

# CHAPTER 01 - AIRCRAFT GENERAL

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## GENERAL

The C-295 is a full-metal construction, high cantilever-wing, twin turbo-prop engine aircraft, with pressurized fuselage cabin and retractable tricycle landing gear.

| The C-295 is intended for short and medium range military transport. Its ramp and cargo door allow diverse sort of loads for a variety of missions, such as:

- Troop transport
- Cargo transport
- Paratroops dropping
- Cargo dropping
- Surveillance
- Medical evacuation

C-295 aircraft is all-weather certified, and under both: Visual Flight Rules (VFR) and Instrumental Flight Rules (IFR).

# AIRCRAFT SYSTEMS

The main functions and features of the aircraft systems are as follows:

- **STRUCTURE:** The aircraft is distributed into:
  1. FUSELAGE, which is also divided into:
    - A. Front Fuselage
    - B. Central Fuselage
    - C. Rear Fuselage
    - D. Tail Fuselage
    - E. Main Landing Gear (MLG) Fairings
  2. TAIL, which includes:
    - A. Horizontal Stabilizers
    - B. Vertical Stabilizer
  3. WING, which is divided into:
    - A. Right Outer Wing Section
    - B. Left Outer Wing Section
    - C. Central Wing Section
  4. DOORS and WINDOWS
- **AIR CONDITIONING AND PRESSURIZATION CONTROL:** divided into:
  1. Air-conditioning System: A recirculating model, to minimize engine air-bleed requirements. It maintains the aircraft temperature between 18°C and 30°C. It also provides cooling for the pressurized avionics compartments.
  2. Pressurization System: Maintains the aircraft interior to be kept at an adequate pressure (which is higher than the outside pressure) without exceeding the nominal maximum differential pressure.
- **AUTOPilot/FLIGHT DIRECTOR:** As a flight crew aid, the aircraft includes:
  1. Flight Director (FD), which provides the crew with visual manoeuvres indications.
  2. A Yaw Damper (YD), which automatically governs the main directional control, to give yaw stability, turns coordination and sideslips control.
  3. Automatic Pilot (AP), which automatically drives the main pitch and roll control surfaces when connected. It can be coupled to the FD, in order to follow its indications (AP/FD).

- **COMMUNICATIONS:** It allows the crew to communicate, between them and with:
  1. Passengers
  2. Ground personnel
  3. Other aircraft
  4. Ground stations
- **ELECTRICAL POWER:** There are different ways in which the system supplies electrical power as needed by the aircraft to operate both on ground and airborne.
  1. Direct Current power from two engine driven generators/starters and two batteries.
  2. Alternating Current supplied by from two alternators and two inverters.
  3. Auxiliary DC from two Transformer/Rectifier Units (TRU).
  4. Auxiliary DC from two back-up batteries
  5. Auxiliary AC from a standby inverter
  6. DC or AC from a Ground Power Unit (GPU) connected on ground to the power plugs outside the aircraft.
- **INTERIOR LAY OUT AND FURNISHING:** The aircraft has three main compartments:
  1. Cockpit, which suits for two pilots and one flight engineer.
  2. Passengers cabin, which can be fitted out according to the nature of the mission (cargo transport, troop seats, passenger seats, stretchers or VIP seats).
  3. The cargo compartment, which may comprise either the ramp and cargo door area only, or both the ramp and cargo door area and the passengers cabin on cargo transport missions.

In addition, the aircraft includes a toilet compartment, specific areas for operational and emergency equipment storage, as well as interior fittings as required for cargo or paratroops dropping operations.
- **FIRE PROTECTION:** Provides the crew with the required warnings and means for smoke or overheating detection and fire extinguishing. It consists of:
  1. Detection System, which comprises:
    - A. Engine Overheat or Fire Detection
    - B. Overheat detection in the Central Wing Section, due to engine air-bleed leakage.
    - C. Smoke detection in the Cargo Compartment.
  2. Fire Extinguishing System, made up of:
    - A. Engine Fire Extinguishing System
    - B. Portable Fire Extinguishers

- **FLIGHT CONTROLS:** The system has:

1. Primary flight controls (ailerons, elevators and rudder): which are manually operated by means of control columns and wheels, and directly actuated through rods, pulleys and cables. These are reversible controls, and provide three axes aircraft manoeuvrability. Every control is doubled, and there are two independent actuation channels for ailerons and elevators, that permits synchronous operation when interconnected. They can be disconnected in case of channel jamming, to keep the aircraft under control.
2. Secondary Flight Controls:
  - A. Flaps, hydraulically-powered with asymmetry control.
  - B. Primary Flight Control Trimmers (Electrically-powered Trim Tabs, and Servo Tabs, mechanically controlled by a set of rods).
3. Gust Lock System.
4. Stall Warning and Recovery System (SWRS).
5. Pneumatic Rudder Actuation System (Rudder Booster).
6. Rudder and Elevators Autotrimming System.
7. Rudder Travel Control System (RTCS).

