

FLIGHT REPLICAS

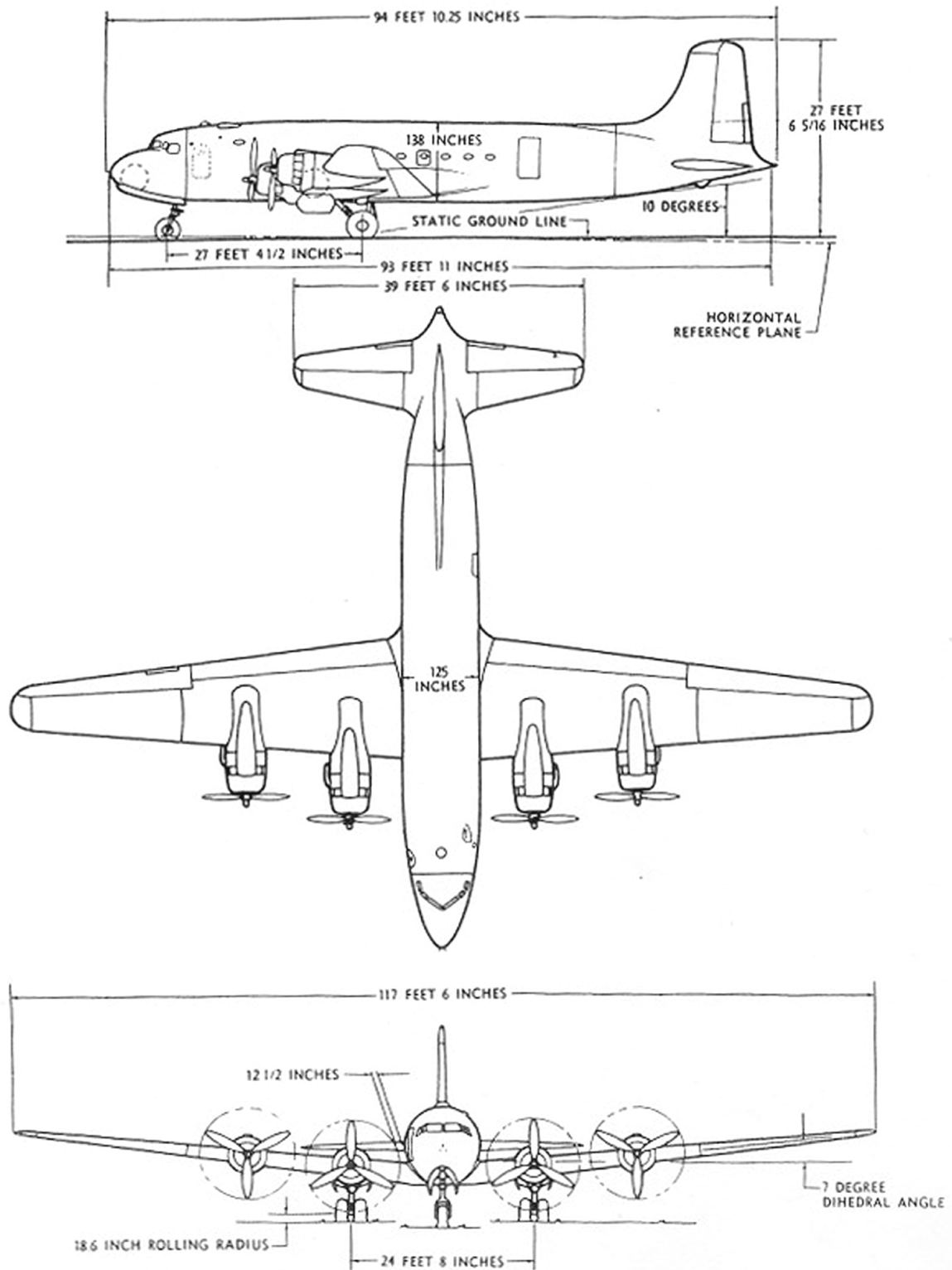
# DC-4/C-54/Carvair

For Lockheed Martin Prepar3D v4



This is a complex simulation. To get full enjoyment of the aircraft in this package, please read this Manual thoroughly and carefully.

**Warning: The manual and models in this package must not be used for real flight training purposes.**



## History

In 1938, the Douglas Aircraft Co. decided to produce a four-engine transport about twice the size of the DC-3. It developed a single DC-4E model, to carry some 42 passengers. In development it proved too expensive to maintain, so airlines agreed to suspend development in favor of a new model, the less complex DC-4. Due to WWII, the aircraft was not put into commercial service until 1946, but in the interim its military derivative, the C-54 "Skymaster" transport, was ordered by the U.S. Army Air Forces starting in 1942. The first, a C-54, flew from Clover Field in Santa Monica, California on 14 February 1942.

