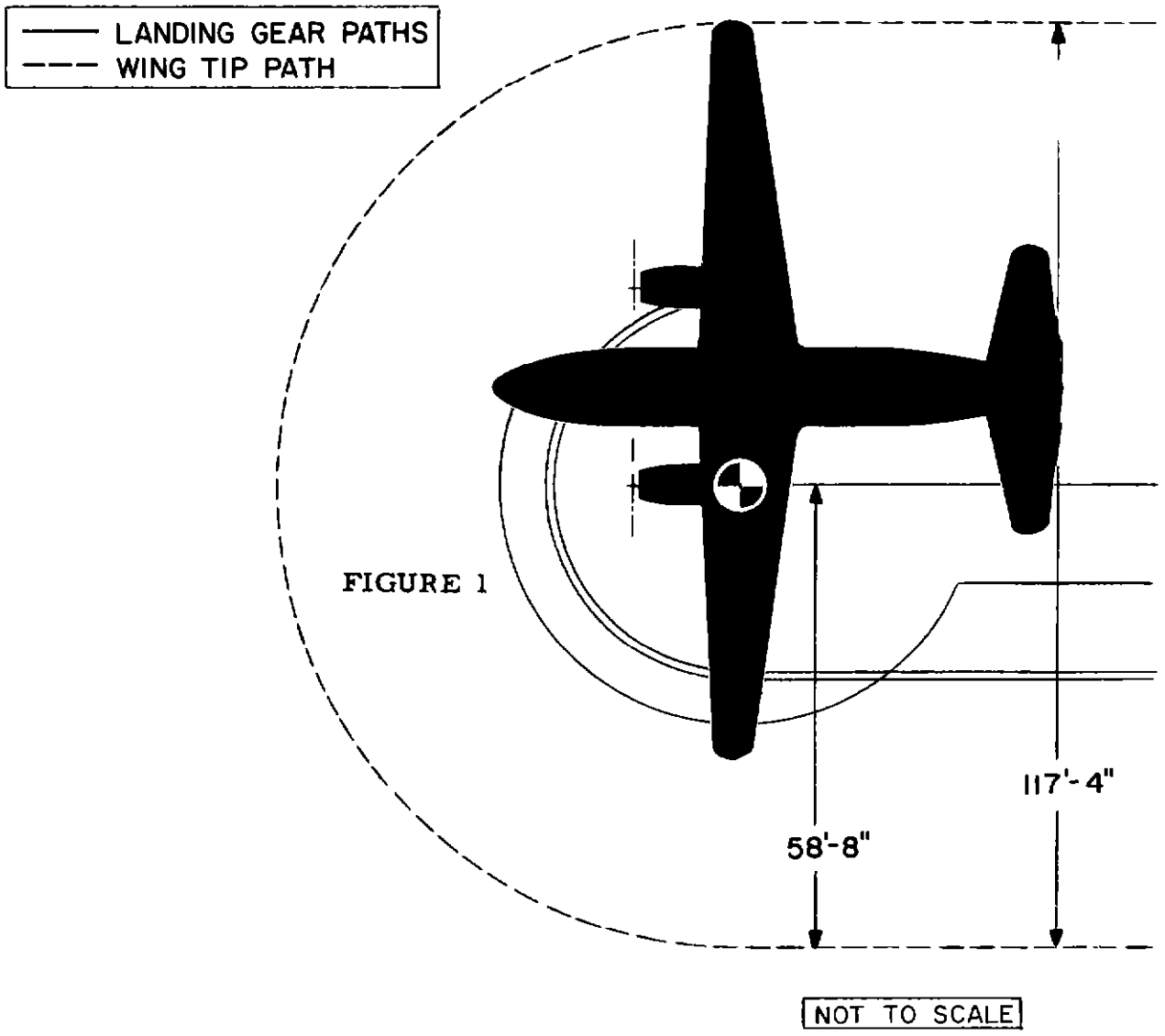


FIGURE 1

NORMAL GROUND CLEARANCE	
WING TIP	12'-6"
FUSELAGE	5'-5"
PROP TIP	1'-0"

DIMENSIONS	
WING SPAN	93' - 4"
LENGTH	74' - 7"
HEIGHT	28' - 8"
TREAD	25' - 0"

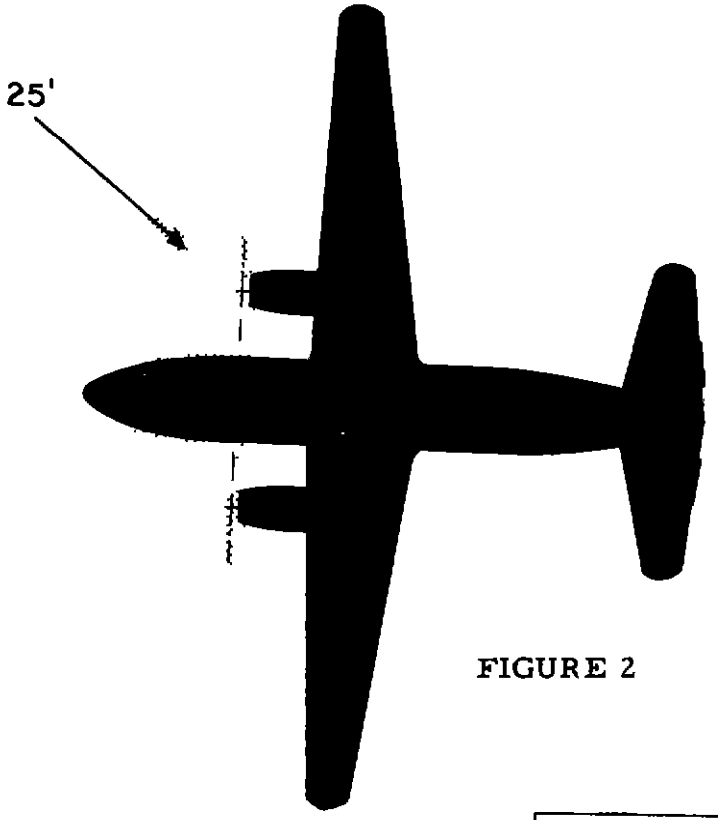


FIGURE 2

NOT TO SCALE

GENERAL DESCRIPTION

The Vickers Viscount Series 745D airplane is a four engine, turbo-prop, low wing, passenger and cargo transport The fully retractable tricycle type landing gear consists of two - dual wheel main gear and a single nose wheel equipped with power steering. The minimum crew required consists of one pilot and one co-pilot.

The airplane is powered by four Rolls Royce Dart 510, gas turbine engines, equipped with four blade, automatic feathering propellers. Limitations of the power plant are as follows

Maximum rated power (1,600 shp) is developed at 595 degrees centigrade, JPT, maximum rated temperature, and 14,500 rpm. The maximum allowable time at this power setting is 5 minutes.

Maximum climb and cruise power is developed at 520 degrees centigrade, JPT, and 14,000 rpm. There is no time limit for this power setting.

Maximum continuous power (1,400 shp) is developed at 560 degrees centigrade, JPT, and 14,000 rpm. There is no time limit for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 64,500 pounds
Maximum Take-off 64,500 pounds
Maximum Landing 57,500 pounds

Additional information

Basic Operating Weight 40,500 pounds
Zero Fuel Weight 49,110 pounds
Fuel (usable). 15,390 pounds
Footprint Pressure at Maximum Ramp Weight 115 psi main and nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 to 28 volt D. C. power source. Emergency starting may be accomplished by the internal power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 1 0 to 2. 0 minutes
Prepare for taxi 0. 5 to 1. 0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum· 30
Operationally desirable: 20

Vickers Viscount 745D

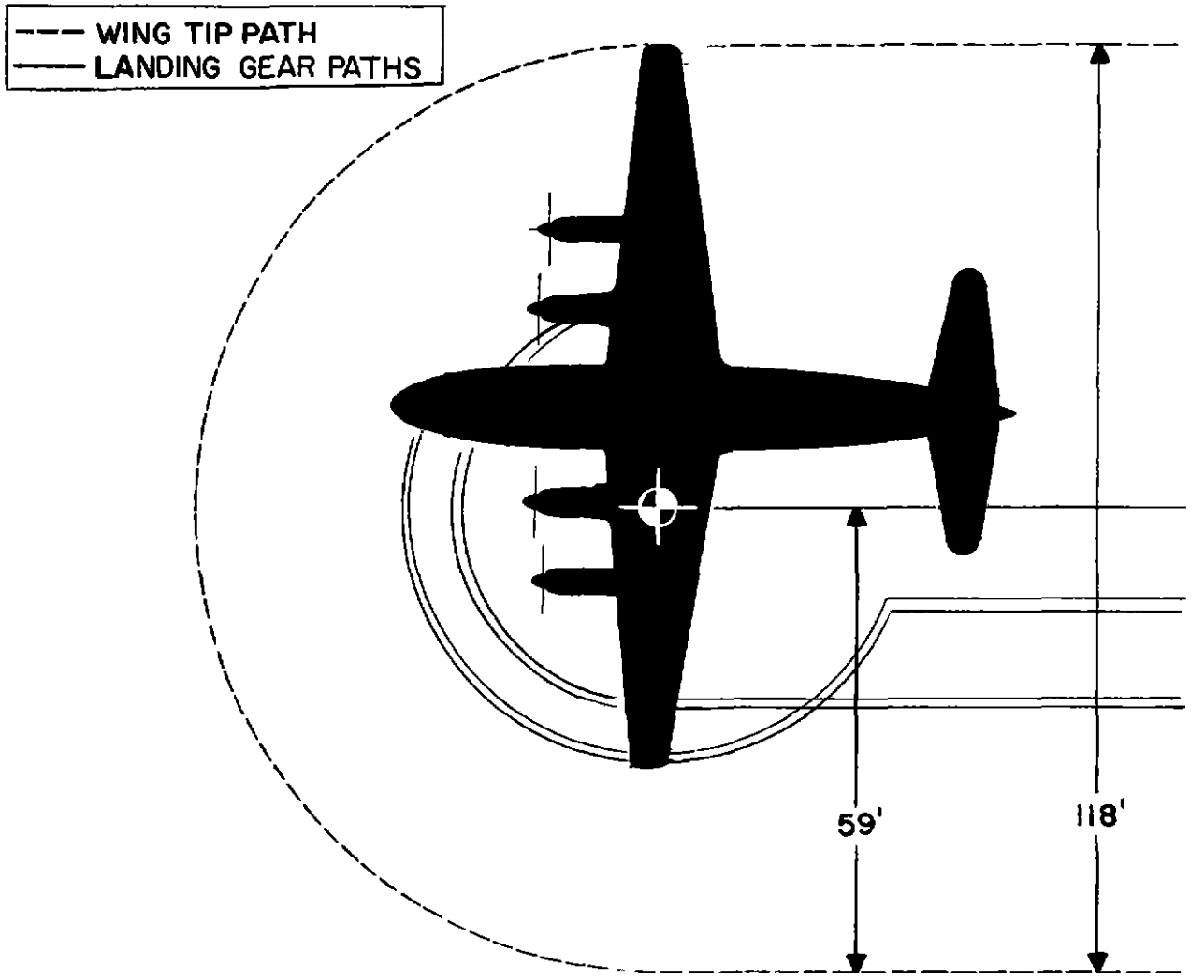


FIGURE 1

NOT TO SCALE

DIMENSIONS	
WING SPAN	94'
LENGTH	82'
HEIGHT	27'

GENERAL DESCRIPTION

The Vickers Viscount series 812 airplane is a four engine, turbo-prop, low wing, passenger and cargo transport The fully retractable tricycle type landing gear consists of two, dual wheel main gears and a steerable dual wheel nose gear The minimum crew required consists of a pilot and co-pilot

The airplane is powered by four Rolls Royce Dart-Mark 525B gas turbine engines, equipped with water injection systems Each engine drives a four blade, full feathering Rotol propeller. Limitations of the power plant are as follows

Maximum rated power (wet), (1, 800 shp) plus 500 pounds thrust (at sea level) is developed at 810 degrees centigrade (EGT) and 15, 000 rpm The maximum allowable time at this power setting is 5 minutes

Maximum, except take-off (METO), power is developed at 750 degrees centigrade (EGT) and 14, 500 rpm This is also maximum continuous power There is no time limit for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 69, 000 pounds
Maximum Take-off 69, 000 pounds
Maximum Landing 62, 000 pounds

Additional information

Basic Operating Weight 45, 090 pounds
Zero Fuel Weight 53, 800 pounds
Fuel (usable)· 15, 200 pounds
Footprint Pressure at Maximum Ramp Weight 115 psi main and nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an external 24 - 28 volt D C power source. Emergency starting may be accomplished by the airplane's internal power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figure 1

Time

Start engines 1 0 to 2 0 minutes
Prepare for taxi 0 5 to 1 0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 30
Operationally desirable 20

Vickers Viscount 812

NOT TO SCALE

—— LANDING GEAR PATHS
– – – WING TIP PATH

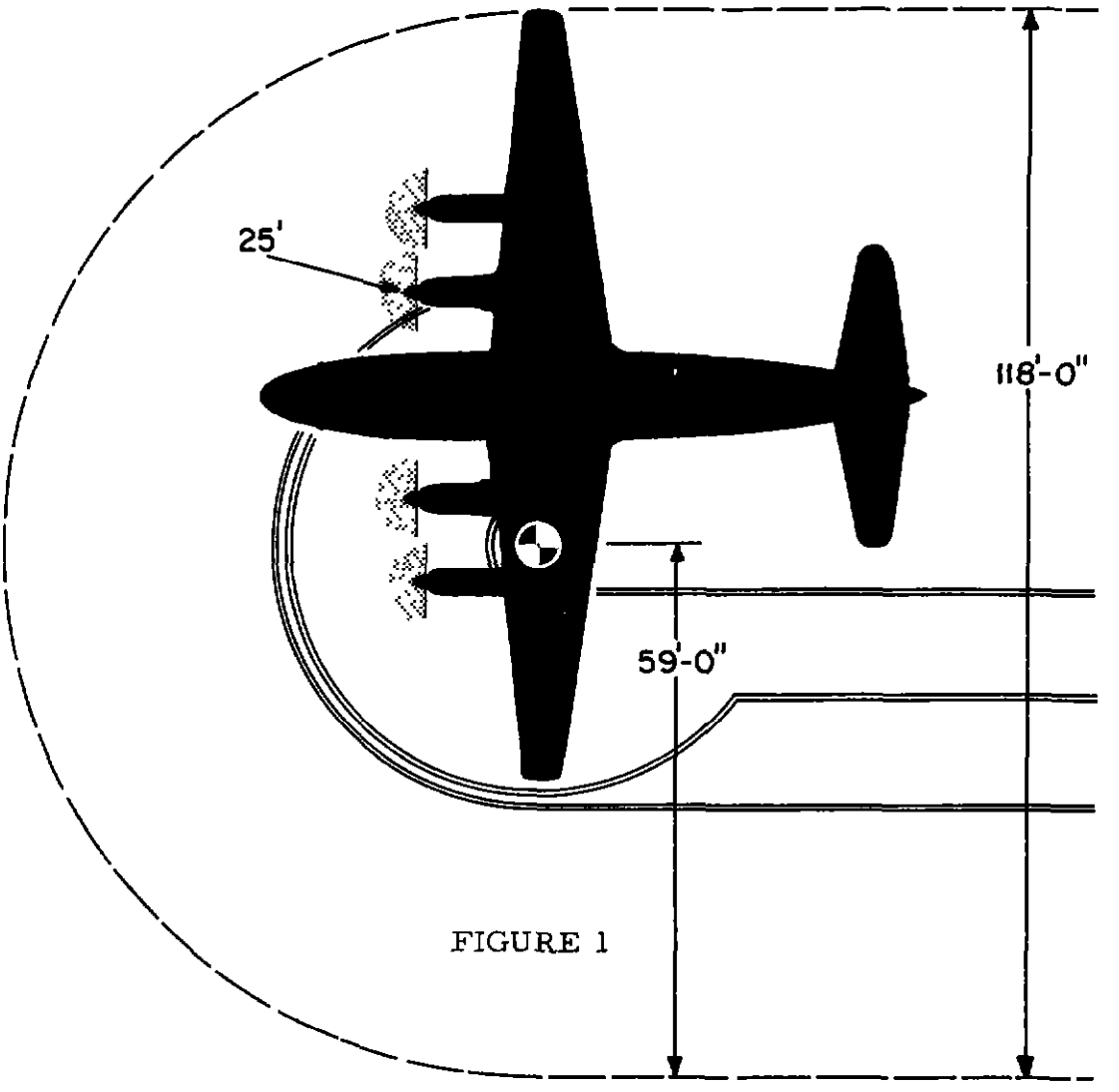


FIGURE 1

DIMENSIONS	
WING SPAN	93'-8 1/2"
LENGTH	85'-0"
HEIGHT	27'-0"

AIR VEHICLE PERFORMANCE CHARACTERISTICS

Volumes I-A through IX

SECTION 3

GENERAL AVIATION

containing data on

Aero Commander 500

Aero Commander 680 (L-26C)

Aero Commander 720

Beechcraft "Bonanza" K-35

Beechcraft "Twin Bonanza" (L-23D)

Beechcraft Model 95

Beechcraft Super 18

Cessna 150

Cessna 172

Cessna 175

Cessna 180 (Amphibian)

Cessna 182

Cessna 310A (L-27A)

Cessna 310C

de Havilland "Beaver" (L-20A)

de Havilland "Otter" (U-1A)

Mooney Mark 20A

Piper "Tri-Pacer" PA-22

Piper "Apache"" PA-23

Piper "Comanche" PA-24-180

(date of latest revision September 1, 1959)

UNITED STATES FEDERAL AVIATION AGENCY
Bureau of Research & Development Washington 25, D. C.

GENERAL DESCRIPTION

The Aero Commander Model 500 is a light twin engine, piston driven, high wing airplane, characterized by a high up-swept empennage and a high vertical stabilizer It is equipped with fully retractable tricycle type landing gear with power steering on the nose wheel The minimum crew required consists of one pilot

The airplane is powered by two Lycoming Model 0-540-A2B six cylinder, horizontally opposed engines driving two blade, constant speed, full feathering propellers. Limitations of the power plant are as follows

Maximum and maximum continuous power (250 bhp) is developed at 2, 575 rpm and full throttle There is no time limit for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 6, 000 pounds
Maximum Take-off 6, 000 pounds
Maximum Landing 6, 000 pounds

Additional information

Basic Operating Weight 4, 231 pounds
Zero Fuel Weight 5, 064 pounds
Fuel (usable) 936 pounds
Footprint Pressure at Maximum Ramp Weight 50 psi main gear, 35 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 24 volt D. C power source Emergency starting may be accomplished by an external 24 to 28 volt D. C. power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2.