- **FUEL:** The fuel system consists of four integral tanks installed into the wings structures:

1. Two main tanks located in the Central Wing Section
2. Two auxiliary tanks located in the Outer Wing Sections.

Through its feed pipes and by a combination of electric and Venturi-effect pumps, the fuel system provides:

1. Pressurized fuel to the engines
2. The possibility to transfer fuel between tanks, either by pressure or gravity.
3. Refuelling and defuelling of the tanks either by pressure or gravity.

- **HYDRAULIC POWER:** Fed by three electric pumps, the hydraulic power operates the following systems:

1. Landing Gear Extension/Retraction System
2. Normal Wheel Brakes and Anti-Skid
3. Emergency and Parking Brake
4. Nose-Wheel Steering
5. Propeller Brake
6. Flaps
7. Ramp and Cargo Door

- **ICE AND RAIN PROTECTION:** The ice and rain protection system provides an ice detection signal, avoiding and removing the build up of ice on critical specific locations of the aircraft: leading edges of the wings, tail, engine air intakes, and propellers. In addition, it delivers electrical heating to the windshield, AOA probes and Pitot tubes, and wipes water from the windshield as well.
- **INDICATING / RECORDING SYSTEM:** The aircraft has a highly-integrated avionics system based on the "Topdeck Avionics Suite", with a Flight Desk System (FDS), including:
  1. Four liquid crystal displays (two NDs and two PFDs)
  2. Four control panels (two ICPs and two EFCPs)
  3. An Integrated Electronic Standby Instrument for attitude indication (IESI)
  4. A backup magnetic compass

The system is completed with:

- 1. Flight Data Recorder (FDR) system, that records data for maintenance and accident investigation purposes.
- 2. Cockpit Voice Recorder (CVR) system, that records data for maintenance and accident investigation purposes.
- 3. Multifunction Control and Display System (MCDUs) that collects and allows to manage every data as shown on two displays located on the pedestal, relative to the following systems:
  - A. Radio Management System (RMS)
  - B. Flight Management System (FMS)
  - C. Centralized Diagnostics System (CDS)
- **LANDING GEAR:** The aircraft is equipped with retractable tricycle landing gear, with an hydraulically actuated extension and retraction device electrically controlled from the cockpit with the landing control gear handle. The complete system includes:
  1. Emergency Landing Gear Extension-by-Gravity system.
  2. The main landing gear wheels Braking System, with Anti-skid units option.
  3. Emergency and Parking Brake System.
  4. Nose-wheel Steering System to drive (control) the aircraft while taxiing.
- **LIGHTS:** The system provides the necessary visibility to operate both inside and outside the aircraft. The system has several lighting appliances compatible with Night Vision Goggles (NVG). The system is divided into:
  1. Exterior Lighting
  2. Interior Lighting
  3. Emergency Lighting.