Over the production history of the aircraft, Douglas ended up building 1,241 DC-4s and its military counterparts, including the R5D for the Navy. A total of 1,163 C-54/R5Ds were built for the United States military between 1942 and January 1946. During the war, C-54s flew a million miles a month over the rugged North Atlantic — more than 20 roundtrips a day. So successful and reliable was the design that it became the first presidential aircraft, ordered for Franklin D. Roosevelt.

After World War II a further 79 DC-4s were built. Commercial airlines placed more than 300 civilian DC-4 transports into service, and these DC-4s, along with C-54s converted for civil use, carried more passengers than any other four-engine transport during their careers.

A variant with four Merlin engines was built in Canada postwar as the Canadair North Star.

A total of 330 DC-4s and C-54s were used in the Berlin Airlift in 1948-1949, which made them the most used types in that crisis, and C-54s continued to fulfill their role during the Korean war. The aircraft have also found other uses over the years, such as in aerial firefighting, and few DC-4's were still proving their worth well into the 21st century, such as those with Buffalo Airways and Brooks Air Fuel.

A further development of the type was done by Aviation Traders in 1961, when 21 airframes were converted to specialised cargo and automobile air ferries. The conversion of the original aircraft entailed replacing the forward fuselage with one 8 feet 8 inches (2.64 m) longer, with a raised flight deck similar to that of the later Boeing 747, to allow a sideways hinged full-fuselage nose door. It also entailed more powerful wheel brakes and an enlarged fin and rudder, often thought to be a Douglas DC-7 unit, but in fact a new design. These were in service until the 1970's, with two aircraft still in existence in 2017.

## General Notes:

1. Fuel and Max Operating Weight: **Be careful to make sure your aircraft is within weight limits for take-off and landing.** Plan fuel and loads according to your planned route.
2. **The aircraft will load with full fuel tanks:** check the aircraft **Fuel and Payload** dropdown window in FSX/P3D to see what you have on board, and remove fuel or payload as needed to keep within maximum take off weight.
3. DC-4s/C-54s/Carvairs came in a great variety of layouts and equipment over the years. For simplicity's sake, some standardization of the cockpit layouts has been used - although there are still substantial variations in this package. As even the real aircraft Manuals state, depicted cockpit illustrations are only "typical", and that's true with this Manual as well. Get to know your cockpit before you fly.
4. Some areas of the model have been somewhat simplified from reality (without taking away from overall feel), to accommodate the polygon limitations and other limits of the modeling software. Related to this, some cockpit animations have had to be limited, as there appears to be a limit within FSX on how many animations a model can have.
5. The polygon limit has necessitated that, in the VC model only, there are no engines on the left-hand wing (which would not be seen from the standard pilot position in FSX in any case). There are engines on the right-hand wing due to visibility from the open crew door. The Carvair VC is slightly different. (This info is important to some users.)
6. There appears to be a bug in P3Dv4 that allows landing lights and other lights situated rear of the VC to illuminate the VC, when flying at night.
7. Installation: In the Prepar3D v4\Gauges folder you will find a folder entitled "DC-4 backup". Copy and paste **all** gauges with the name "Cessna.", "Cessna182s.", "Beech\_Baron", "Bendix\_King\_Radio" and "KingAir\_Radio" into this folder, as they will need to be replaced if the DC-4 is uninstalled.
8. **Paint Kit:** This is available from the Downloads page here: <http://www.flight-replicas.com/Downloads.htm> Instructions included.
9. **Support:** Please see the last page of this Manual.

## The Cockpit (Typical / C-54B)



## Cockpit Panels

**NOTE:** The panels illustrated in the following pages are those of the C-54B. It is from this layout that all other C-54/DC-4/Carvair panels were derived. As such, by getting to know this cockpit layout first, it will be possible to appreciate the later cockpit changes as the design improved or was adapted to different needs. Instruments have been kept similar for ease of recognition, although some newer gauges (eg. GPS, transponder) will turn up on newer aircraft. The C-54B panels will also make it easier to appreciate the limitations of the earlier C-54A panels and what pilots and crew had to work with.

Radio panels are different between certain aircraft, and as such are illustrated individually.

*Later ADF gauge*





## Main and Emergency Panels



- |  |  |
|--|--|
| 1. Altimeter   | 15. RPM (dual) (engine number on needle)           |
| 2. Airspeed  | 16. Fuel Pressure (dual) (engine number on needle) |
| 3. Turn and Slip   | 17. Oil Pressure (dual) (engine number on needle)  |
| 4. Vertical Speed Indicator (VSI)                        | 18. Undercarriage Position Lights                  |
| 5. Artificial Horizon                                    | 19. Flap Position Indicator                        |
| 6. ILS and VOR fine-tuning indicator                     | 20. Oil Quantity (dual) (engine number on needle)  |
| 7. Sperry Autopilot (see “Sperry A-3 Autopilot” page)    | 21. Gyro Compass and adjustment knob               |
| 8. VOR1 and VOR2 Direction Indicator                     | 22. Fuel quantities (see “Fuel” page)              |
| 9. Cockpit Heater Temp (unit be turned on in passageway) | 23. Suction  |
| 10. Inner Marker Indicator                               | 24. De-ice Pressure                                |
| 11. Hydraulic Pressure                                   | 25. Rudder Trim Position                           |
| 12. Clock  | 26. Emergency Brakes                               |
| 13. Artificial Horizon Caging Knob                       |  |
| 14. Manifold Pressure (dual) (engine number on needle)   |  |