Time

Start engines 0 5 to 1 0 minute
Prepare for taxi 1 0 to 3 0 minutes
Pre-take-off functional check is performed while taxiing

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable 10

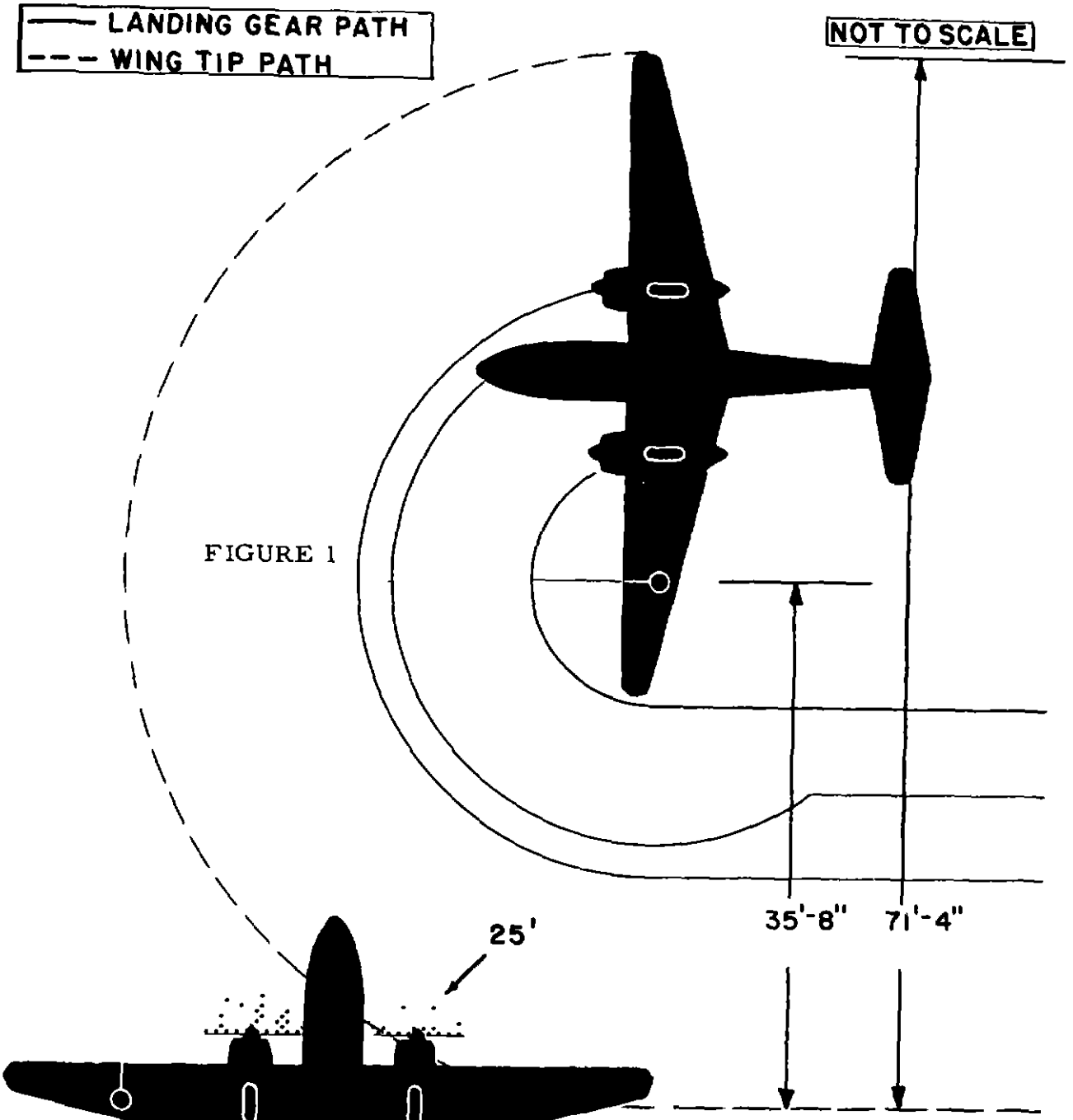


FIGURE 1

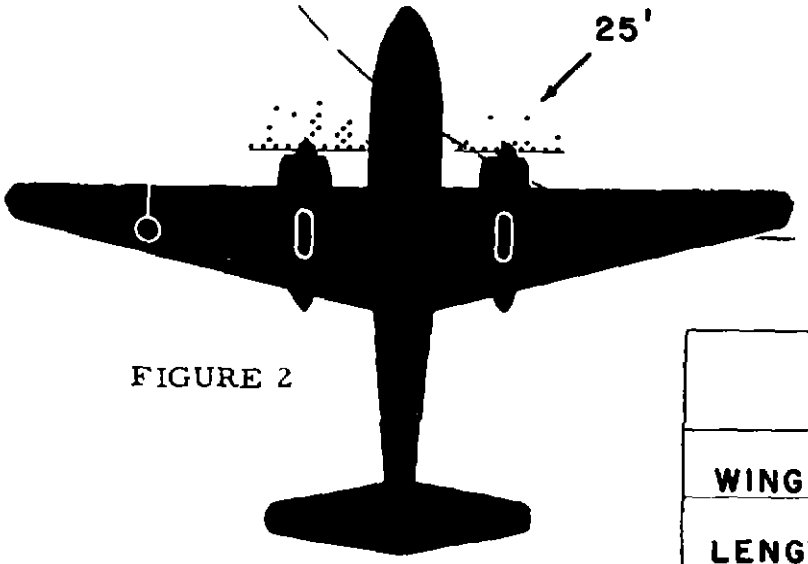


FIGURE 2

DIMENSIONS	
WING SPAN	49'
LENGTH	35'-5"
HEIGHT	14'- 9"

GENERAL DESCRIPTION

The Aero Design "Aero Commander" 680 (L-26C) airplane is a light twin engine, piston driven, high wing executive transport, characterized by a high up-swept empennage and high vertical stabilizer It is equipped with a fully retractable tricycle landing gear with power steering on the nose gear The airplane provides fast and economical transportation of passengers and light cargo The minimum crew required consists of one pilot However, dual controls are provided and in normal operations of transporting up to four passengers, the crew consists of both pilot and co-pilot

The airplane is powered by two Lycoming super-charged GSO-480-A1A6, six cylinder engines, driving three blade, constant speed, full feathering propellers Limitations of the power plant are as follows

Maximum power is developed at 48 inches manifold pressure at 3, 400 rpm The maximum allowable time at this power setting is five minutes

Maximum except take-off (METO) power at sea level is developed at 45 inches manifold pressure at 3, 200 rpm There is no time limitation for this power setting

METO power at 7, 500 feet is developed at 43 inches manifold pressure at 3, 200 rpm There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 7, 000 pounds
Maximum Take-off 7, 000 pounds
Maximum Landing 7, 000 pounds

Additional information

Basic Operating Weight 4, 330 pounds
Zero Fuel Weight 5, 656 pounds
Fuel (usable) 1, 344 pounds
Footprint Pressure at Maximum Ramp Weight 50 psi main gear
35 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 24 volt D C power source Emergency starting may be accomplished by using an external 28 volt D. C power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 2 0 to 4 0 minutes
Prepare for taxi 3 0 to 5 0 minutes
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 10
Operationally desirable 8

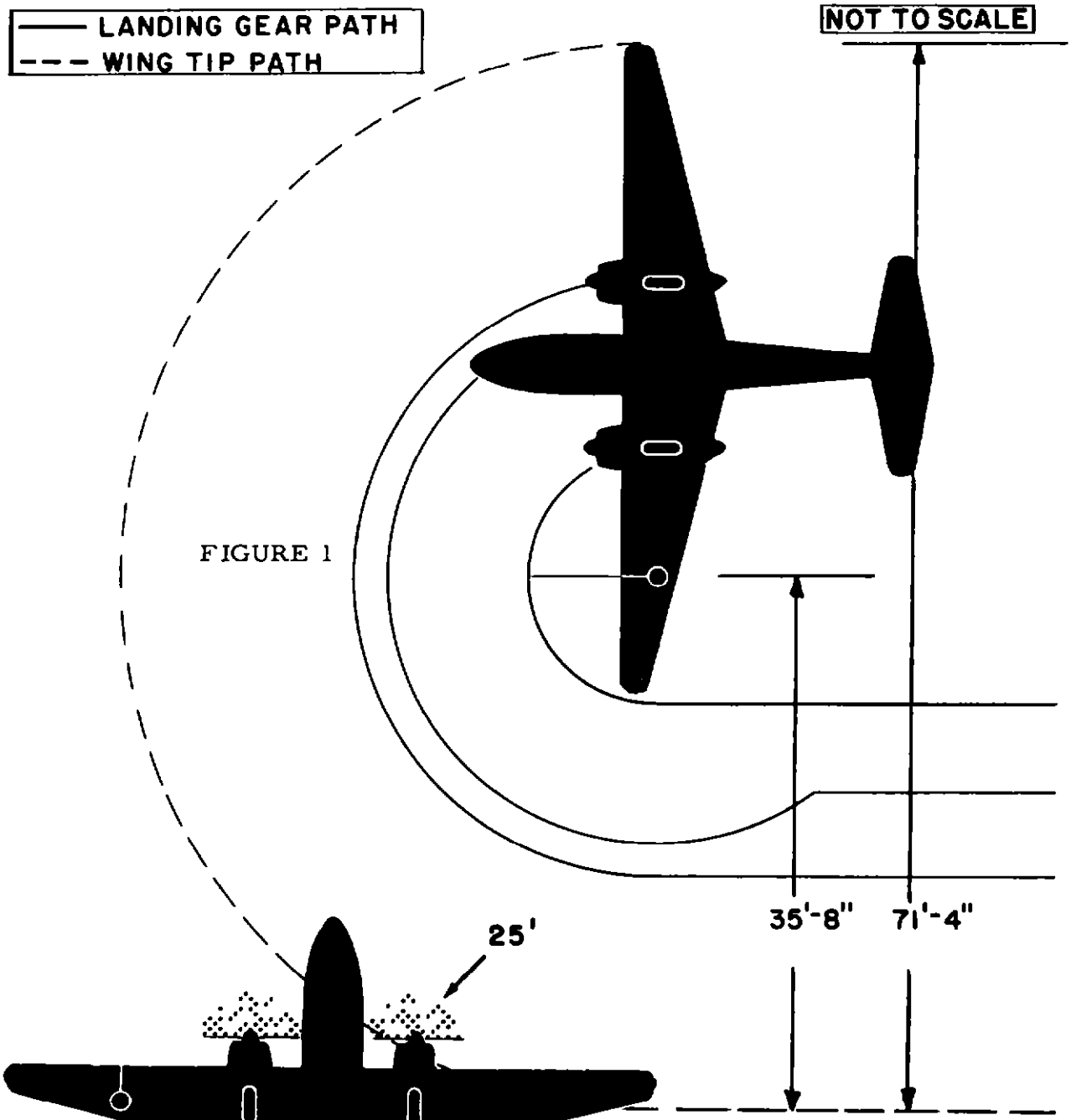


FIGURE 1

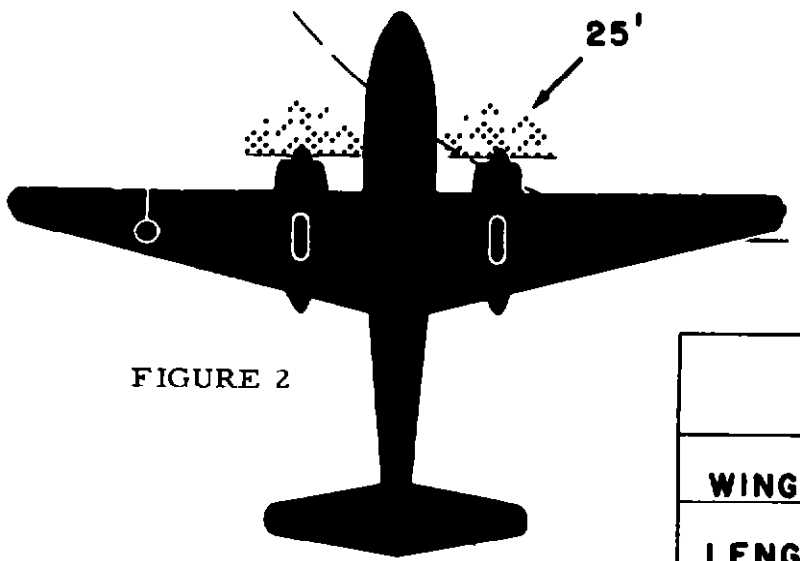


FIGURE 2

DIMENSIONS	
WING SPAN	49'
LENGTH	35'-5"
HEIGHT	14'-9"

GENERAL DESCRIPTION

The Aero Design 720 "Aero Commander" is a light twin engine, high wing executive type aircraft characterized by a high up-swept empennage and high vertical stabilizer It is equipped with fully retractable tricycle type landing gear with power steering on the nose gear. The minimum crew required consists of one pilot

The airplane is powered by two Lycoming super-charged GSO-480-B1A6 six cylinder engines driving three blade, constant speed, full feathering propellers Limitations of the power plant are as follows

Maximum power is developed at 48 inches manifold pressure at 3, 400 rpm The maximum allowable time at this power setting is five minutes

Maximum except take-off (METO) power at sea level is developed at 45 inches manifold pressure at 3, 200 rpm There is no time limitation for this power setting

METO power at 7, 500 feet altitude is developed at 43 inches manifold pressure at 3, 200 rpm There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 7, 500 pounds
Maximum Take-off 7, 500 pounds
Maximum Landing 7, 500 pounds

Additional information

Basic Operating Weight 4, 475 pounds
Zero Fuel Weight 6, 162 pounds
Fuel (usable). 1, 338 pounds
Footprint Pressure at Maximum Ramp Weight 50 psi main gear, 35 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 24 volt D C power source Emergency starting may be accomplished by an external 24 to 28 volt D C power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines. 1 0 to 2 0 minutes
Prepare for taxi 2.0 to 3 0 minutes
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum. 10
Operationally desirable: 8

Aero Commander (720)

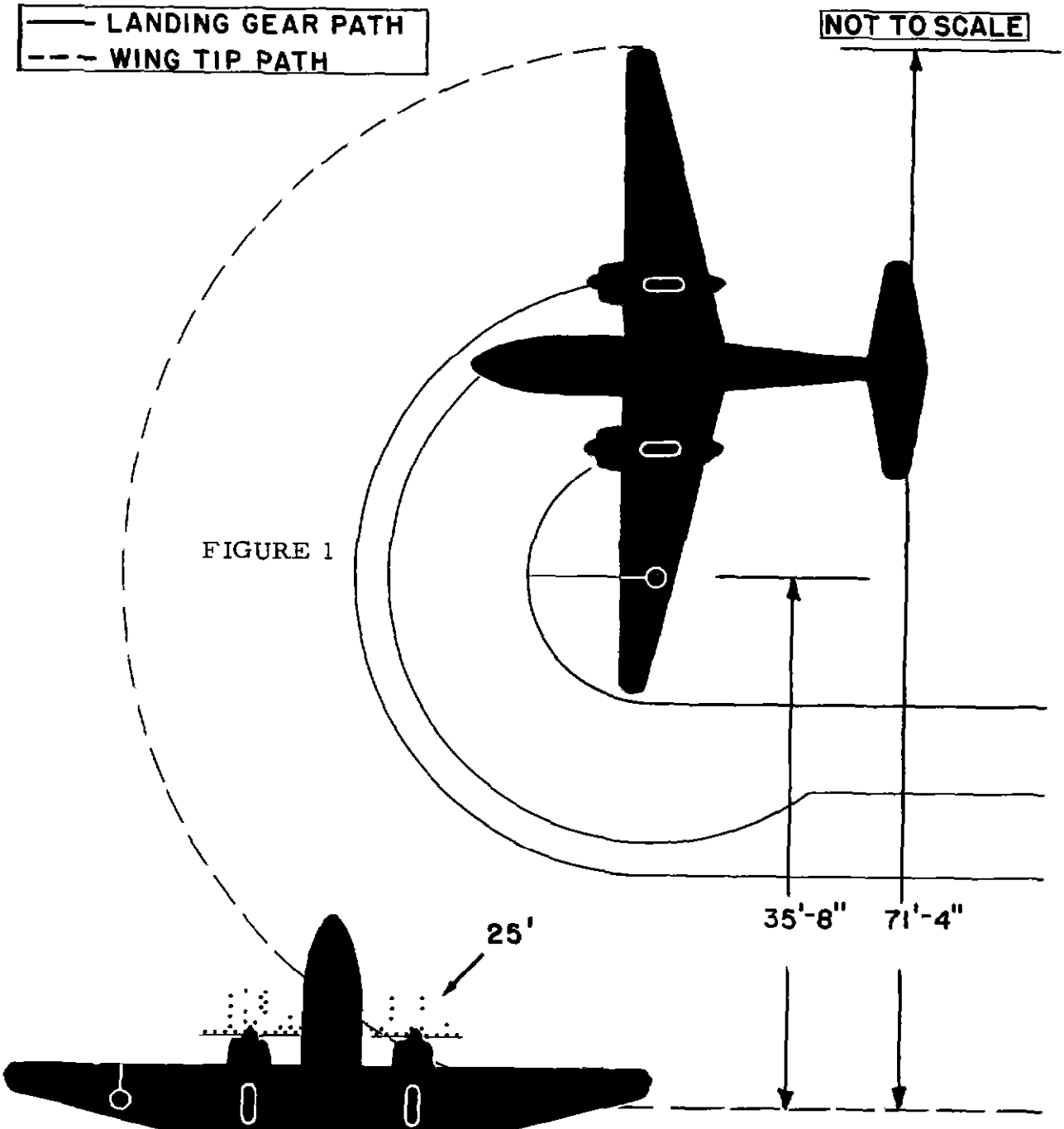


FIGURE 1

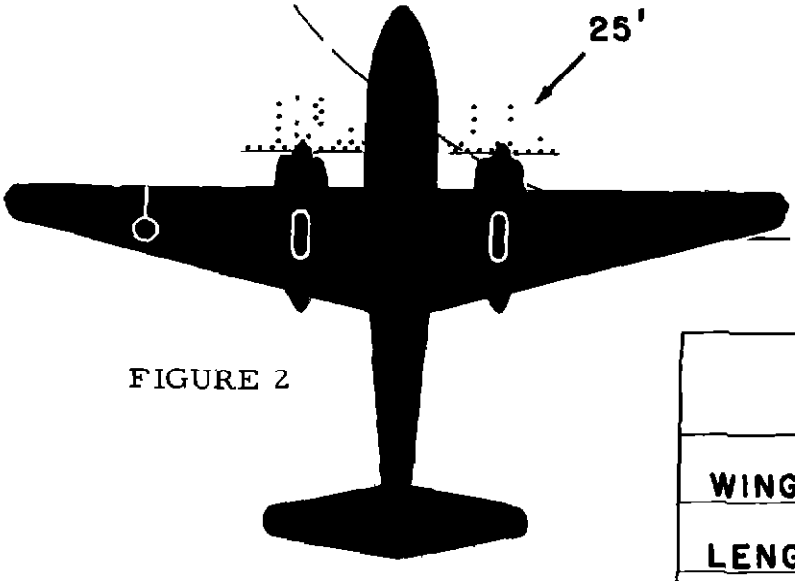


FIGURE 2

DIMENSIONS	
WING SPAN	49'
LENGTH	35'-5"
HEIGHT	14'- 9"