- **NAVIGATION:** The aircraft navigation system has a Primary Reference System (PRS) consisting of:
  - A. Air Data System (ADS).
  - B. Attitude and Heading Reference System (AHRS).The aircraft is fitted with equipment for short range (MMR, DME and ADF) and long range (GPS, IRS/GPS) navigation. It also includes a radio altimeter and weather radar.
- **OXYGEN:** The aircraft is equipped with two (high pressure) oxygen supply systems:
  1. Fixed Oxygen Cylinder supply: Using gaseous oxygen.
  2. Portable Oxygen Cylinder supply: By means of gaseous oxygen bottles.
- **PNEUMATIC SYSTEM:** The pneumatic system has all those units and components required to remove and monitor engine air bleed, and its subsequent allocation to the various aircraft systems that use it. These are as follows:
  1. Pneumatic Rudder System (Rudder Booster)
  2. Engine Oil Cooling System
  3. Pneumatic De-Icing System (Leading edge Wings, Tail, and Engine Air-Intakes)
  4. Air conditioning and Pressurization Control System
- **CENTRAL MAINTENANCE SYSTEM:** Enables monitoring different components of the aircraft avionics system and includes the following capabilities:
  1. Allows the current state of the monitored items to be recognized.
  2. Lets to perform a functional test on each isolated component.
  3. It stores data concerning failures reported by each component, and lets subsequent downloading.
- **DOORS:** There are one crew door, two paratroops doors, an emergency exit door and a ramp and cargo door for cargo operations.
- **POWER PLANT:** The aircraft is powered by two Pratt & Whitney Canada PW127G turboprop engines, each one drives a Hamilton Sunstrand 568F-5 six-blade variable-pitch propeller. Both engines are mounted in two identical nacelles, which are supported by the Central Wing Section.
- **SURVEILLANCE:** Not applicable.
- **WEAPONS SYSTEM:** Not applicable.
- **ELECTRONIC WARFARE:** Not applicable.

Layout of the various system panels inside the aircraft is shown as follows:

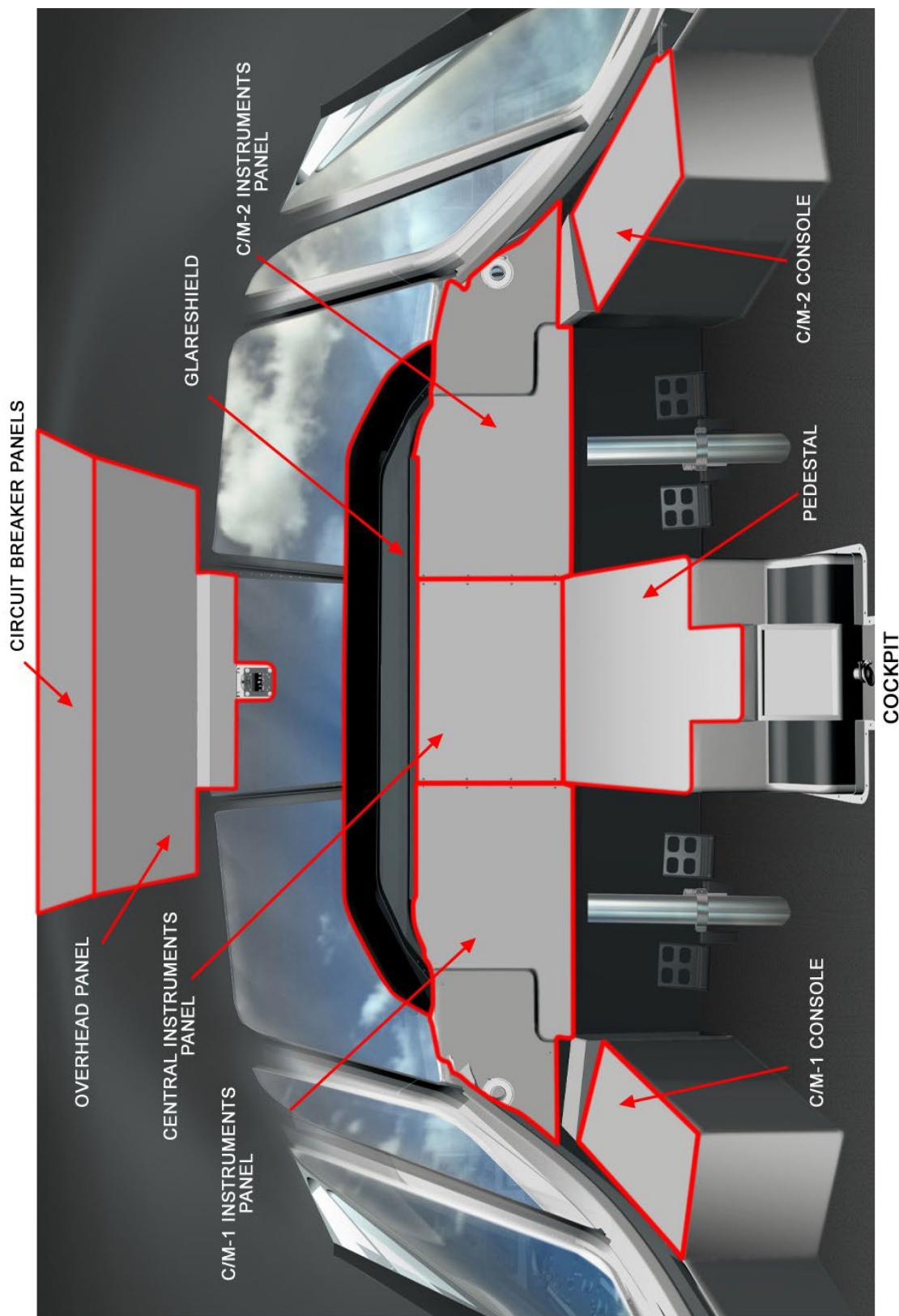
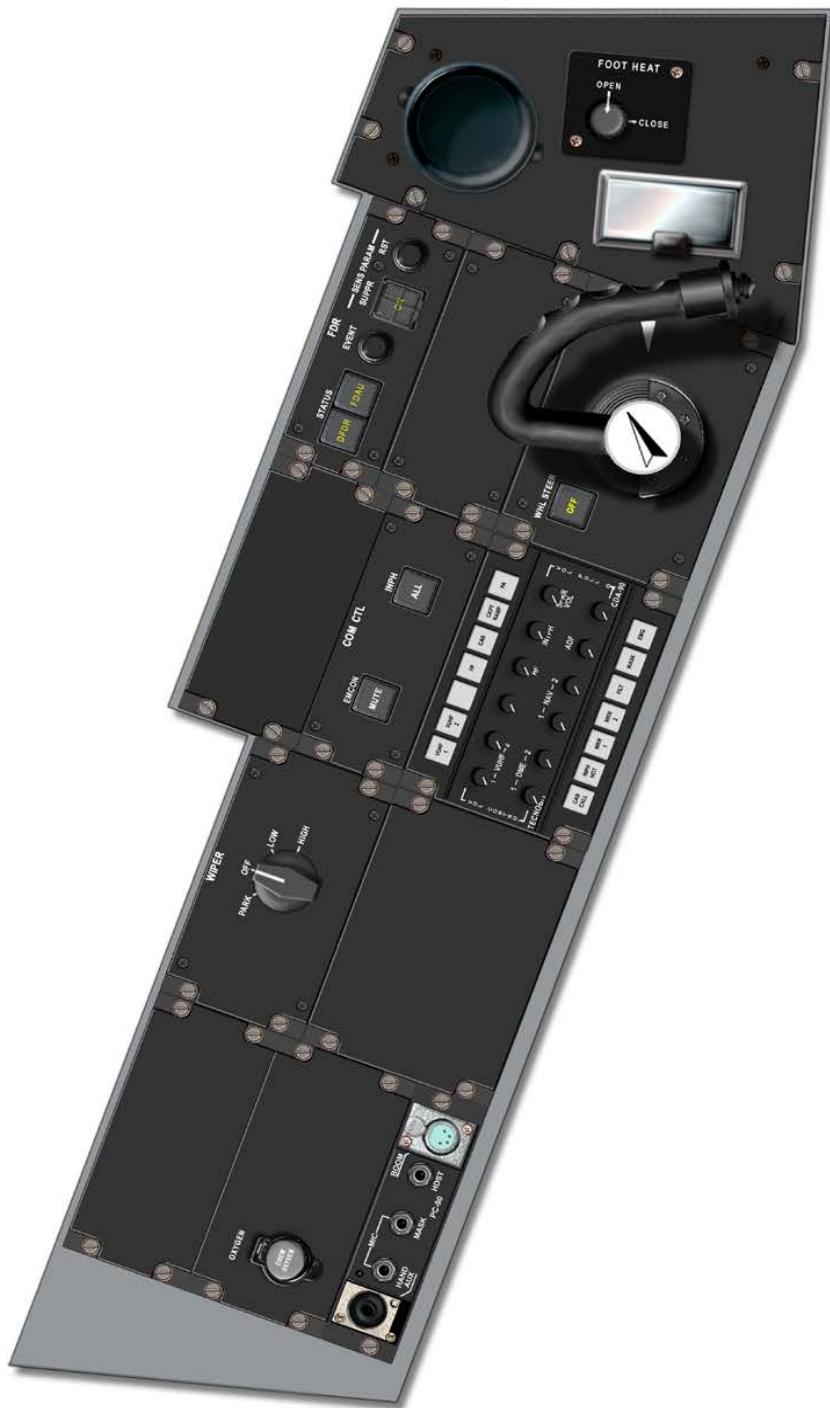