## Overhead Panel



- |   |   |
|---|---|
| 1. Master Switch                              | 12. Master Magneto Switch   |
| 2. Main Instrument On/off Switch              | 13. Magneto Switches  |
| 3. Alarm Bell                                 | 14. Outside Air Temperature (OAT)                                     |
| 4. Panel Lights                               | 15. Electrical  |
| 5. De-icing                                   | 16. Pitot Switches and Ammeter (will read when pitot switches are on) |
| 6. Fuel Pumps                                 | 17. Oil Temperatures  |
| 7. Landing Lights                             | 18. Carburetor Temperatures   |
| 8. Wing and Tail Lights                       | 19. Cylinder Temperatures   |
| 9. Engine Start Switches (see "Engine Start") | 20. "Door Open" Light   |
| 10. Feathering Switches                       | 21. "Cabin Call" Light  |
| 11. Generator Switches                        |   |



## Engine Start



There are four (one for each engine) sets of these three switches for starting the engines (see item 9 in “Overhead panel” for location). They are used in sequence as illustrated.

1. **Primer Switch.** Use 3 or 4 times to prime the engine.
2. **Starter Switch.** Once primed, use to start the propeller turning, to clear excess oil from the lower engine cylinders and lubricate the others. Use for as long as you think necessary for outside conditions. **Leave on**, and then:
3. **Mesh and Boost Switch.** Once the engine has turned over sufficiently, use this switch to actually start the engine, which should fire up immediately. Following engine startup, **switch off the Starter switch.**

## Pedestal Aux and Windshield Wipers



- |  |                           |
|--|---------------------------|
| 1. Call Button – Cabin (light comes on overhead)                       | 3. Pilot's Throttles      |
| 2. Windshield Wiper Controls (use mouse wheel to select fast/off/slow) | 4. RPM Levers             |
|  | 5. Copilot's Throttles    |
|  | 6. Fuel Control Levers    |
|  | 7. Carburetor Heat Levers |

## Pedestal



- |   |                                    |
|---|------------------------------------|
| 1. Elevator Trim Wheel  | 4. Undercarriage Lever             |
| 2. Autopilot On/Off Plunger (see also<br>"Sperry Autopilot" page) | 5. Flap Position Lever             |
| 3. Mixture Levers (red knobs)                                     | 6. Supercharger Levers (red knobs) |
|   | 7. Cowl Flap Levers (blue knobs)   |

## Navigator's Panel



1. Outside Air Temperature
2. Airspeed
3. Altimeter

4. Clock
5. Gyro Magnetic Compass
6. ADF1 Direction Indicator



## Visibility Click Spots



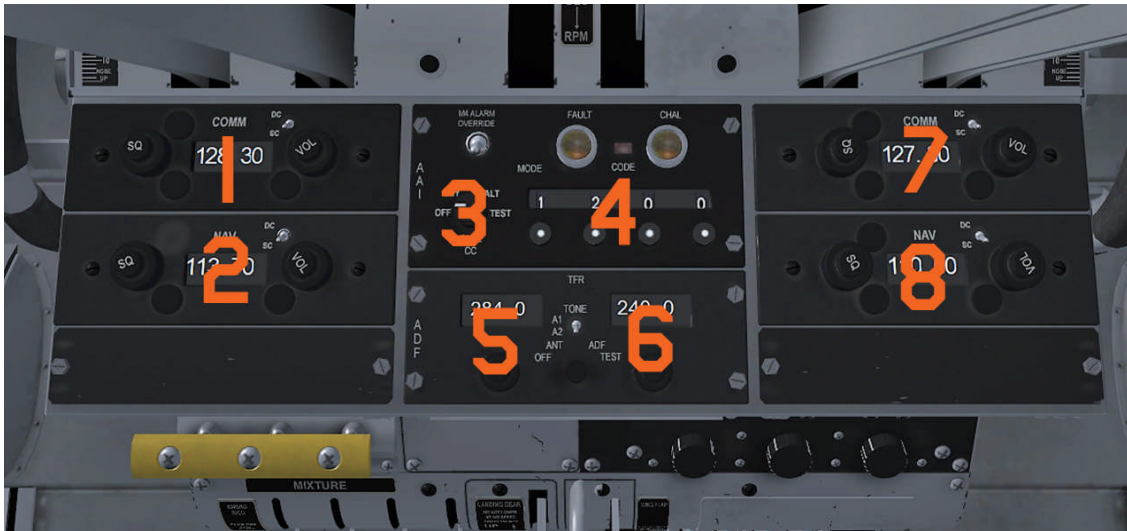
- |                                       |   |
|---------------------------------------|---|
| 1. (air vents) Control Yokes          | 4. (panel lamps – may be top or bottom) Throttle and Mixture Levers |
| 2. (padding) Pilots, in External View | 5. (wiper motor) Passenger Stairs                                   |
| 3. (wiper motor) Crew Stairs          |   |

**NOTE:** Click spot 3: With the Carvair model, this click spot opens the nose cargo door, as there are no crew stairs.

**NOTE:** Throttle stiffness levers have their own click spots that will indicate throttle position (percentage), in order to be able to know where the overall throttle positions are if throttle visibility is switched to off. Linked to throttle #2.