GENERAL DESCRIPTION

The Beechcraft K-35 "Bonanza" airplane is a land based, single engine, four-place, low-wing monoplane, with a tricycle landing gear and a "V" tail Minimum crew required is one pilot

The aircraft is powered by a Continental IO-470-C engine rated at 250 hp, driving a Beech two blade, variable pitch aluminum alloy propeller Limitations of the power plant are as follows

Maximum power is developed at 28 inches manifold pressure at 2, 600 rpm

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 2, 950 pounds
Maximum Take-off 2, 950 pounds
Maximum Landing 2, 950 pounds

Additional information

Basic Operating Weight 1, 832 pounds
Zero Fuel Weight 2, 656 pounds
Fuel (usable) 294 pounds
Footprint Pressure at Maximum Ramp Weight 30 psi main gear, 30 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is normally started by an internal 12 volt D C power source In emergencies, starting may be accomplished by an external power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 0 1 to 0. 5 minute
Prepare to taxi 2 0 minutes
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 9 knots
Operationally desirable 9 knots

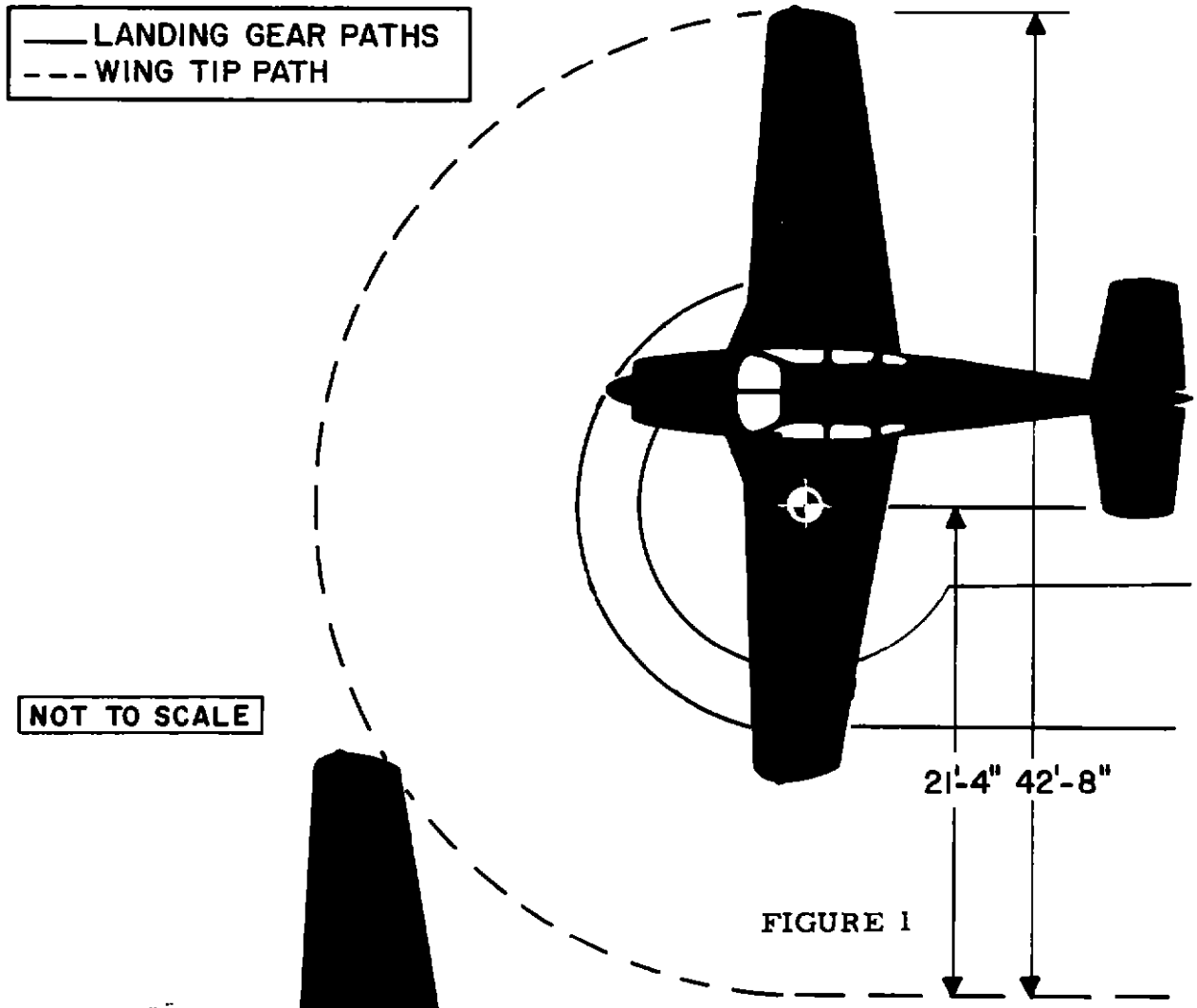


FIGURE 1

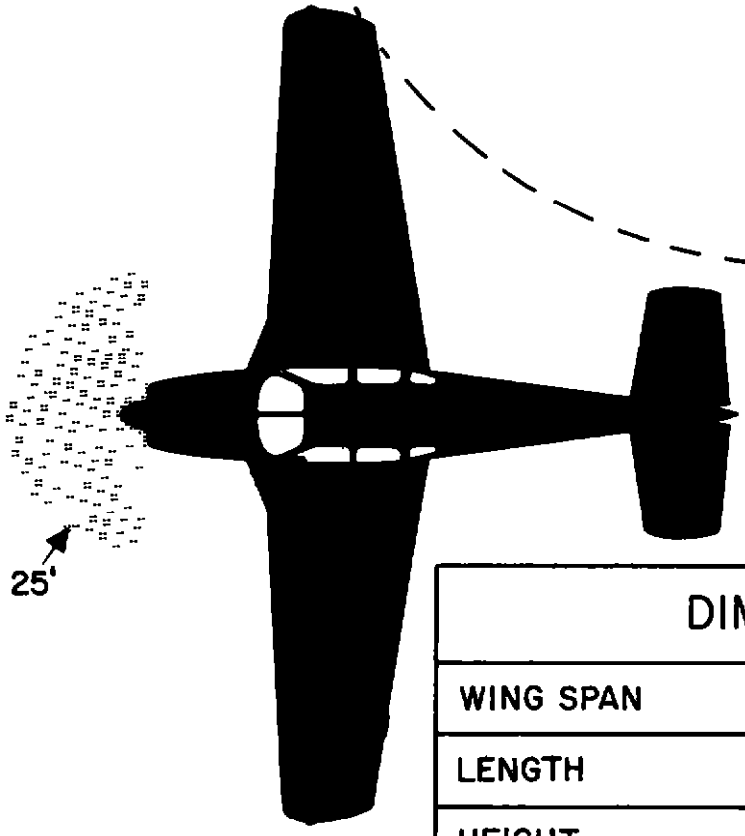


FIGURE 2

DIMENSIONS	
WING SPAN	32' - 10"
LENGTH	25' - 2"
HEIGHT	6' - 6 1/2"
TREAD	9' - 7 1/8"

GENERAL DESCRIPTION

The Beechcraft "Twin Bonanza" (L-23D) airplane is a light twin engine, low wing, executive transport It is equipped with fully retractable, tricycle landing gear with power steering on the nose gear It can transport five passengers plus light cargo The minimum crew required consists of one pilot

The airplane is powered by two Lycoming supercharged model GSO-480-1, horizontally opposed six cylinder engines, driving three blade, constant speed, full feathering propellers Limitations of the power plant are as follows

Maximum power is developed at 48 inches manifold pressure at 3, 400 rpm. The maximum allowable time at this power setting is 5 minutes

Maximum except take-off (METO) power is developed at 45 inches manifold pressure at 3, 200 rpm There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 7, 000 pounds
Maximum Take-off 7, 000 pounds
Maximum Landing 7, 000 pounds

Additional information

Basic Operating Weight 4, 978 pounds
Zero Fuel Weight 5, 620 pounds
Fuel (usable) 1, 380 pounds
Footprint Pressure at Maximum Ramp Weight 35 psi main gear, 35 psi nose wheel

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 24 volt D C. power source Emergency starting may be accomplished by using a 24 volt D C external power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 1 0 to 2 0 minutes
Prepare for taxi 1.0 to 1.5 minutes
The pre-take-off functional check is performed during taxiing

Speed (knots IAS during taxi)

Maximum 8
Operationally desirable. 5

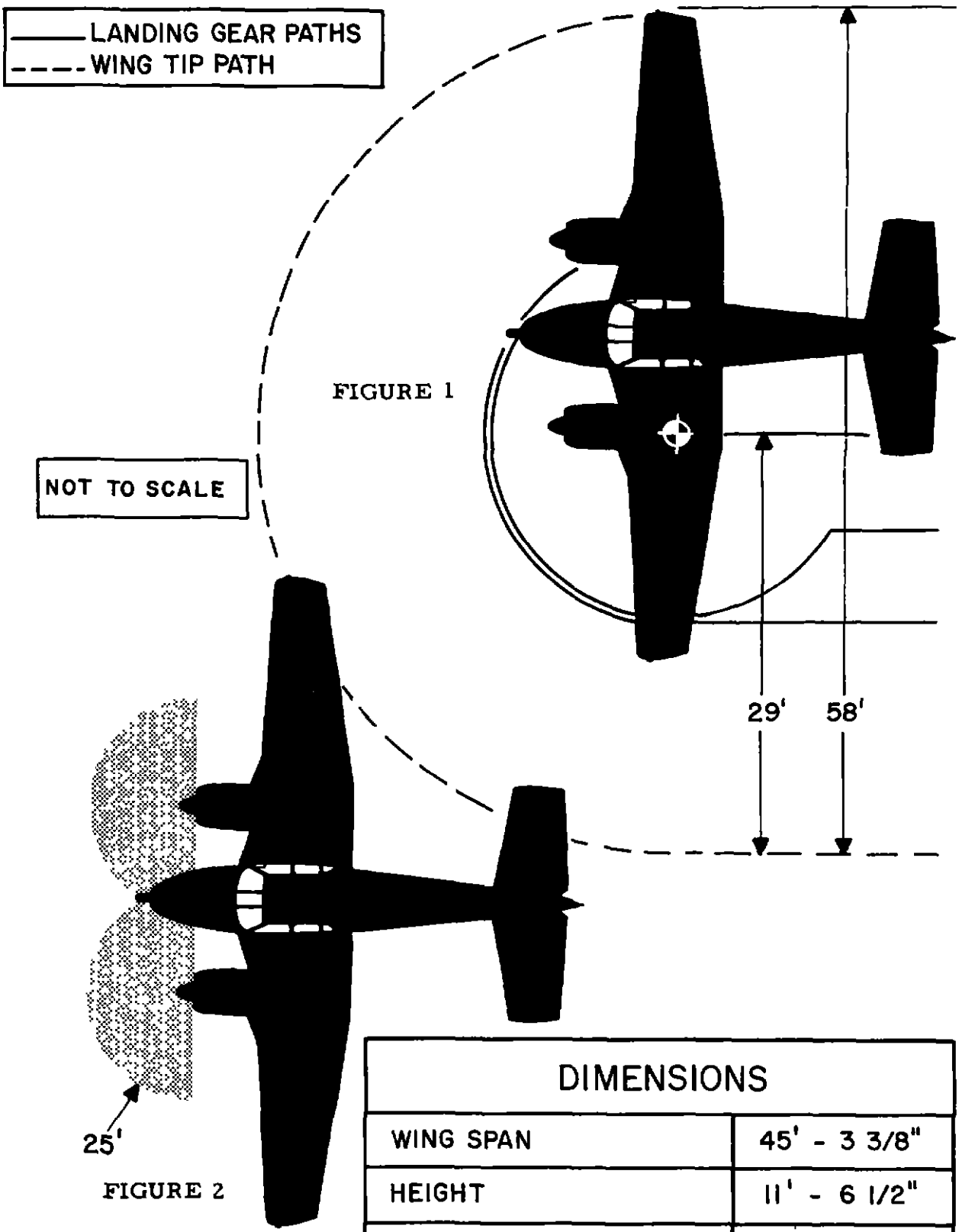


FIGURE 1

FIGURE 2

DIMENSIONS	
WING SPAN	45' - 3 3/8"
HEIGHT	11' - 6 1/2"
LENGTH	31' - 6 15/32"
TREAD	12' - 9"

GENERAL DESCRIPTION

The Beechcraft Model 95 "Travel Air" is a light twin engine, four-place, executive type, low wing airplane It is equipped with a fully retractable tricycle type landing gear with hydraulic wheel brakes actuated by the rudder pedals Steering control of the nose gear is accomplished mechanically by movement of the rudder pedals The minimum crew requirement is one pilot.

Power is furnished by two Lycoming 0-360-A1A engines, each rated at 180 horsepower at 2, 700 rpm Each engine drives a Hartzell two blade, constant-speed, full feathering propeller Limitations of the power plant are as follows·

Maximum power is developed at 28. 5 inches manifold pressure at 2, 700 rpm for all operations

Pertinent gross weight limitations of the airplane are as follows
- Maximum Ramp 4, 000 pounds
- Maximum Take-off 4, 000 pounds
- Maximum Landing 4, 000 pounds

Additional information
- Basic Operating Weight 2, 580 pounds
- Zero Fuel Weight 3, 496 pounds
- Fuel (usable) 504 pounds
- Footprint Pressure at Maximum Ramp Weight 36 psi main gear, 28 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 24 volt D. C power source Starting may also be accomplished by using an external 24 volt D. C power supply

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2.

Time

Start engines 0 2 to 1 0 minute
Prepare for taxi 1.0 to 2 0 minutes (including the pre-take-off functional check)

Speed (taxi)

Maximum 13 knots
Operationally desirable 9 knots

Beechcraft Model 95

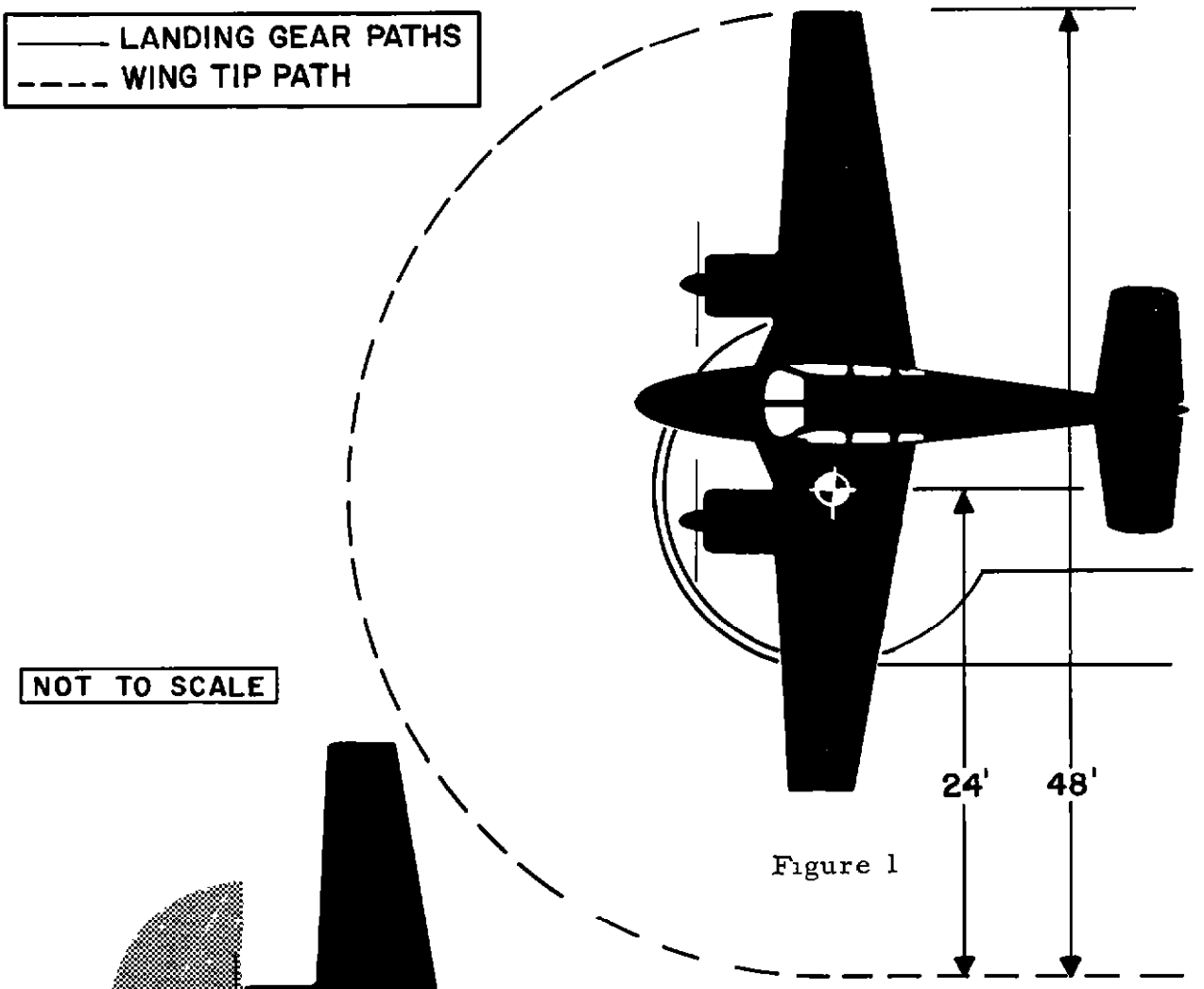


Figure 1

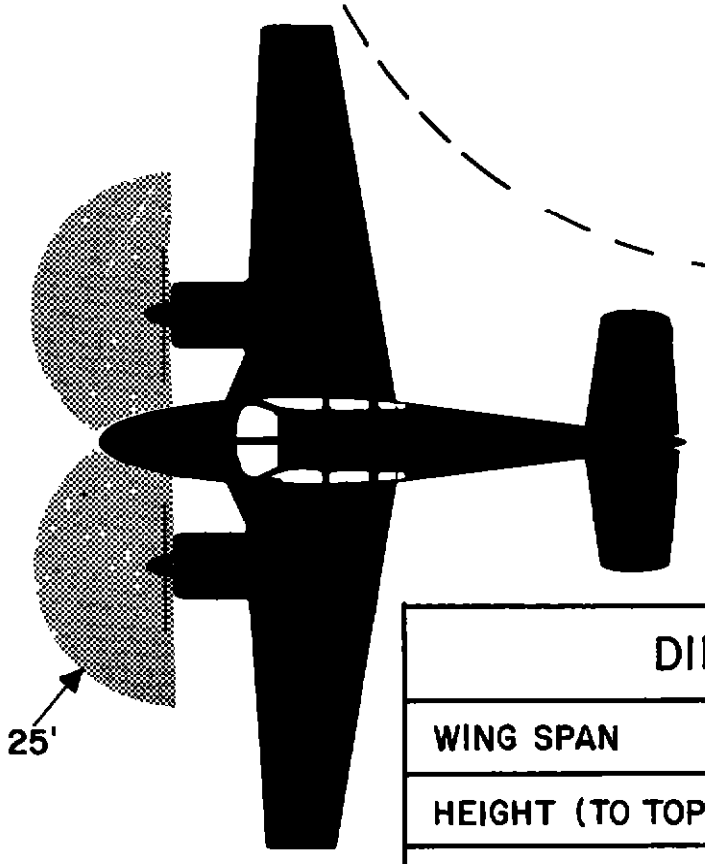


Figure 2

DIMENSIONS	
WING SPAN	37' - 10"
HEIGHT (TO TOP OF FIN)	9' - 6"
LENGTH	25' - 4"
TREAD	9' - 7"