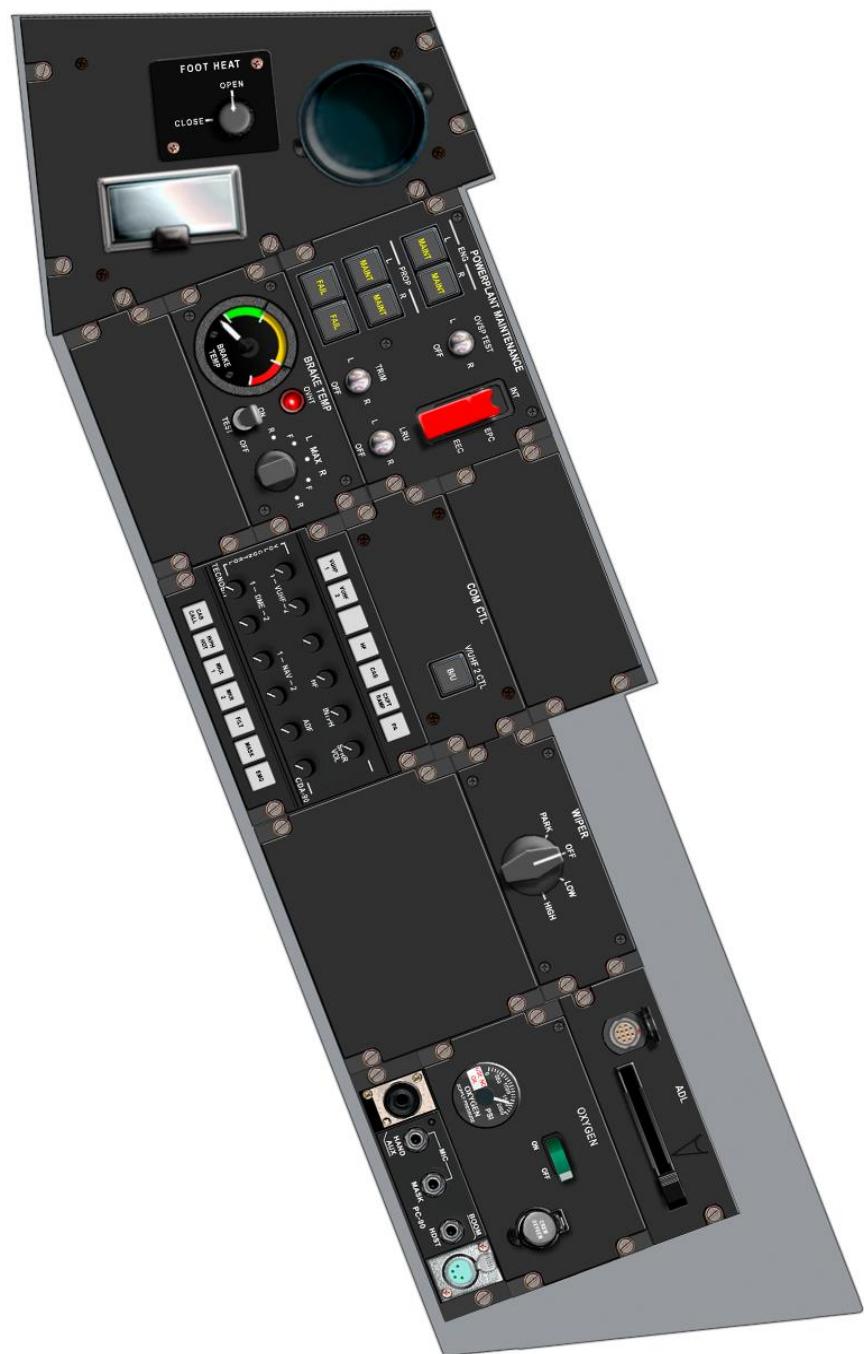