## Radios

1. **Early versions** (eg. C-54A, C-54B, and those using similar cockpits): Radios are operated via the 2D pop-up screen only (Shift-1).
2. **Later Radios** (eg. BAF, Ansett and similar)



- |  |         |
|--|---------|
| 1. COM1  | 5. ADF1 |
| 2. NAV1  | 6. ADF2 |
| 3. Transponder On/Off, test and set knob (use mouse wheel) | 7. COM2 |
| 4. Transponder Numerals                                    | 8. NAV2 |

**NOTE: Radio Click Spots:** If the click spots are too small for easy use in the VC, substitute default 2D pop-up panels are provided via Shift-1.



3. **Modern Radios:** These are default FSX radio and GPSs, with the exception of the transponder.

(Firefighter)



- |                       |                         |
|-----------------------|-------------------------|
| 1. GPS                | 5. Transponder          |
| 2. Radio Audio Panels | 6. ADF1                 |
| 3. COM1 and NAV1      | 7. Autopilot            |
| 4. COM2 and NAV2      | 8. Radios Master Switch |

(Carvair N898AT)



1. GPS
2. Audio Panels
3. COM1 and NAV1
4. COM2 and NAV2

5. Transponder
6. ADF1
7. Autopilot

## Sperry A-3 Autopilot



**To turn on the Autopilot:** The yellow lever on the pedestal must be pushed down all the way.

- |                                    |   |
|------------------------------------|---|
| 1. Directional Control Cage/Uncage | 7. “Bird” Control to Align with Horizon Bar |
| 2. Artificial Horizon Cage/Uncage  | 8. Direction Sector Knob                    |
| 3. Hydraulic Pressure              | 9. Activate Auto-Direction                  |
| 4. Direction Selection Indicator   | 10. Activate Level Flight                   |
| 5. Gyro Compass Indicator          | 11. Sensitivity Dials (not implemented)     |
| 6. Artificial Horizon              |   |

### To use the Autopilot:

1. Set aircraft on course and altitude desired.
2. Adjust trim to hands-off.
3. Set Direction Selection Indicator (4) to indicated gyro heading (the course you’re on) (5) using the Direction Sector Knob (8).
4. Press yellow plunger on pedestal all the way down, to turn on autopilot.
5. Click “Activate Auto-Direction” knob (9).
6. Click “Activate Level Flight” knob (10).
7. Adjust artificial horizon ‘bird’ to match horizon bar (7) (use mouse wheel).



## Fuel Tanks

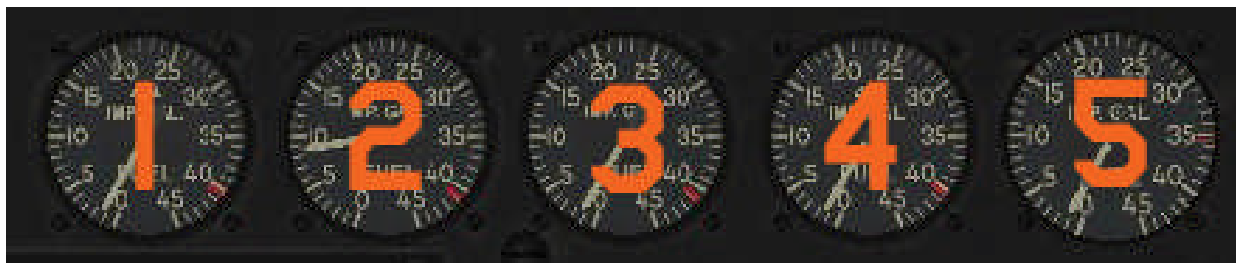
The DC-4 had a relatively complex system of fuel crossfeed valves, operated by levers with red knobs on the co-pilot's side of the pedestal. As this system has relatively little use in FSX and is next to impossible to use from the pilot's seat, this aspect of the fuel system is left out in order to increase functionality elsewhere. The fuel levers on the pilot's side of the pedestal function as fuel system levers for each engine.

**NOTE:** C-54a and C-54B models had fuel tanks in the forward fuselage, just behind the cockpit (these can be seen through the windows in the models). **Fuel gauges for these tanks were not displayed in the cockpit**, crew members having to visit the compartment to see the fuel levels. As such, on the C-54A and C-54B models, **fuel gauges on the main instrument panel will show as full, until these 'invisible' fuselage tanks are dry**. To accommodate this, and for correct sequential draining, in the aircraft.cfg the auxiliary fuel tanks contain their normal amounts plus those of their respective fuselage tanks.