GENERAL DESCRIPTION

The Beechcraft "Super 18" is a light twin engine, low wing passenger and cargo transport It is equipped with a retractable, conventional landing gear consisting of the main gear and a free swiveling center locking tail wheel The minimum crew required consists of one pilot However, dual controls are provided and in normal operations the crew consists of both pilot and co-pilot

The airplane is powered by two Pratt & Whitney R985/AN-14B nine-cylinder radial engines driving two-blade, constant speed full feathering propellers Limitations of the power plant are as follows

Maximum power (450 bhp) is developed at 36 5 inches manifold pressure at 2, 300 rpm There is no time limit for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 9, 700 pounds
Maximum Take-off. 9, 700 pounds
Maximum Landing 9, 400 pounds

Additional information

Basic Operating Weight· 6, 050 pounds
Zero Fuel Weight 8, 050 pounds
Fuel (usable) 1, 650 pounds
Footprint Pressure at Maximum Ramp Weight 45 psi main gear, 50 psi tail wheel

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 24 volt D C power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines. 0 2 to 0 5 minute
Prepare for taxi 0 5 to 1 0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable. 10

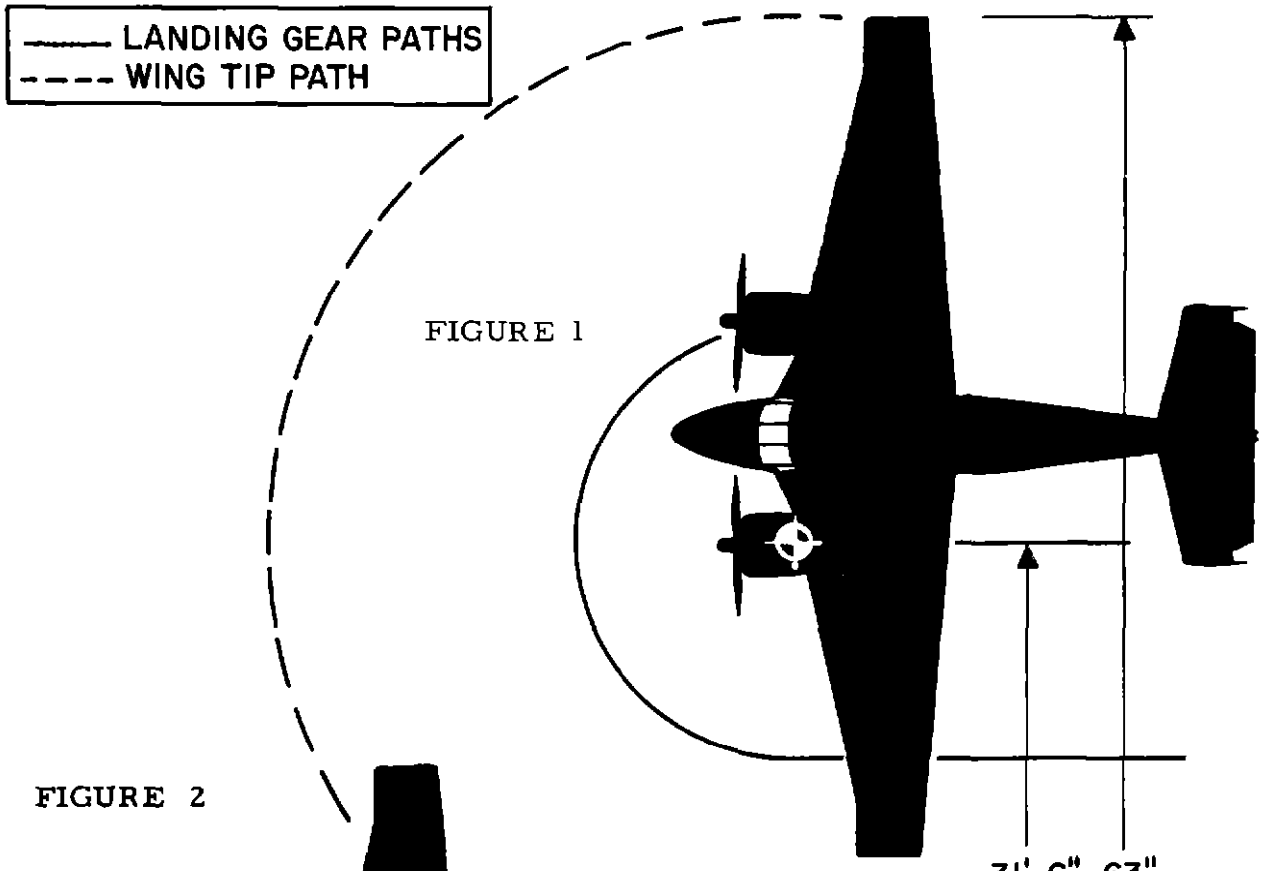


FIGURE 1

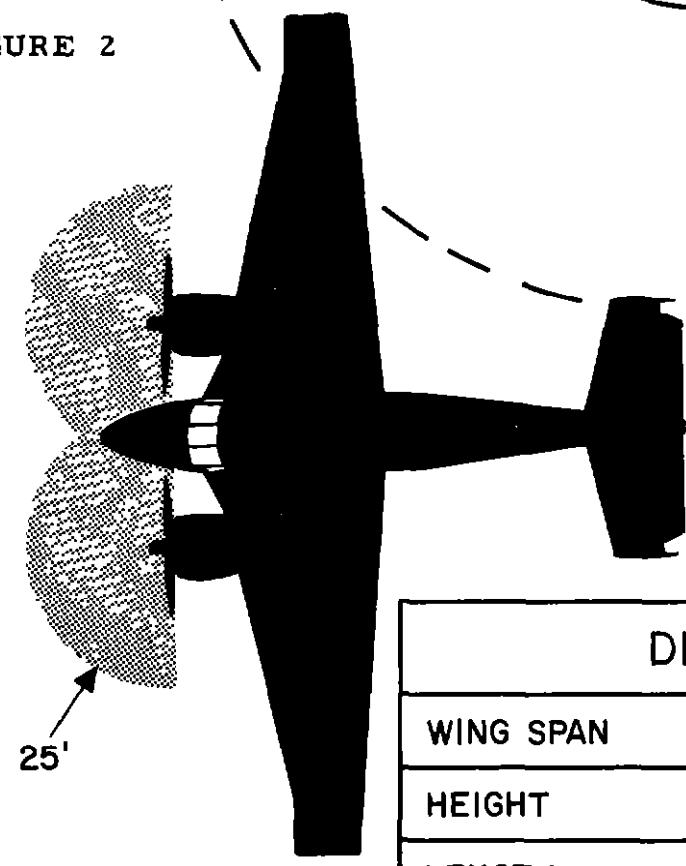


FIGURE 2

DIMENSIONS	
WING SPAN	49' - 8"
HEIGHT	7' - 3"
LENGTH	35' - 2"
TREAD	12' - 11"

GENERAL DESCRIPTION

The Cessna 172 is a light single engine, propeller driven, high wing, four place airplane with a fixed main landing gear, and a steerable nose wheel. The minimum crew required is one pilot.

The airplane is powered by a Continental Model 0-300-A six cylinder engine, driving a two blade, constant speed propeller. The limitations of the power plant are as follows

Maximum power (145 bhp) is developed at 2,700 rpm. The maximum allowable time at this power setting is five minutes.

Maximum power except take-off (METO) at sea level (103 bhp) is developed at 2,500 rpm There is no limit at this power setting

METO power at 7,500 feet altitude (101 bhp) is developed at 2,600 rpm There is no time limit at this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 2,200 pounds
Maximum Take-off 2,200 pounds
Maximum Landing 2,200 pounds

Additional information:

Basic Operating Weight 1,460 pounds
Zero Fuel Weight: 1,978 pounds
Fuel (usable). 222 pounds
Footprint Pressure at Maximum Ramp Weight: 23 psi main gear, 26 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is started by an internal 12 volt D. C. power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engine 5 to 10 seconds
Prepare for taxi 1 0 to 2. 0 minutes
Pre-take-off functional check is performed while taxiing.

Speed (knots IAS during taxi)

Maximum 13
Operationally desirable 10

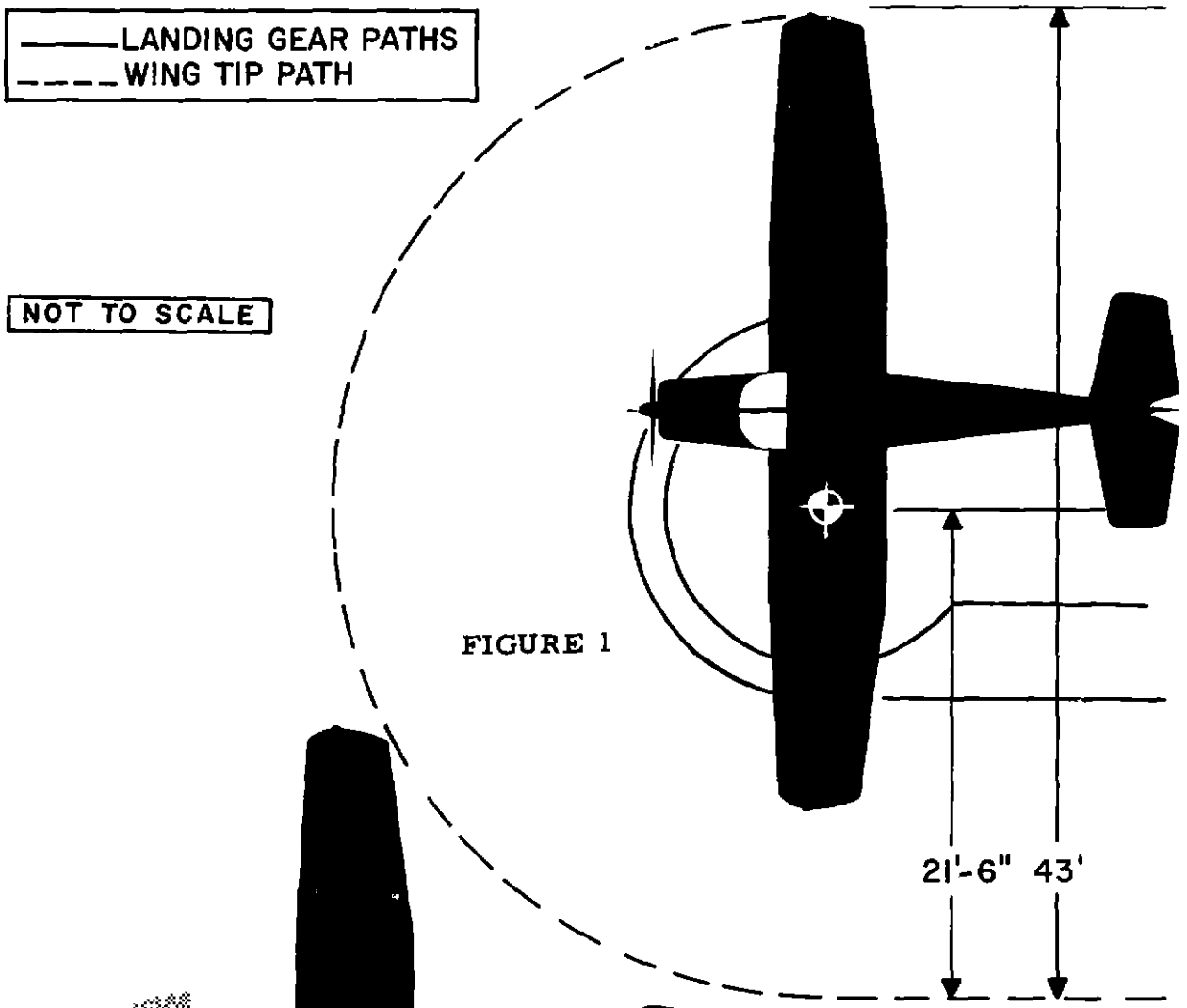


FIGURE 1

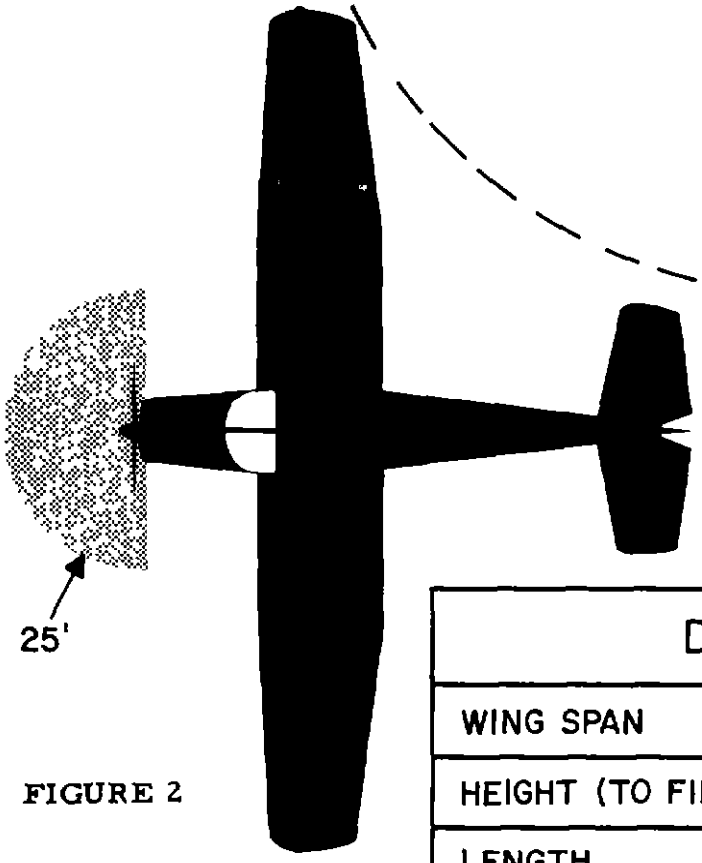


FIGURE 2

DIMENSIONS	
WING SPAN	36' - 0"
HEIGHT (TO FIN)	8' - 6"
LENGTH	24' - 0"
TREAD	7' - 2"

GENERAL DESCRIPTION

The Cessna 175 is a light single engine, propeller driven, high wing, four-place utility airplane. It is equipped with a fixed tricycle type landing gear including a steerable nose wheel. The minimum crew required is one pilot

The aircraft is powered by a single Continental Model GO-300-A engine, driving a fixed pitch, metal propeller Limitations of the power plant are as follows

Maximum power (175 bhp) is developed at 3, 200 rpm There is no time limitation for this power setting

Maximum recommended cruising power (72% bhp) is developed at 3, 200 rpm

Pertinent gross weight limitations of the airplane are as follows

Maximum ramp 2, 350 pounds
Maximum take-off 2, 350 pounds
Maximum landing 2, 350 pounds

Additional information

Basic Operating Weight. 1, 580 pounds
Zero Fuel Weight 2, 092 pounds
Fuel (usable) 258 pounds
Footprint Pressure at Maximum Ramp Weight 23 psi main gear, 26 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is started by an internal 12 volt D C power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2.