On the C-54A, these fuselage tanks contained **1800 US Gallons**.

On the C-54B, these fuselage tanks contained **900 US Gallons**.

After this, fuel in all models was moved to wing tanks only. Later models had both 6 and 8 wing tank systems; the models have the 6 tank system (the extra 2 would be optional fuselage tanks, not always used. Auxiliary gauge will read zero unless you add the fuel).



- |                |                                       |
|----------------|---------------------------------------|
| 1. Outer Left  | 4. Outer Right                        |
| 2. Inner Left  | 5. Auxiliary Tanks (L R dual needles) |
| 3. Inner Right |                                       |

**C-54A:** Fuselage fuel is combined into the Outer fuel tank quantities in the aircraft.cfg. If you want to fly without fuselage tanks, remove 900 gallons from

each of the outer tank quantities either in the aircraft.cfg or the drop-down fuel menu..

**C-54B:** Fuselage fuel is combined into the Outer fuel tank quantities in the aircraft.cfg. If you want to fly without fuselage tanks, remove 900 gallons from each of the outer tank quantities either in the aircraft.cfg or the drop-down fuel menu.

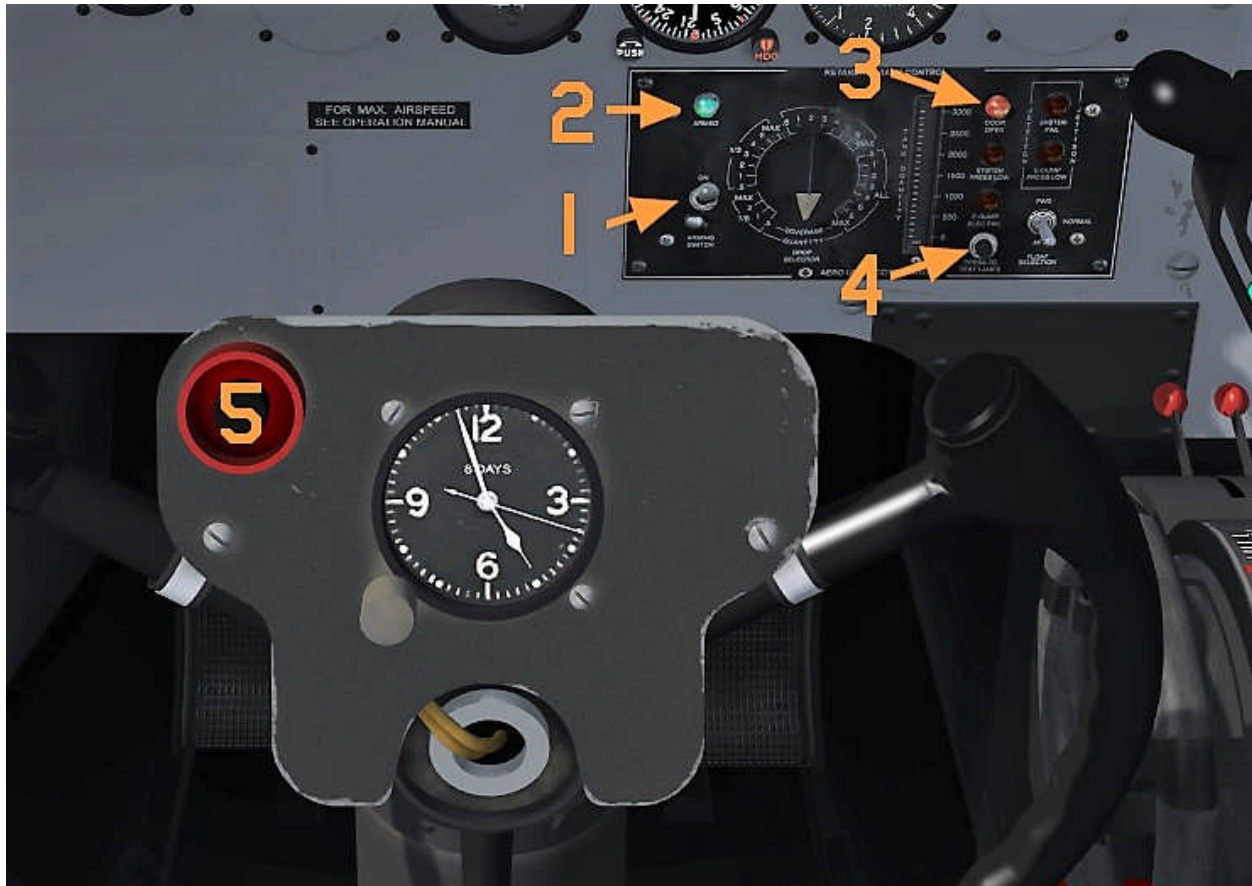
*View of DC-4-1009 VC*



## Aerial Fire Fighting

This requires a separate addon program to actually work as a water/retardant bomber. **FireFighterX** (payware) is **highly** recommended for its realism and functionality.

The Fire Fighting version of the DC-4 has additional controls:



- |   |  |
|---|--|
| 1. Drop System Master Switch                | 4. Light Test Button   |
| 2. Indicator Light that System is Activate  | 5. Control Yoke Drop Button (will become active only when Master Switch (1) is on) |
| 3. Indicator Light that Drop Doors are Open |  |

**Note: Drop can be made at any time using Shift-D, even without the system switch turned on, in case the yoke visibility has been set to off.**



# Flying the DC-4

## Pre-Flight Cockpit Check:

1. All doors CLOSED
2. Hydraulic hand pump DOWN
1. Hydraulic pressure (rearmost; co-pilot's wall) above 1800 psi
2. Parking brake ON
3. Landing gear handle UP
4. Cowl flaps function CHECKED
5. Fuel tanks ON
6. Carb air lever (pedestal) UP
7. Prop levers FULLY FORWARD
8. Mixture levers IDLE CUTOFF
9. Trim tabs NEUTRAL
10. Supercharger levers to LOW
11. Generator switches OFF
12. De-icing switch OFF
13. Fuel pump switches OFF
14. Master switch ON
15. Beacon light switch (if present) ON
16. Gyro instruments CAGED
17. Cowl flaps OPEN

## Starting and Warm-Up:

1. Throttles ¼ OPEN
2. Master ignition switch (if present) ON (pressed in)
3. ENGINE Start ORDER: **3, 4, 2, 1**
- 4. Engine 3:**
5. Ignition switch ON
6. Fuel pump switch ON
7. Start switch ON
8. Prime as required (flip 2 or 3 times)
9. After 10 to 12 seconds, Mesh switch to ON
10. After engine fires, start switch OFF
11. Mixture lever to TAKEOFF and CLIMB (**85%**)
12. When oil pressure apparent, RPM to 1000
- 13. Repeat for engines 4, 2, and 1**
14. Radios ON (overhead or pedestal switch)

## Taxiing Procedure:

1. Parking brake OFF
2. Control column FORWARD (to keep nose wheel firmly planted)
3. Gyro instruments checked FUNCTIONAL
4. Flaps to FULL DOWN, then UP to second position
5. Taxi at 800 RPM or higher

## Run-up Sequence:

1. Parking brakes ON
2. Throttles to 1700 RPM
3. Supercharger to HIGH
4. Prop levers to full LOW, then back to HIGH RPM
5. Carb heat levers to ON, then OFF
6. Throttles to 1000 RPM
7. **Engine 1:**
8. Throttle to 30" MANIFOLD PRESSURE (approx. 2350 RPM)
9. Supercharger to LOW to check drop of 2"
10. Magneto switch to LEFT, the BOTH, then RIGHT, then BOTH. Magnetos max. drop 100 RPM
11. Oil and fuel pressures CHECKED
12. Generator switch 1 ON
13. **Repeat for engines 2, 3, and 4**
14. Gyro instruments un-caged and set to COMPASS HEADING

## Take-off Check:

1. Flaps CHECKED
2. Cowl flaps to TRAIL (50 % or as close as possible)
3. Fuel pump switches ON
4. Superchargers LOW
5. Generators ON
6. Fuel Booster switches ON
7. Auto-pilot master switch OFF

8. Hydraulic pressure CHECKED
9. Artificial Horizon UNCAGED
10. Fuel quantity CHECKED
11. Wing flaps 15 DEGREES (or as needed)
12. Controls FREE
13. Heaters OFF
14. Carburetor heat COLD

## **Take-off Procedures:**

1. Throttles smoothly to 50" MANIFOLD PRESSURE
2. Forward pressure on control yoke until RUDDER EFFECTIVE
3. Start easing back the yoke 5-10mph below take off speed
4. Aircraft should leave the ground between 115 and 120 MPH, depending on weight
5. When VSI indicates positive rate of climb, GEAR UP
6. Tap brakes as gear goes up to stop spinning
7. When feasible (eg. constant 500 fpm climb), RPM 2550, then MANIFOLD PRESSURE 40"
8. Flaps up at 500 FEET AGL ALTITUDE and before 144 MPH. In a heavy aircraft, anticipate aircraft to settle as flaps come up. Compensate by nose up.
9. Above 500 FEET ALTITUDE, RPM 2350 and MANIFOLD PRESSURE 35"
10. Landing lights shall be used for night take-offs. They are turned off and retracted after the initial power reduction

## Climb:

1. Ensure props SYNCHRONIZED
2. Cruise climb is between 155 and 160 MPH
3. When no longer possible to maintain MANIFOLD PRESSURE 35" shift Superchargers to HIGH