Time

Start engines 0 1 to 0 5 minute
Prepare for taxi 1 0 to 2 0 minutes
Pre-take-off functional check is performed while taxiing

Speed (knots IAS during taxi)

Maximum 13
Operationally desirable 9

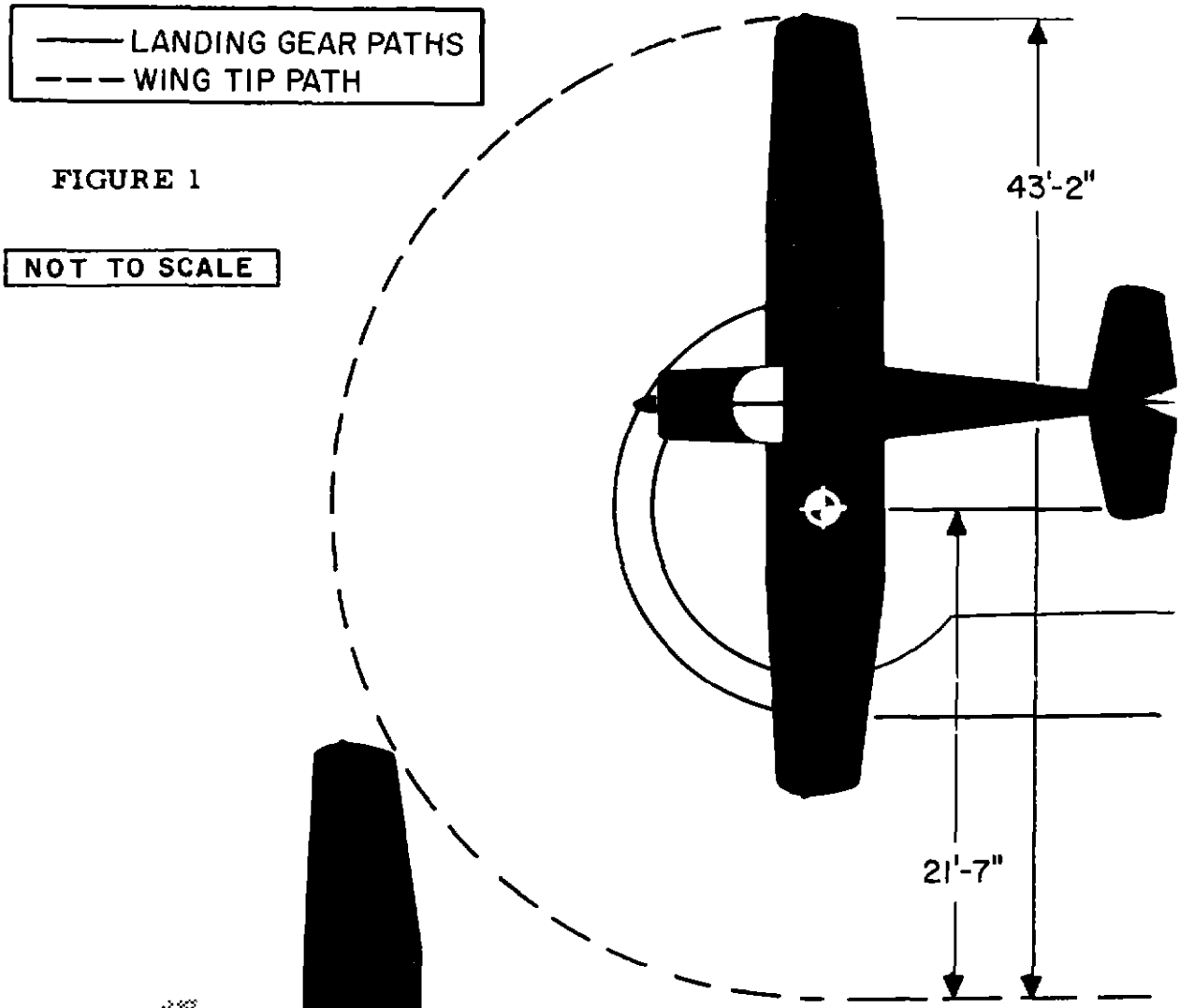


FIGURE 1

NOT TO SCALE

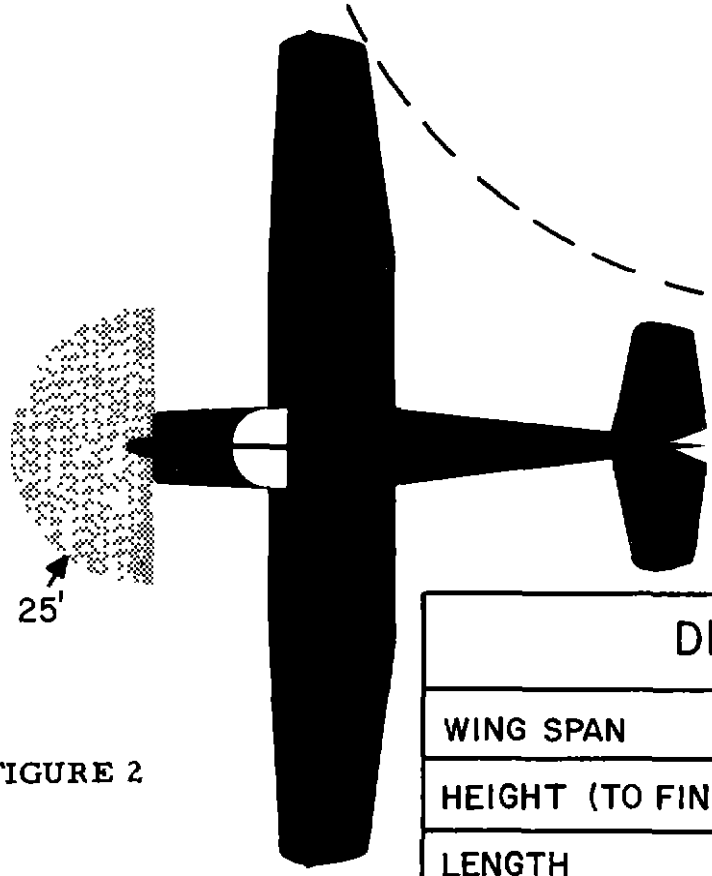


FIGURE 2

DIMENSIONS	
WING SPAN	36' - 0"
HEIGHT (TO FIN)	8' - 7"
LENGTH	24' - 0"
TREAD	7' - 2"

GENERAL DESCRIPTION

The Cessna 180 Amphibian is a light single engine, high wing airplane It is equipped with Edo Amphibious landing gear consisting of retractable wheels on floats. Each float consists of a main wheel and a nose or low wheel. The minimum crew required is one pilot

The airplane is powered by a Continental model 0-470-K, six cylinder engine driving a two blade constant speed propeller. Limitations of the power plant are as follows

Maximum power (230 bhp) is developed at 23 inches manifold pressure at 2,600 rpm. There is no time limit for this power setting.

Normal cruise power (175 bhp) is developed at 23 inches manifold pressure at 2,450 rpm.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 2,850 pounds
Maximum Take-off 2,850 pounds
Maximum Landing. 2,850 pounds

Additional information

Basic Operating Weight 2,034 pounds
Zero Fuel Weight. 2,520 pounds
Fuel (usable) 330 pounds
Footprint Pressure at Maximum Ramp Weight not available from manufacturer

NARRATIVE SUMMARY

Sequence of Operations

The engine is normally started by an internal 12 volt D.C. power source Emergency starting may be accomplished manually (hand-prop)

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 0.5 to 1.0 minute
Prepare for taxi 0.5 to 1.0 minute
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable 10

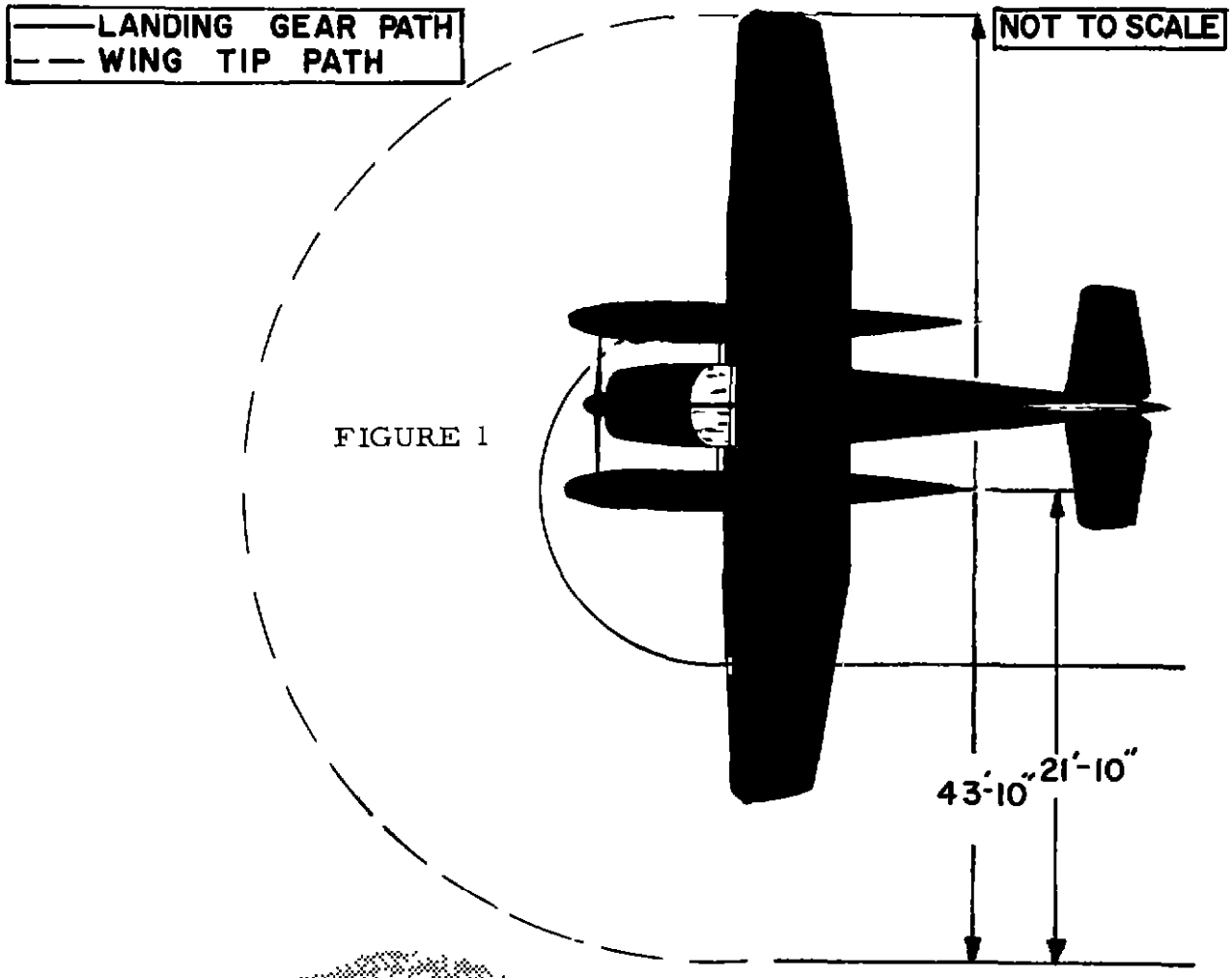


FIGURE 1

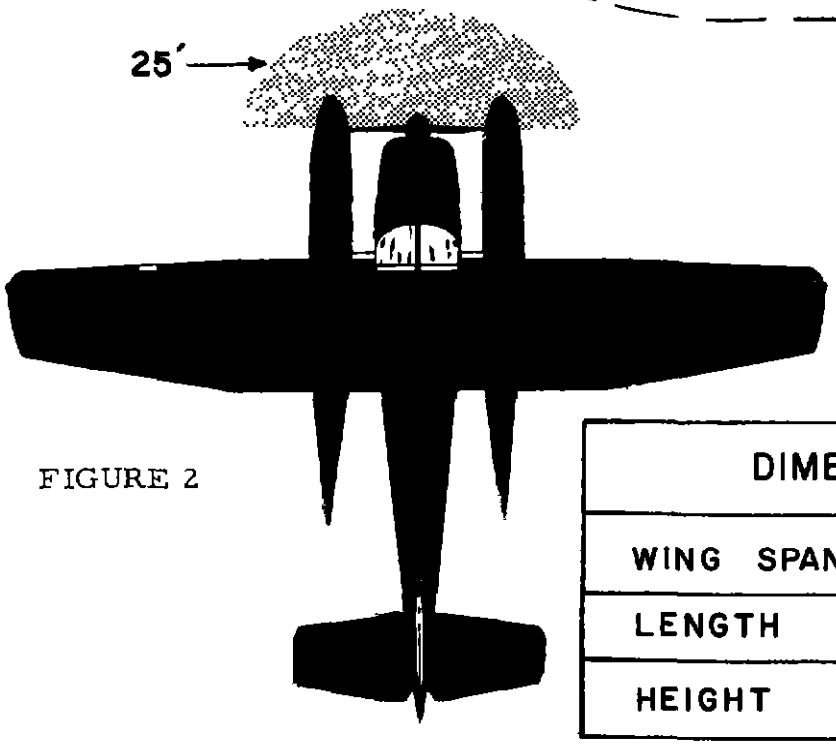


FIGURE 2

DIMENSIONS	
WING SPAN	36'-0"
LENGTH	26'-2"
HEIGHT	7'-64"

GENERAL DESCRIPTION

The Cessna 182 is a light single engine, piston driven, high wing airplane. It is equipped with a fixed tricycle type landing gear utilizing a steerable nose wheel. The minimum crew required is one pilot.

The airplane is powered by a single Continental 0-470-L, six cylinder engine, driving a two blade constant speed propeller Limitations of the power plant are as follows

Maximum power (230 bhp) is developed at 23 inches manifold pressure at 2,600 rpm. There is no time limitation for this power setting.

Maximum except take-off (METO) power at sea level is developed at 23 inches manifold pressure at 2,450 rpm. There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows
Maximum Ramp 2,650 pounds
Maximum Take-off 2,650 pounds
Maximum Landing 2,650 pounds

Additional information
Basic Operating Weight 1,621 pounds
Zero Fuel Weight 2,320 pounds
Fuel (usable) 330 pounds
Footprint Pressure at Maximum Ramp Weight 28 psi main gear, 29 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is normally started by an internal 12 volt D.C. power source. Emergency starting is accomplished manually (hand-prop).

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2.

Time

Start engine 0.2 to 0.5 minute
Prepare for taxi 1 0 to 3 0 minutes
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable· 10

FIGURE 1

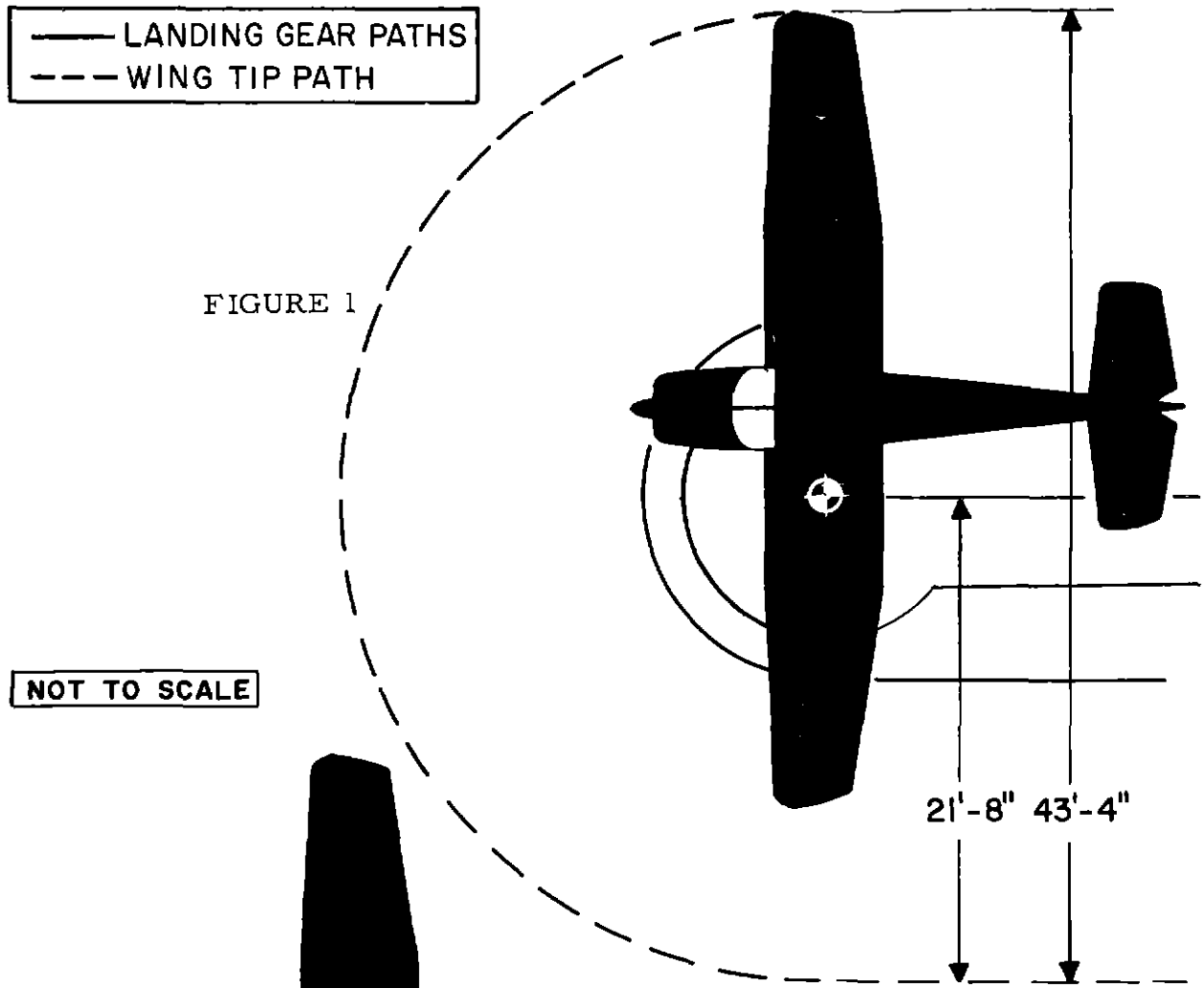
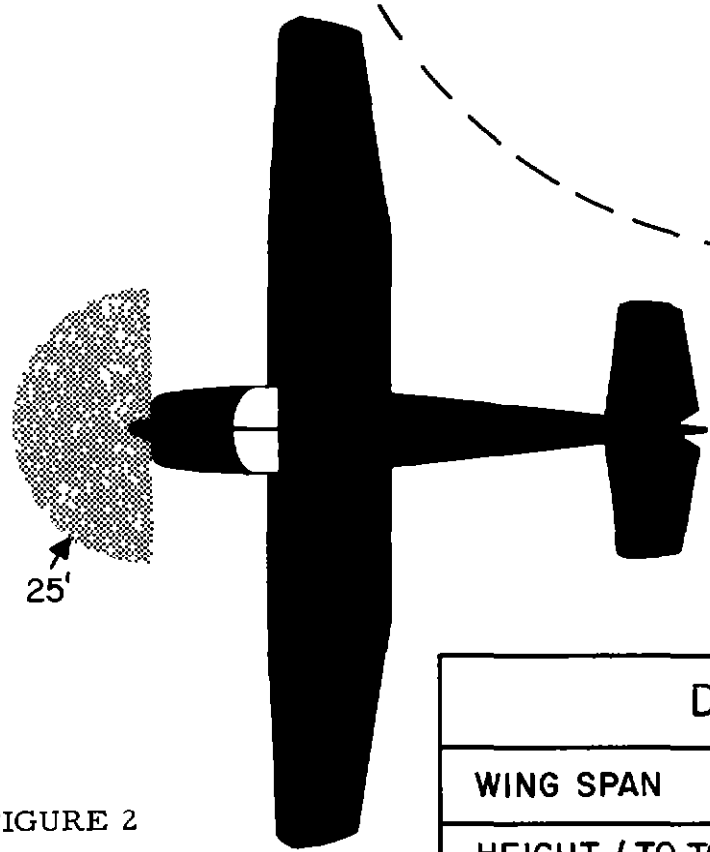


FIGURE 2



DIMENSIONS	
WING SPAN	36' - 0"
HEIGHT (TO TOP OF FIN)	8' - 6"
LENGTH	25' - 2"

GENERAL DESCRIPTION

The Cessna 310A (L-27A) airplane is a light twin engine, piston driven, low wing, liaison aircraft and light cargo transport. It is equipped with fully retractable tricycle landing gear. Ground steering is accomplished by movement of the rudder pedals which are connected by a steering linkage with the nosewheel. The minimum crew required consists of one pilot Dual flight controls are provided, and an additional pilot and three passengers can be transported.

The airplane is powered by two Continental model 0-470-M, six cylinder engines, driving two blade, constant speed, full feathering propellers. Limitations of the power plant are as follows

Maximum power is 240 bhp developed at 24 inches manifold pressure at 2,600 rpm. There is no time limitation for this power setting.