## Cruise:

1. Best lift-to-drag ratio is when the aircraft is not flying nose high at cruise, but is rather ON THE STEP (tail slightly high). To do this there are TWO METHODS
2. 1. Climb to 500' above cruising altitude, set RPM and AMNIFOLD PRESSURE to cruise settings, and then descend gently to cruise altitude
3. Cowl flaps CLOSED
4. Aircraft trim to LEVEL FLIGHT
5. 2. Level off at desired cruise altitude, but keep climb settings until at a good airspeed above desired cruise speed. Reduce settings until desired cruise speed is achieved.
6. Cowl flaps CLOSED
7. Aircraft trim to LEVEL FLIGHT
8. Throttles and manifold pressure setting to CRUISE SETTINGS
9. Mixture levers to CRUISE (during level flight only)
10. If not using Superchargers, clear occasionally by shifting to HIGH for 5 minutes, then back to LOW
11. If using the Supercharger, then reverse the process
12. Supercharger use order: 4, 2, 3, 1
13. NOTE: Superchargers normally used at over 15,000' ALTITUDE only (seldom used due to oxygen requirements and un-pressurized aircraft. In fact, controls removed in many aircraft.)

## Descent:

1. Descent is normally made at 300 fpm, for passenger comfort.
2. To calculate START OF DESCENT point, and to arrive at the destination at 1000' altitude, divide the number of feet you want to let down by 300. The answer is the time in minutes, which you subtract from your ETA to get the approximate time to start the descent.
3. Descent speed 200 MPH (do not exceed 205 MPH)
4. Adjust throttles to keep MANIFOLD PRESSURE and AIRSPEED at desired setting.

## Approach:

1. General approach is made at 144 MPH. It will take a lot of time to reduce speed, so start early. Use 10 DEGREES of flap to keep fuselage as level as possible. Pulling throttles all the way back, below 17" MAP, will result in the horn going off.
2. Autopilot OFF
3. Superchargers on LOW
4. Mixture levers to TAKEOFF and CLIMB (50%)
5. Each engine MAGNETO CHECK: Magneto switch to LEFT, the BOTH, then RIGHT, then BOTH. Magneto max. drop 100 RPM
6. De-icers OFF
7. Flaps to 15 DEGREES
8. Landing gear DOWN
9. Prop controls to 2250 RPM
10. Fuel pumps ON
11. Flaps as required into FINAL APPROACH (normally 30 DEGREES)
12. Flap to 40 DEGREES when 200-300 feet above the ground
13. VSI at -500 FPM



14. Landing Lights extended and ON
15. Trim CHECKED
16. Adjust approach angle preferably with THROTTLES not elevator
17. Approach speed 110 MPH
18. Extend flare for gentle touch down.

## Landing:

1. Let nose down slowly
2. Touch brakes to engage steering mechanism

## After Landing:

1. Landing lights OFF
2. Cowl flaps OPEN
3. Fuel pump switches OFF
4. Props to HIGH RPM
5. Generator OFF
6. Flaps UP
7. **Engines 1 and 4:** STOP, by moving MIXTURE LEVERS to IDLE CUTOFF
8. **Engines 1 and 4:** Ignition switches OFF
9. **Engines 1 and 4:** Generators OFF
10. When at full stop:
11. **Engines 2 and 3:** STOP, by moving MIXTURE LEVERS to IDLE CUTOFF
12. **Engines 2 and 3:** Ignition switches OFF
13. **Engines 2 and 3:** Generators OFF
14. Fuel levers to OFF

15. Instruments OFF (overhead or pedestal switch)

16. Master switch OFF

---

*Carvair VC:*



# Flight Operations Charts And Range Calculator


Atmospheric inaccuracies in FSX and P3D do not allow for use of the real flight planning charts that DC-4 pilots used. However, included in the package is a Microsoft Excel file that has been **specifically calibrated** to allow precise flight planning for the DC-4/C-54/Carvair within the FSX/P3D environment.


There are 11 pages of charts, covering all aspects of flight from Engine, Take Off, Climb, Cruise (7 pages) and Landing.


You will need to use Microsoft Excel (or Excel Viewer, a free download) to read the charts.


*Screenshot of a page of the Charts. Tabs at the bottom will take you to the different pages:*


DC-4\_C54\_Carvair\_perf.xlsx - Microsoft Excel Viewer


 Open


 Quick Print


 Print Preview


 Copy

 Find

 Go To

 Page Setup

 Print Area

 Switch Windows

Office Document

Edit

Page Setup

Window

|    | A   | B    | C     | D      | E     | F     | G          | H  | I     | J   | K   | L                   | M    | N     | O   | P   | Q                 | R                            | S     | T                      | U   | V |      |  |
|----|---|------|-------|--------|-------|-------|------------|--|-------|-----|-----|---------------------|------|-------|-----|-----|-------------------|------------------------------|-------|------------------------|-----|---|------|--|
| 1  | AIRCRAFT MODEL  |      |       |        |       |       |            | FLIGHT OPERATIONS INSTRUCTION CHART        |       |     |     |                     |      |       |     |     |                   | NUMBER OF ENGINES OPERATING: |       |                        |     |   | FOUR |  |
| 2  | DC-4/C-54/Carvair   |      |       |        |       |       |            | CHART WEIGHT LIMITS: 73000 to 70000 POUNDS |       |     |     |                     |      |       |     |     |                   | LEGEND                       |       | ALT: PRESSURE ALTITUDE |     |   |      |  |
| 3  | ENGINES   |      |       |        |       |       |            |  |       |     |     |                     |      |       |     |     |                   |                              |       | MP: MANIFOLD PRESSURE  |     |   |      |  |
| 4  | R-2000-9  |      |       |        |       |       |            |  |       |     |     |                     |      |       |     |     |                   |                              |       | GPH: U.S.GAL PER HOUR  |     |   |      |  |
| 5  | LIMITS  | RPM  | MP    | BLOWER | TIME  | CYL.  | total      | RANGE CALCULATOR                           |       | KTS | GPH | US GAL              | =    | NM    | STM |     |                   | KTS: KNOTS                   |       |                        |     |   |      |  |
| 6  |   |      | IN.HG | POS.   | LIMIT | TEMP  | GPH        |  |       | 1   | 1   | 1                   |      | 1     | 1   |     |                   | S.L.: SEA LEVEL              |       |                        |     |   |      |  |
| 7  | TAKE OFF  | 2700 | 50.0  | LOW    | 5     | 220   | 710        |  |       |     |     |                     |      |       |     |     |                   | F.T.: FULL THROTTLE          |       |                        |     |   |      |  |
| 8  |   |      |       |        |       |       |            |  |       |     |     |                     |      |       |     |     |                   |                              |       |                        |     |   |      |  |
| 9  | MAX CONTINUOUS  |      |       |        |       | PRESS | MAX CRUISE |  |       |     |     | INTERMEDIATE CRUISE |      |       |     |     | LONG RANGE CRUISE |                              |       |                        |     |   |      |  |
| 10 | RPM   | MP   | total | TAS    |       | ALT   | RPM        | MP   | total | TAS |     | RPM                 | MP   | total | TAS |     | RPM               | MP                           | total | TAS                    |     |   |      |  |
| 11 |   |      | GPH   | MPH    | KTS   | FT    |            |  | GPH   | MPH | KTS |                     |      | GPH   | MPH | KTS |                   |                              | GPH   | MPH                    | KTS |   |      |  |
| 12 |   |      |       |        |       | 30000 |            |  |       |     |     |                     |      |       |     |     |                   |                              |       |                        |     |   |      |  |
| 13 |   |      |       |        |       | 25000 |            |  |       |     |     |                     |      |       |     |     |                   |                              |       |                        |     |   |      |  |
| 14 | 2550  | F.T. | 375   | 268    | 233   | 20000 | 2500       | 25.5                                       | 340   | 256 | 222 | 2300                | 24.5 | 300   | 234 | 203 | 2150              | 24.0                         | 270   | 197                    | 171 |   |      |  |
| 15 | 2550  | 30.5 | 410   | 271    | 235   | 15000 | 2350       | 29.5                                       | 375   | 259 | 225 | 2150                | 28.5 | 320   | 240 | 208 | 2150              | 26.0                         | 285   | 223                    | 194 |   |      |  |
| 16 | 2550  | F.T. | 470   | 273    | 237   | 10000 | 2400       | 31.5                                       | 385   | 251 | 218 | 2200                | 30.0 | 335   | 236 | 205 | 2100              | 29.0                         | 305   | 224                    | 195 |   |      |  |
| 17 |   |      |       |        |       | 5000  | 2200       | 34.5                                       | 385   | 241 | 209 | 2000                | 33.5 | 340   | 229 | 199 | 2000              | 31.0                         | 310   | 218                    | 189 |   |      |  |
| 18 |   |      |       |        |       | S.L.  | 2150       | 36.0                                       | 390   | 231 | 201 | 2000                | 34.5 | 345   | 220 | 191 | 1950              | 33.5                         | 295   | 205                    | 178 |   |      |  |
| 19 | Note: subtract 2-4mph/kts TAS for the Carvair/Firefighter |      |       |        |       |       |            |  |       |     |     |                     |      |       |     |     |                   |                              |       |                        |     |   |      |  |
| 20 |   |      |       |        |       |       |            |  |       |     |     |                     |      |       |     |     |                   |                              |       |                        |     |   |      |  |

power plant

take off

climb

crz 73-70

crz 70-65

crz 65-60

crz 60-55

crz 55-50

crz 50-45

crz 45-40

landing

Ready

100%

**Sounds:** Sounds in this package are a combination of default and custom.

**Gauges:** Sounds in this package are a combination of default and custom.

## Support:

[support@flight-replicas.com](mailto:support@flight-replicas.com)

All requests for support must be accompanied by the following information:

1. Place/website where the North Star was purchased;
2. Order number;
3. Name used when purchasing; and
4. Date of purchase.

No support will be available without this information.

© Flight Replicas 2017 All Rights Reserved