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 4,830 pounds
Maximum Take-off 4,830 pounds
Maximum Landing 4,600 pounds

Additional information

Basic Operating Weight 3,926 pounds
Zero Fuel Weight 4,050 pounds
Fuel (usable) 780 pounds
Footprint Pressure at Maximum Ramp Weight 75 psi main gear, 42 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by using an external 24 to 28 volt D.C. power source Emergency starting may be accomplished by using the airplane's 24 volt internal power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 1 to 2 minutes
Prepare for taxi 3 to 5 minutes
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 10
Operationally desirable 8

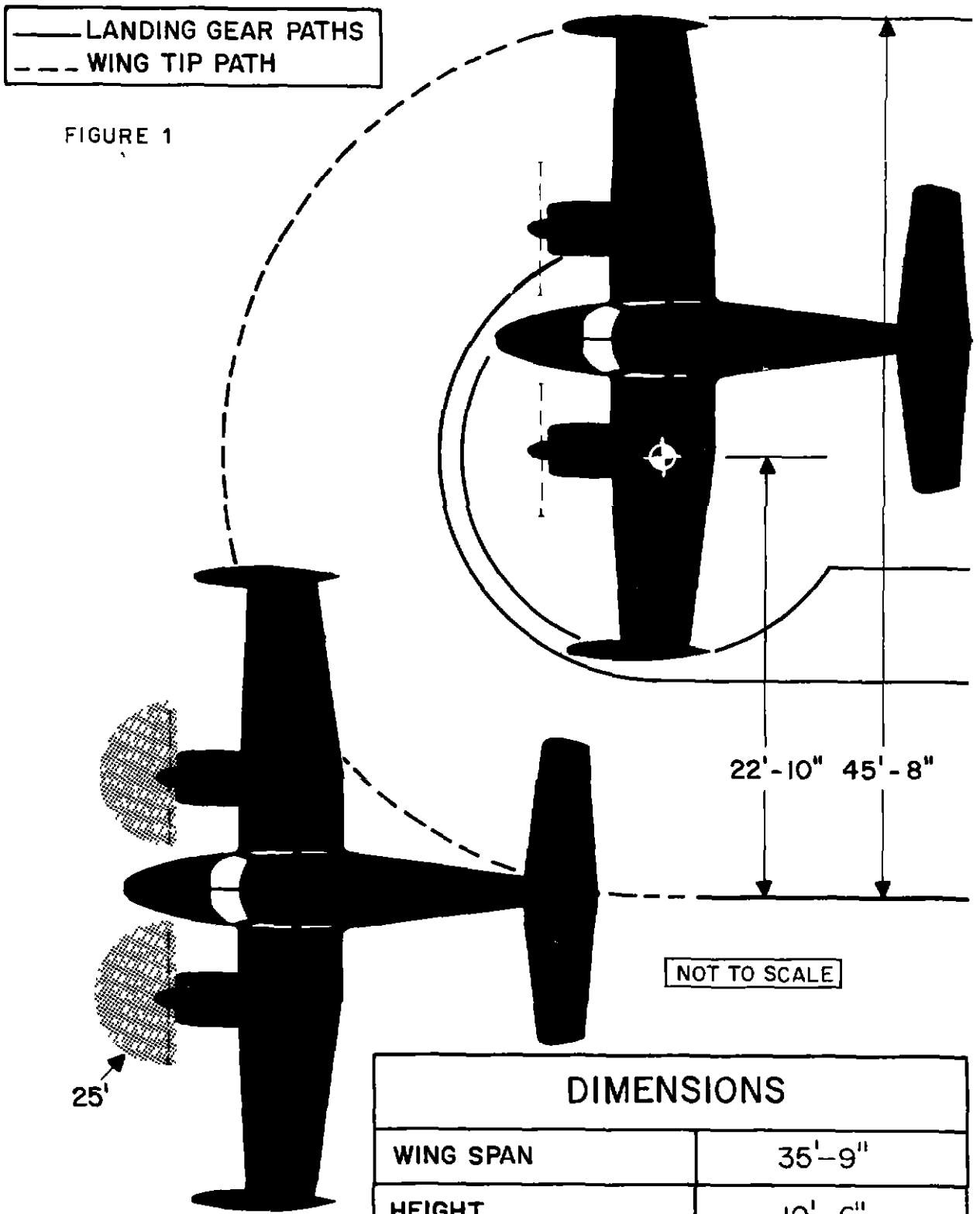


FIGURE 1

FIGURE 2

DIMENSIONS	
WING SPAN	35'-9"
HEIGHT	10'-6"
LENGTH	27'-0"
TREAD	12'-0"

GENERAL DESCRIPTION

The Cessna Model 310C airplane is a light, twin engine, low wing executive transport It is equipped with fully retractable tricycle landing gear with power steering on the nose gear The airplane provides fast and economical transportation of passengers and light cargo The minimum crew required consists of one pilot However, dual controls are provided and in normal operations of transporting up to three passengers, the crew consists of both pilot and co-pilot

The airplane is powered by two, six cylinder, Continental IO-470-D engines, driving two blade, constant speed, full feathering propellers Limitations of the power plant are as follows

Maximum power (260 bhp) is developed at 2, 625 rpm for all operations There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 4, 830 pounds
Maximum Take-off 4, 830 pounds
Maximum Landing 4, 600 pounds

Additional information

Basic Operating Weight 3, 450 pounds
Zero Fuel Weight 4, 230 pounds
Fuel (usable) 600 pounds
Footprint Pressure at Maximum Ramp Weight 40 psi main gear, 30 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are started by an internal 24 volt D C power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engines 0 2 to 0 5 minute
Prepare for taxi 2 0 to 4 0 minutes
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 10
Operationally desirable 8

GENERAL DESCRIPTION

The De Havilland L-20A "Beaver" is a land based, single engine, high wing airplane It is equipped with fixed landing gear and a steerable tail wheel The airplane is mainly used as a utility craft for transportation of light cargo, passengers, or casualty evacuation The minimum crew required is one pilot, however, dual controls are provided and in normal operations of transporting up to four passengers, the crew consists of both pilot and co-pilot

The airplane is powered by a Pratt & Whitney R-985 "Wasp Junior", nine cylinder, air-cooled, radial, supercharged engine, driving a two-blade, all metal, constant-speed propeller. Limitations of the power plant are as follows

Maximum power is developed at 37 inches manifold pressure at 2, 300 rpm The maximum allowable time at this power setting is 5 minutes.

Maximum except take-off (METO) power at sea level is developed at 34 5 inches manifold pressure at 2, 200 rpm There is no time limit at this power setting

METO power at 5, 000 feet altitude is developed at 33 inches manifold pressure at 2, 200 rpm There is no time limit at this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 5, 400 pounds
Maximum Take-off 5, 400 pounds
Maximum Landing 5, 400 pounds

Additional information

Basic Operating Weight 3, 570 pounds
Zero Fuel Weight 4, 572 pounds
Fuel (usable)· 828 pounds
Footprint Pressure at Maximum Ramp Weight· 25 psi on main gear, 35 psi on tail wheel

NARRATIVE SUMMARY

Sequence of Operations

The engine is normally started by an internal 24 volt D C. power source. Starting may also be accomplished by the use of an external 28 volt power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figure 1

Time

Start engine 1 0 to 3 5 minutes
Prepare to taxi. 5 0 minutes
The pre-take-off functional check is performed during taxiing

Speed (knots IAS during taxi)

Maximum 7
Operationally desirable 4

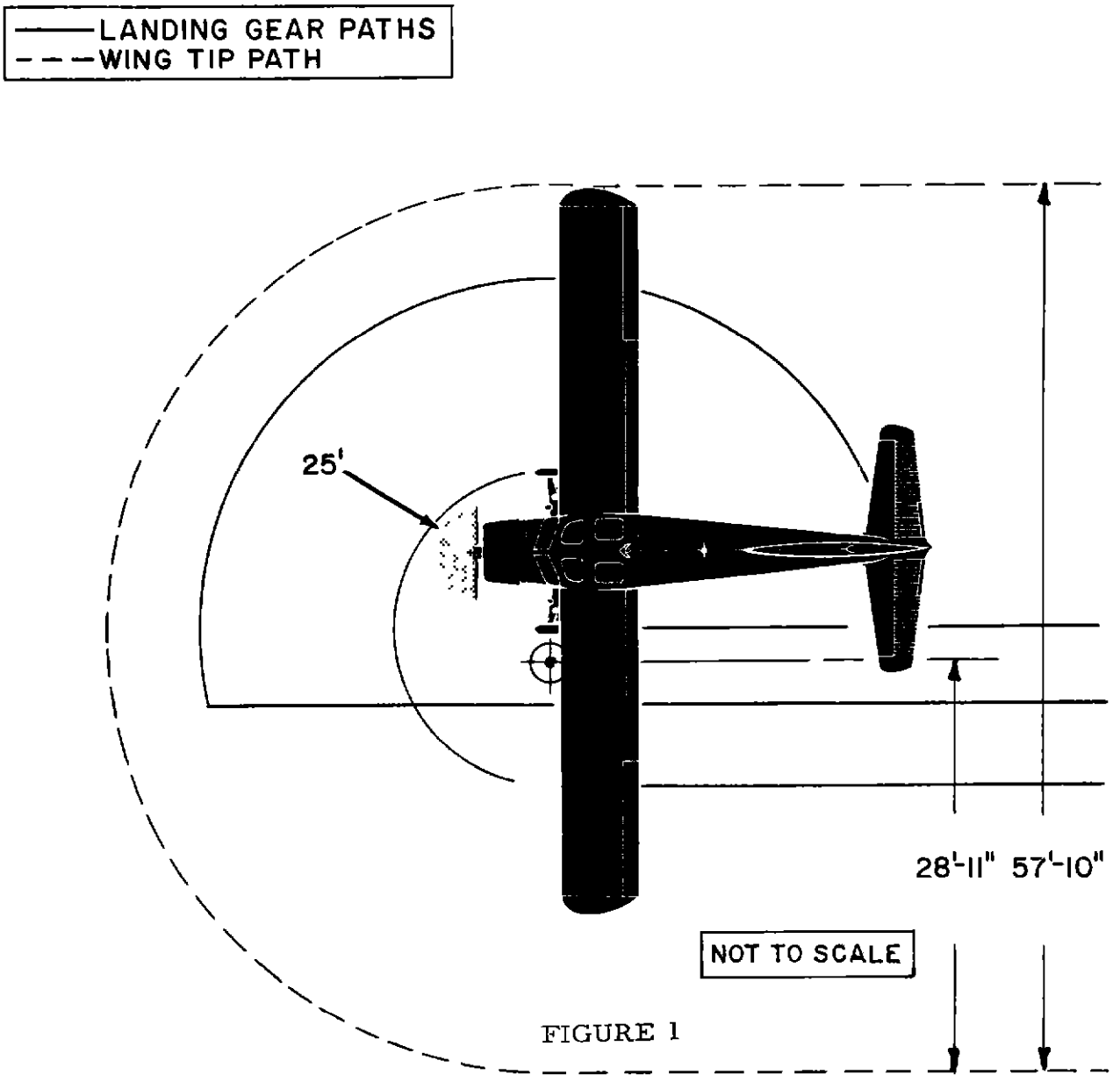


FIGURE 1

DIMENSIONS	
WING SPAN	48'0"
LENGTH	30'-5"
HEIGHT	10'-5"

GENERAL DESCRIPTION

The DeHavilland U-1A "Otter", airplane is a single engine, high wing, utility passenger and cargo transport, designed for operations from short, unimproved fields The airplane is equipped with a fixed landing gear utilizing a steerable tail wheel Alternate provisions are included for float or ski installation The minimum crew required consists of one pilot

The airplane is powered by a Pratt and Whitney R1340, radial engine, driving a three blade, constant speed propeller Limitations of the power plant are as follows

Maximum rated power (600 bhp) is developed at 36 inches manifold pressure at 2, 400 rpm The time limit for this power setting is five minutes

Maximum continuous power (450 bhp) is developed at 30 inches manifold pressure at 2, 150 rpm There is no time limit for this power setting

Normal cruise power (350 bhp) is developed at 28 inches manifold pressure at 1, 800 rpm

Pertinent gross weight limitations of the aircraft are as follows
Maximum Ramp 8, 000 pounds
Maximum Take-off 8, 000 pounds
Maximum Landing 8, 000 pounds

Additional information.
Basic Operating Weight 4, 200 pounds
Zero Fuel Weight 6, 716 pounds
Fuel (usable) 1, 284 pounds
Footprint Pressure at Maximum Ramp Weight 45 psi main gear, 75 psi tail gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is normally started by an external 24-28 volt D C power source Emergency starting may be accomplished by using the airplane's internal power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figure 1

Time

Start engine 1 0 to 3 0 minutes
Prepare for taxi 2 0 to 3 0 minutes
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 15
Operationally desirable. 10

DeHavilland U-1A

NOT TO SCALE

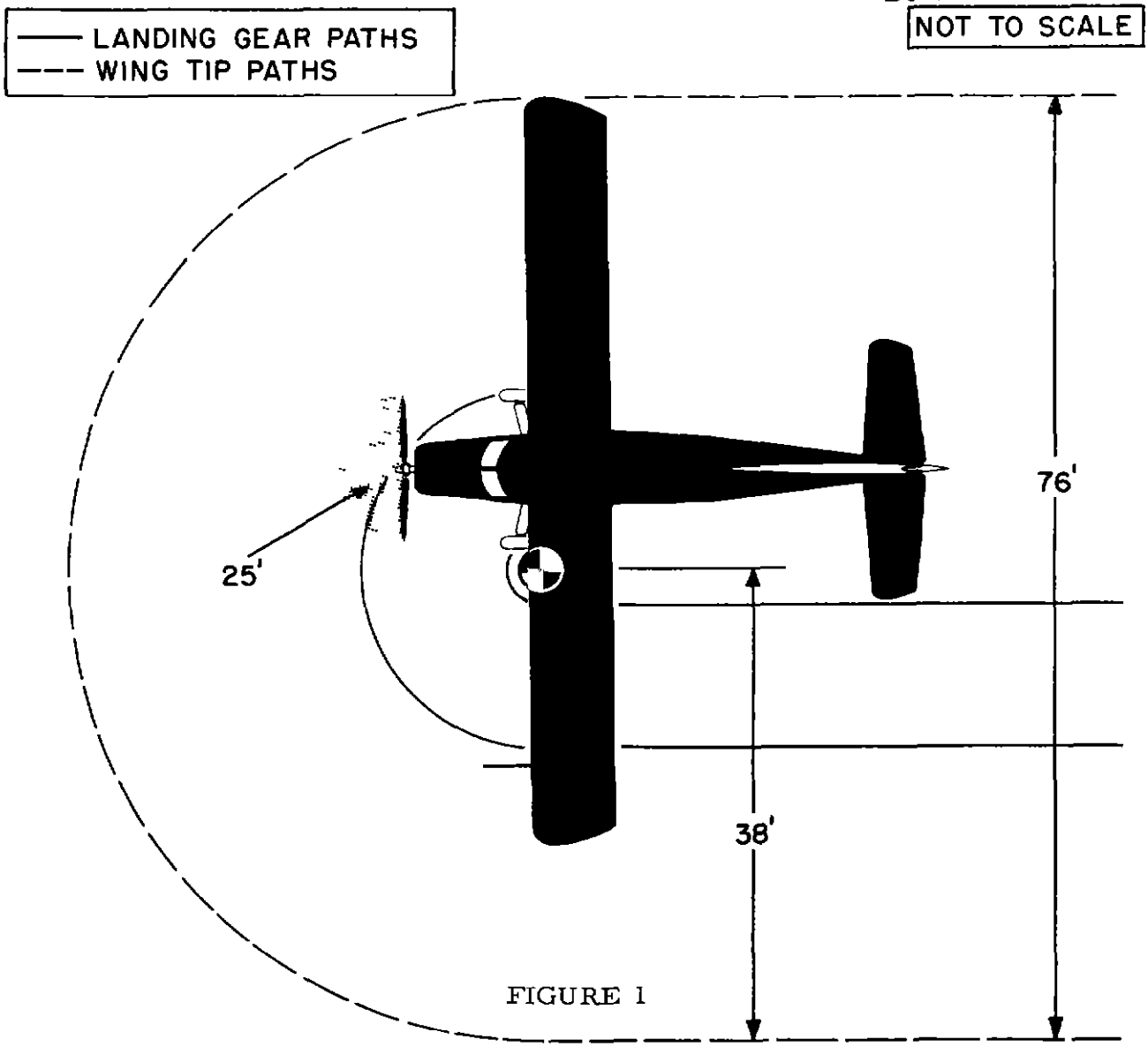


FIGURE 1

DIMENSIONS	
WING SPAN	58'-0"
LENGTH	41'-10"
HEIGHT	12'-5"

GENERAL DESCRIPTION

The Mooney Mark 20A airplane is a light single engine, low wing, four-place aircraft, characterized by a pronounced forward sweep of the vertical stabilizer It is equipped with a fully retractable tricycle landing gear and a steerable nose wheel The minimum crew required is one pilot, but dual controls are provided

The airplane is powered by a Lycoming, model 0-360, four cylinder engine, driving a McCauley two blade, constant speed, controllable pitch propeller Limitations of the power plant are as follows

Maximum power is 180 hp developed at 27 inches manifold pressure at 2,700 rpm There is no time limitation for this power setting.

Maximum continuous power is 135 hp developed at 2,500 rpm. There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 2,450 pounds
Maximum Rake-off 2,450 pounds
Maximum Landing 2,450 pounds

Additional information

Basic Operating Weight 1,440 pounds
Zero Fuel Weight 2,156 pounds
Fuel (usable) 294 pounds
Footprint Pressure at Maximum Ramp Weight Not available from manufacturer

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 12 volt battery Emergency starting may be accomplished manually (hand-prop)

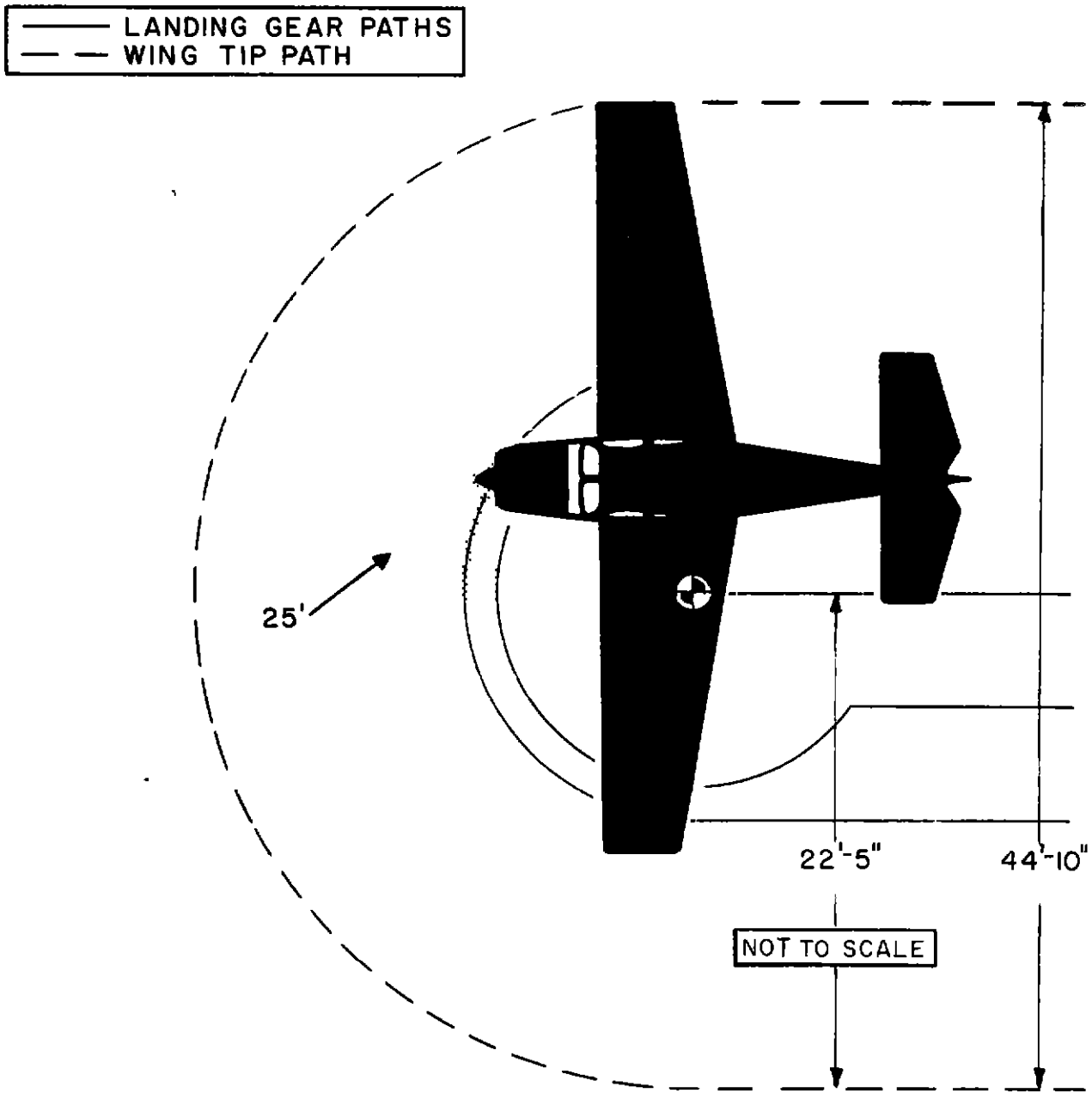
The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engine 1 0 to 2. 0 minutes
Prepare for taxi 0. 3 to 0 5 minute
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 15



FIGURES 1 AND 2

DIMENSIONS	
WING SPAN	35'—0"
LENGTH	23'—2"
HEIGHT	8'—4 5"

GENERAL DESCRIPTION

The Piper "Tri-Pacer" PA-22 airplane is a single engine high wing monoplane It is equipped with a fixed tricycle landing gear with a steerable nose wheel Hydraulic brakes are hand operated A minimum crew of one pilot is required The airplane may be converted by the addition of floats for use on water and by the addition of skis for use on snow An additional internal auxiliary reserve fuel tank may be installed

The airplane is powered by a four cylinder Lycoming Engine, Model 0-320B, driving a constant speed propeller Limitations of the power plant are as follows

Maximum power (160 bhp) is developed at 2, 700 rpm and 28. 5 inches manifold pressure

Maximum continuous power (120 bhp) is developed at 2, 700 rpm and 26 5 inches manifold pressure There is no time limitation for either of the above power settings

Pertinent gross weight limitations of the airplane are as follows
Maximum Ramp 2, 000 pounds
Maximum Take-off 2, 000 pounds
Maximum Landing 2, 000 pounds

Additional information.
Basic Operating Weight. 1, 110 pounds
Zero Fuel Weight 1, 736 pounds
Fuel (usable) 264 pounds
Footprint Pressure at Maximum Ramp Weight 22 psi main gear, 15 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is started by an internal 12 volt D. C. power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2.

Time

Start engine 0.5 to 2.0 minutes
Prepare for taxi 1.0 to 3.0 minutes
Pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 25
Operationally desirable 15

NOT TO SCALE

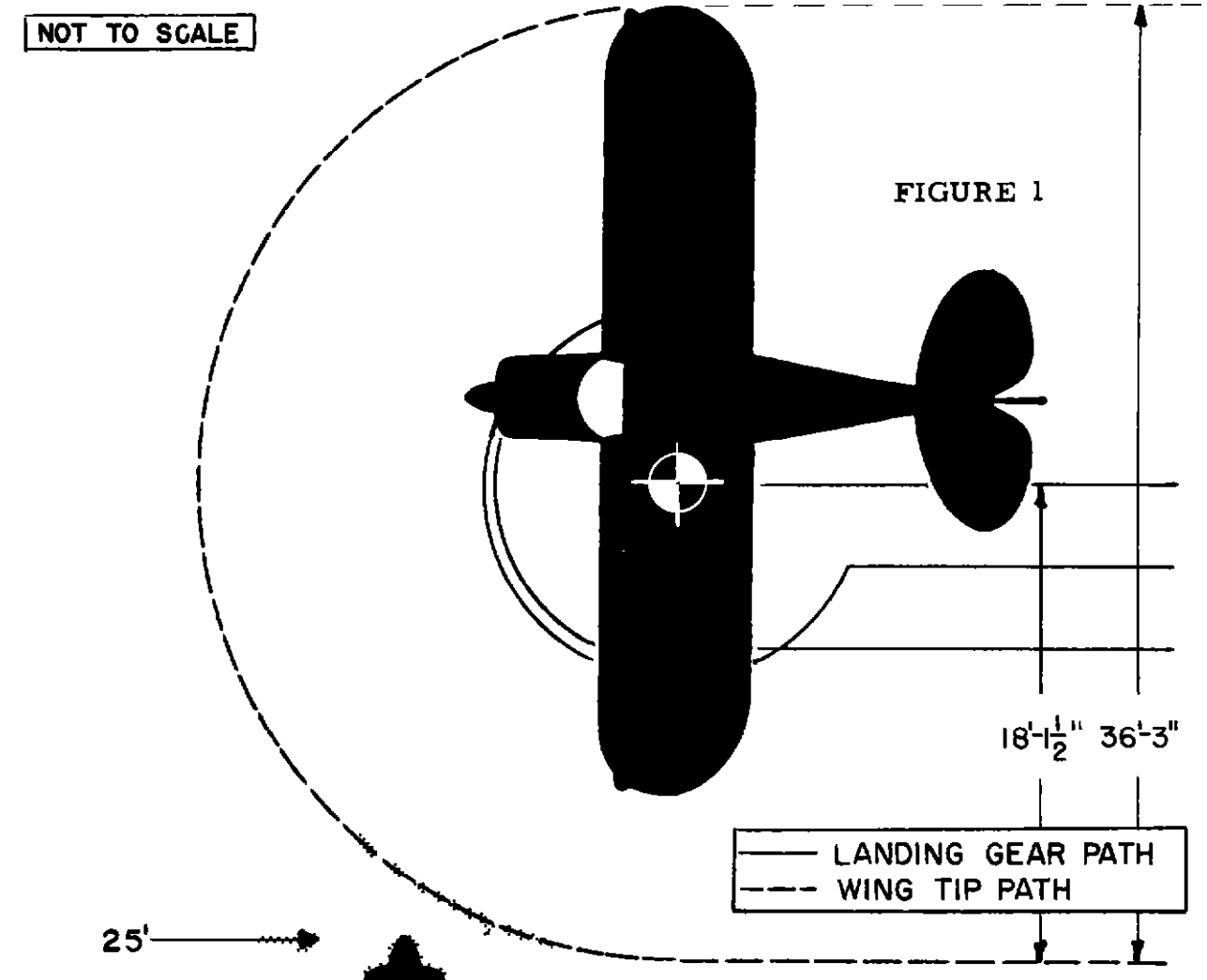


FIGURE 1

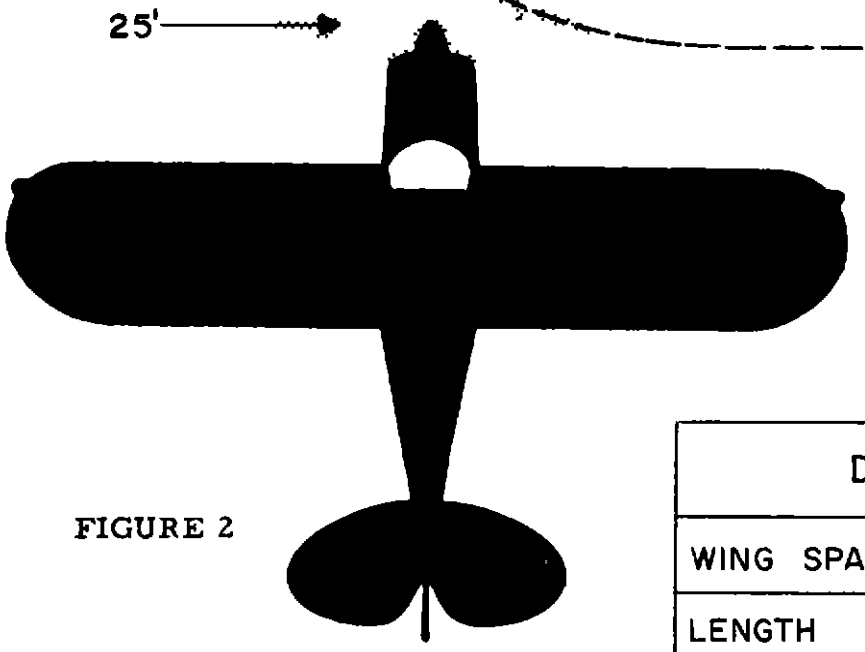


FIGURE 2

DIMENSIONS	
WING SPAN	29'-4"
LENGTH	20'-7"
HEIGHT	8'-4"

GENERAL DESCRIPTION

The Piper "Apache" (PA-23) is a light twin engine, executive type, low wing utility airplane It is equipped with fully retractable tricycle type landing gear and hydraulic wheel brakes actuated by two brake pedals on the left set of rudder pedals Steering control of the nose wheel is accomplished mechanically by movement of the rudder pedals The minimum crew requirement is one pilot In normal operation, the airplane transports up to three passengers

The airplane is powered by two Lycoming 0-320-B engines, each driving a Hartzell two blade, constant speed controllable full feathering propeller Limitations of the power plant are as follows

Maximum power (160 bhp) is developed at 2, 700 rpm and 28. 5 inches manifold pressure

Maximum continuous power (120 bhp) is developed at 2, 700 rpm and 26 5 inches manifold pressure

There is no time limitation for either of the above power settings.

Pertinent gross weight limitations of the airplane are as follows
Maximum Ramp 3, 800 pounds
Maximum Take-off 3, 800 pounds
Maximum Landing 3, 800 pounds

Additional information
Basic Operating Weight 2, 230 pounds
Zero Fuel Weight 3, 176 pounds
Fuel (usable) 624 pounds
Footprint Pressure at Maximum Ramp Weight 35 psi main gear, 27 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engines are normally started by an internal 12 volt D. C. power source.

The minimum turning radius, dimensions, and the danger areas are illustrated in Figure 1

Time

Start engines 1 0 to 2 0 minutes
Prepare for taxi 2 0 to 4 0 minutes (including the pre-take-off functional check)

Speed (knots IAS during taxi)

Maximum 14
Operationally desirable 8

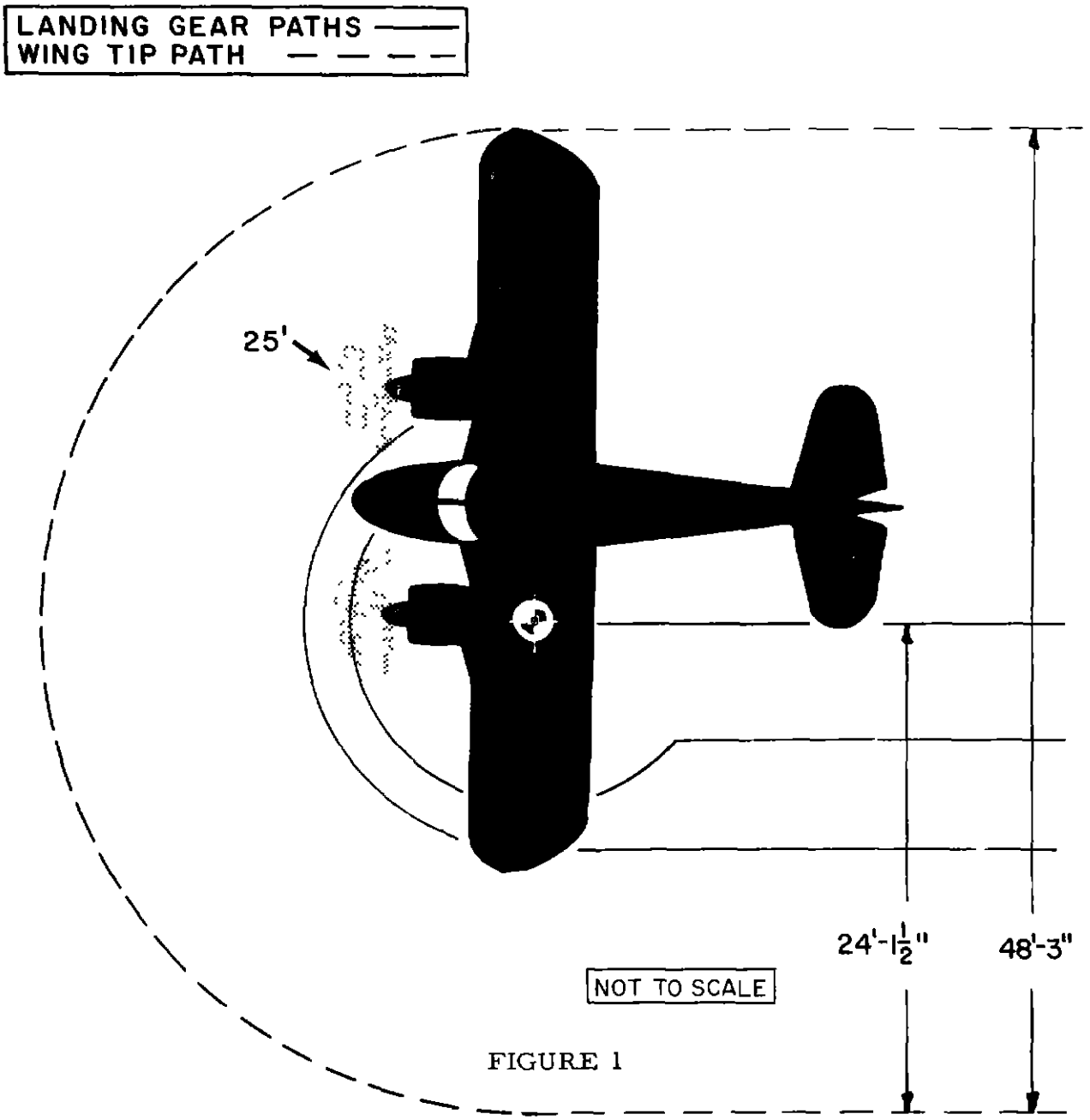


FIGURE 1

DIMENSIONS	
WING SPAN	37'-0"
LENGTH	27'-1"
HEIGHT	9' - 6"

GENERAL DESCRIPTION

The Piper PA-24-180 "Comanche" is a light, single engine, low wing aircraft It is equipped with fully retractable tricycle landing gear Ground steering is accomplished through use of the rudder pedals which are connected through a steering linkage to the nose wheel. The minimum crew consists of one pilot

The airplane is powered by a Lycoming 01360-A1A, six cylinder engine, driving a two blade, constant speed propeller Limitations of the power plant are as follows

Maximum power is 180 hp at 29.0 inches manifold pressure and 2, 700 rpm. There is no time limitation for this power setting

Pertinent gross weight limitations of the airplane are as follows

Maximum Ramp 2, 550 pounds
Maximum Take-off 2, 550 pounds
Maximum Landing 2, 550 pounds

Additional information

Basic Operating Weight 1, 785 pounds
Zero Fuel Weight 2, 250 pounds
Fuel (usable). 300 pounds
Footprint Pressure at Maximum Ramp Weight 27 psi main gear, 27 psi nose gear

NARRATIVE SUMMARY

Sequence of Operations

The engine is started by an internal 12 volt D C. power source

The minimum turning radius, dimensions, and the danger areas are illustrated in Figures 1 and 2

Time

Start engine 1 to 2 minutes
Prepare for taxi 1 to 3 minutes
The pre-take-off functional check is performed during taxi

Speed (knots IAS during taxi)

Maximum 20
Operationally desirable 10

Piper PA-24-180 Comanche

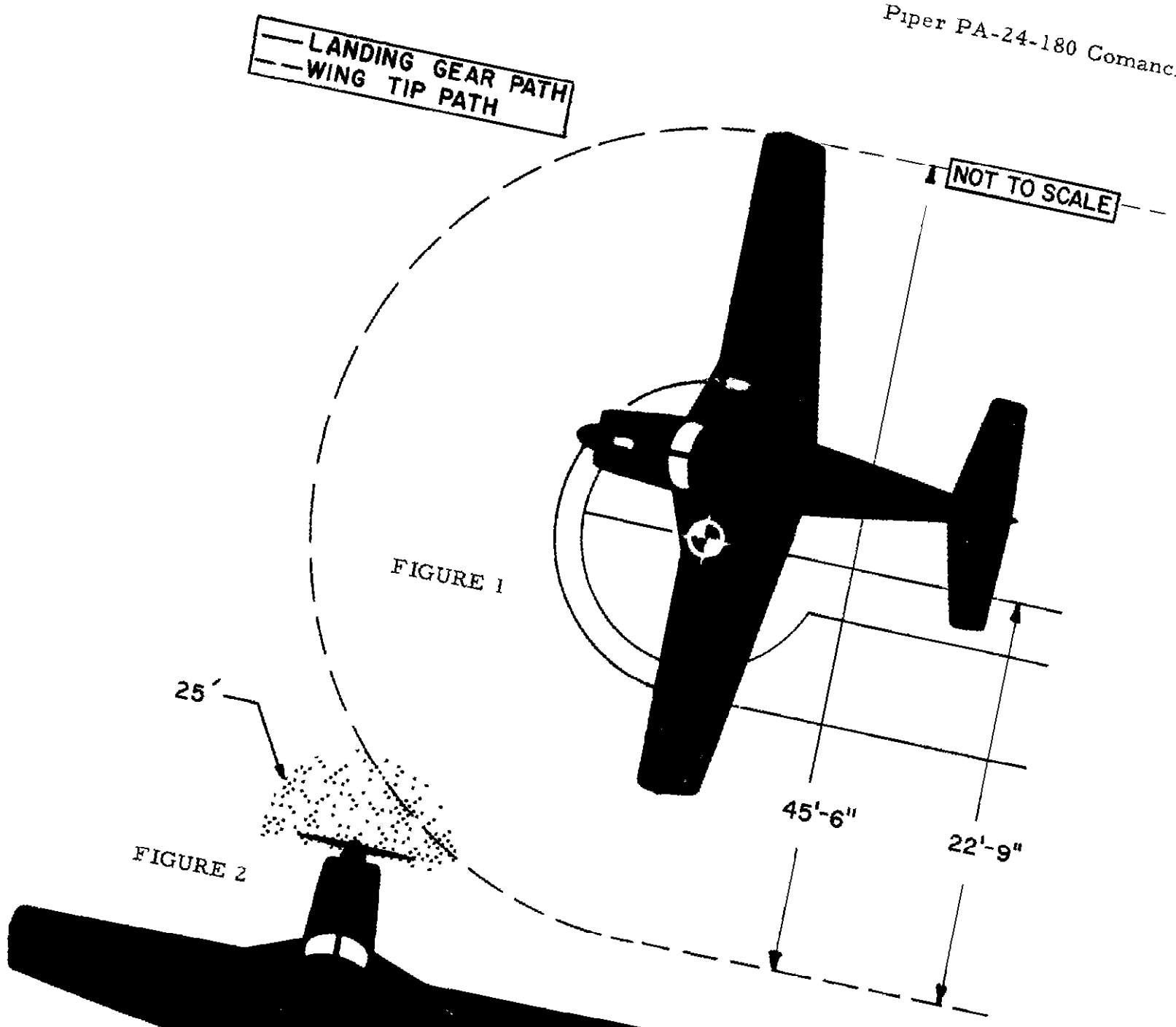


FIGURE 1

FIGURE 2

DIMENSIONS	
WING SPAN	36'
LENGTH	24'-8"
HEIGHT	7'-4"

AIR VEHICLE PERFORMANCE CHARACTERISTICS

APPENDIX

(Containing Definitions and Reference Data)

UNITED STATES FEDERAL AVIATION AGENCY
Bureau of Research & Development Washington 25. D. C.

DEFINITIONS

PHASES OF OPERATION

1. GROUND OPERATIONS· All ground activity from intent to start engines to and including pre-take-off preparations.

2. TAKE-OFF The complete action of getting an air vehicle into the air from the point of brake release through lift-off point.

3. PRE-CLIMB: The flight path from the point of lift-off to the point where climb schedule is established.

4. CLIMB The flight path from the point where climb schedule is established to enroute or operational altitude.

5. ENROUTE Flight path from top of climb to beginning of descent.

6. DESCENT The flight path from beginning of descent to level-off for approach

7. APPROACH PATTERN The flight path from the end of descent to glide path interception.

8. GLIDE PATH The flight path from the glide path interception to landing flareout.

9. LANDING. Landing flareout to turn-off.

DISTANCES

ABORT DISTANCE The remaining runway distance required to stop aircraft after attaining V1 speed.

REFUSAL DISTANCE· The distance at which the aircraft will reach refusal speed assuming normal acceleration

SPEEDS

FLARE SPEED (also see flareout) The transitional airspeed that is established at the completion of the glide path phase to bring the aircraft down in a smooth curve, preparatory for touchdown

MAXIMUM (FLAP RETRACTION) SPEED The highest allowable airspeed at which the aircraft can be flown, with flaps extended

MINIMUM (FLAP RETRACTION) SPEED The lowest airspeed at which the flaps may be retracted without an undesirable loss of altitude.

MACH NUMBER The ratio of the speed of air, or of a moving body through the air, to the speed of sound in the air

REFUSAL SPEED The highest speed to which an aircraft can be accelerated, assuming normal acceleration, and still be stopped on the remaining runway

WEIGHTS

BASIC OPERATING WEIGHT The maximum gross weight of the aircraft less cargo, crew, passengers, fuel and oil.

NORMAL GROSS WEIGHT Typical operating weight selected as most probable at any given phase of flight

MAXIMUM GROSS WEIGHT Maximum operating weight, essentially the same as maximum take-off weight

MAXIMUM RAMP WEIGHT Maximum weight of the loaded aircraft which can be expected at the ramp, generally this will be the maximum take-off weight plus weight of fuel needed for starting, taxiing, and engine warm-up

MAXIMUM TAKE-OFF WEIGHT Maximum allowable weight at take-off limited by performance and/or regulations

MAXIMUM LANDING WEIGHT Maximum allowable weight at landing limited by structural capability and/or regulations.

ZERO FUEL WEIGHT Maximum ramp weight minus usable fuel

MISCELLANEOUS

MAXIMUM AND MINIMUM ACCEPTABLE (as used with respect to enroute airspeeds and altitudes) These minimum and maximum values are the acceptable tolerance on the operationally desirable values given They are not necessarily limits imposed by performance capabilities or by regulations

OPERATIONALLY DESIRABLE Value or condition given by operators or manufacturers as the most preferable, (speeds, altitudes, etc)

DRY POWER Power with engine water/methanol system inoperative.

WET POWER Power with engine water/methanol system operative.

FLAREOUT (also see flare speed) The act of bringing an airplane down in a smooth curve, preparatory to touching down

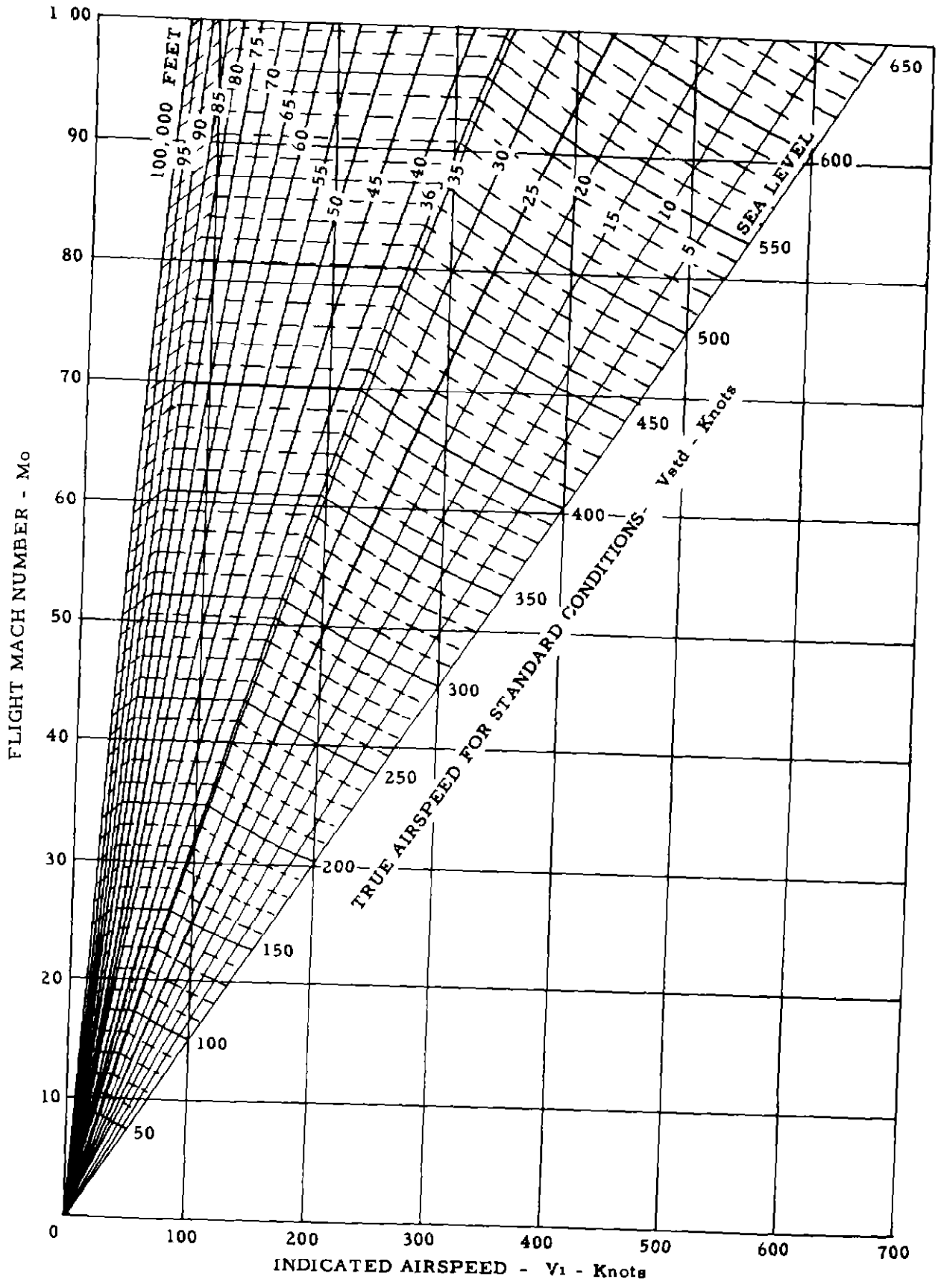
SPEED BRAKES Any aerodynamic device designed for slowing down an airplane in flight

HOVER (relating to helicopters or VTOL) To remain in a stationary position at a given altitude above the surface

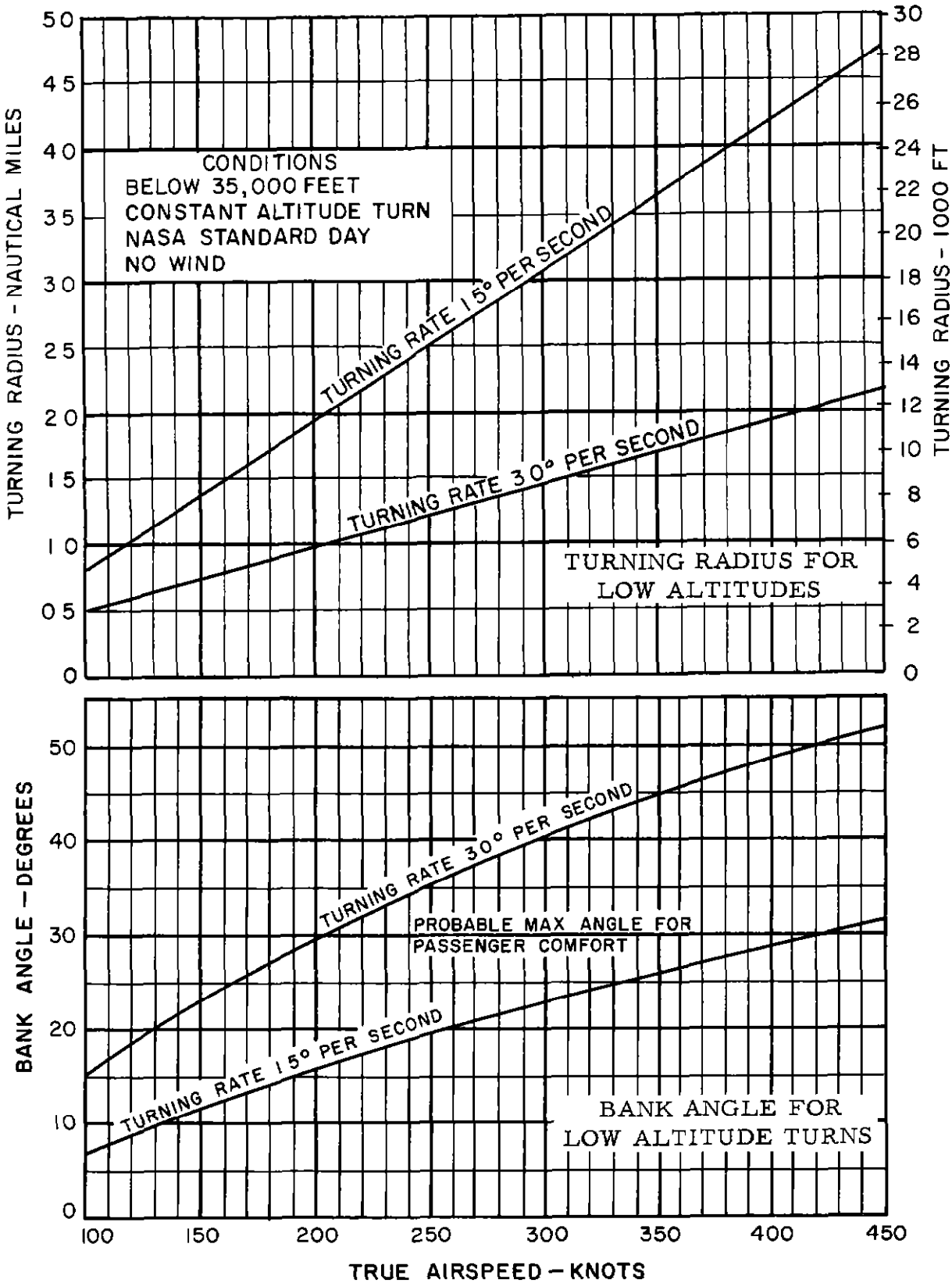
TRANSLATIONAL LIFT The lift force exerted on the rotor blades of a helicopter when increased speed is imparted to the blades or when their angle of attack is changed in going from one type of flight to another, such as from hovering to horizontal flight

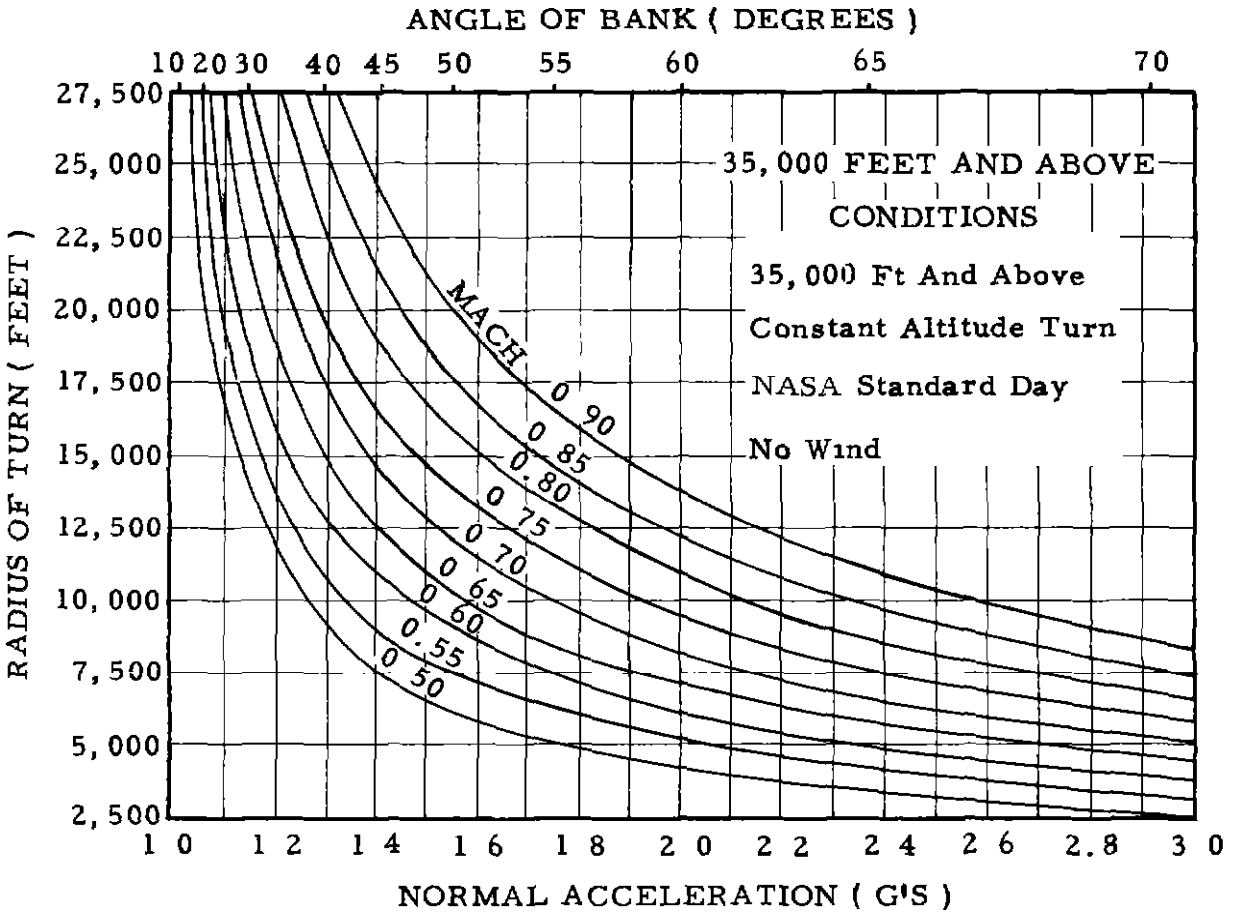
SYMBOLS AND ABBREVIATIONS

ADI	Anti-Detonation Injection
AEW	Airborne Early Warning
ASW	Anti-submarine Warfare
ATO	Assisted Take-Off
bhp	Brake Horsepower
BLC	Boundary Layer Control
BMEP	Brake Mean Effective Pressure
ECM	Electronic Countermeasures
EGT	Exhaust Gas Temperature
eshp	Equivalent Shaft Horsepower
fpm	Feet Per Minute
IAS	Indicated Airspeed
JPT	Jet Pipe Temperature
MEA	Minimum Enroute Altitude
METO	Maximum Except Take-Off
N. A S. A	National Aeronautics and Space Administration
psi	Pounds Per Square Inch
RCD/MAD	Radar Countermeasures - Magnetic Airborne Detection
shp	Shaft Horsepower
rpm	Revolutions Per Minute
TAS	True Airspeed
T/O	Take-Off
V1	Critical Engine Failure Speed
V2 (Vlof)	Take-Off Safety Speed - Actual Lift-Off Speed



INDICATED AIRSPEED CONVERSION GRAPH


TURNING RADIUS - NAUTICAL MILES
TURNING RADIUS - 1000 FT
CONDITIONS
BELOW 35,000 FEET
CONSTANT ALTITUDE TURN
NASA STANDARD DAY
NO WIND
TURNING RATE 15° PER SECOND
TURNING RATE 30° PER SECOND
TURNING RADIUS FOR
LOW ALTITUDES
BANK ANGLE - DEGREES
TURNING RATE 30° PER SECOND
PROBABLE MAX ANGLE FOR
PASSENGER COMFORT
TURNING RATE 15° PER SECOND
BANK ANGLE FOR
LOW ALTITUDE TURNS
TRUE AIRSPEED - KNOTS



TURNING RADIUS GRAPH
HIGH ALTITUDES