Figure 1-1 Cockpit



C/M-1 CONSOLE

Figure 1-2 C/M-1 Console



C/M-2 CONSOLE

Figure 1-3 C/M-2 Console



GLARESHIELD

Figure 1-4 Instrument Panel Glareshield



C/M-1 INSTRUMENT PANEL

Figure 1-5 C/M-1 Instrument Panel



C/M-2 INSTRUMENT PANEL

Figure 1-6 C/M-2 Instrument Panel



CENTRAL INSTRUMENTS PANEL

Figure 1-7 Central Instrument Panel

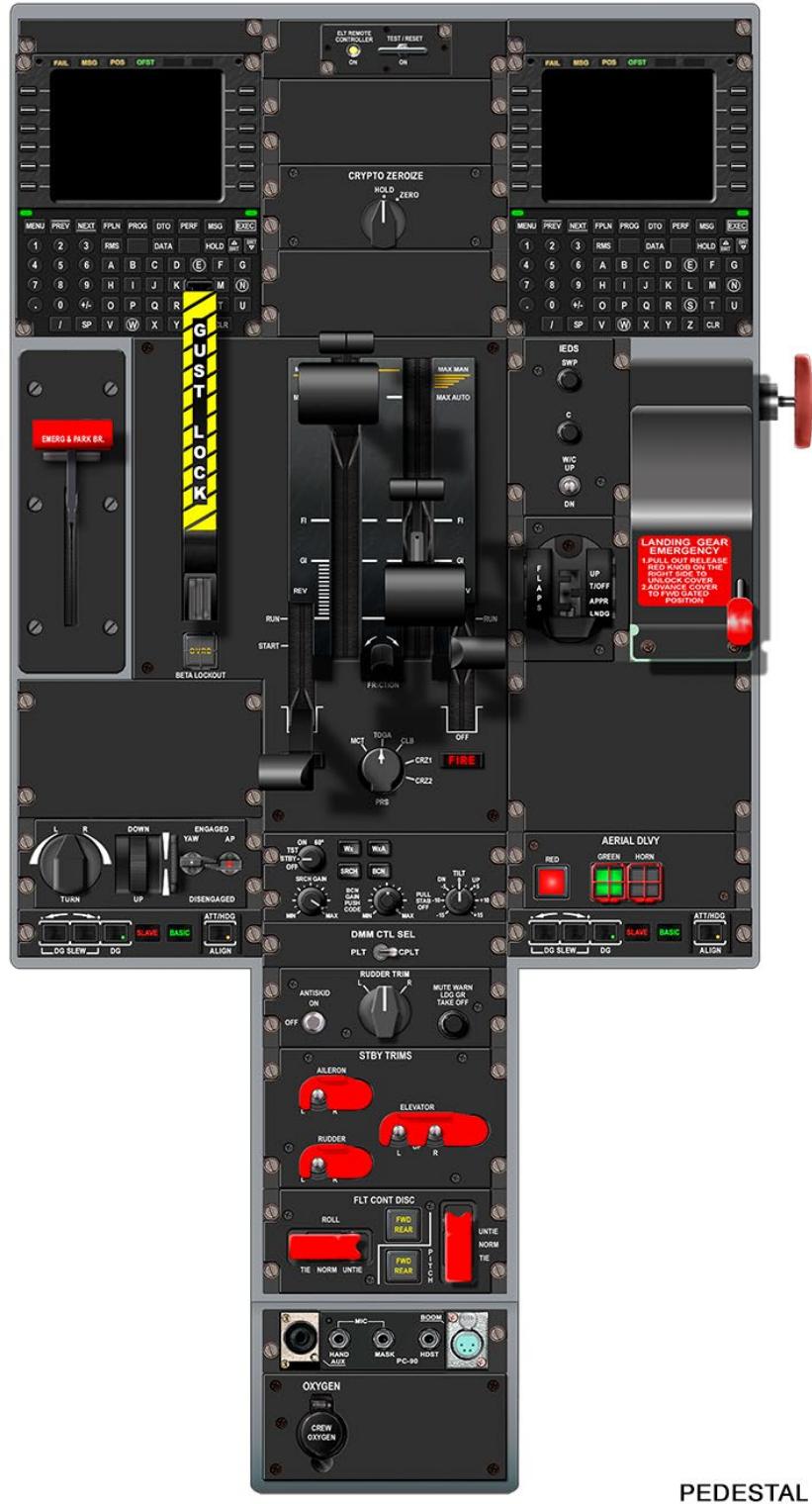


Figure 1-8 Pedestal



OVERHEAD PANEL

Figure 1-9 Overhead Panel



C/M-1 STEERING  
WHEEL



C/M-2 STEERING  
WHEEL

Figure 1-10 C/M-1 and C/M-2 Control Columns

## ANTENNAS

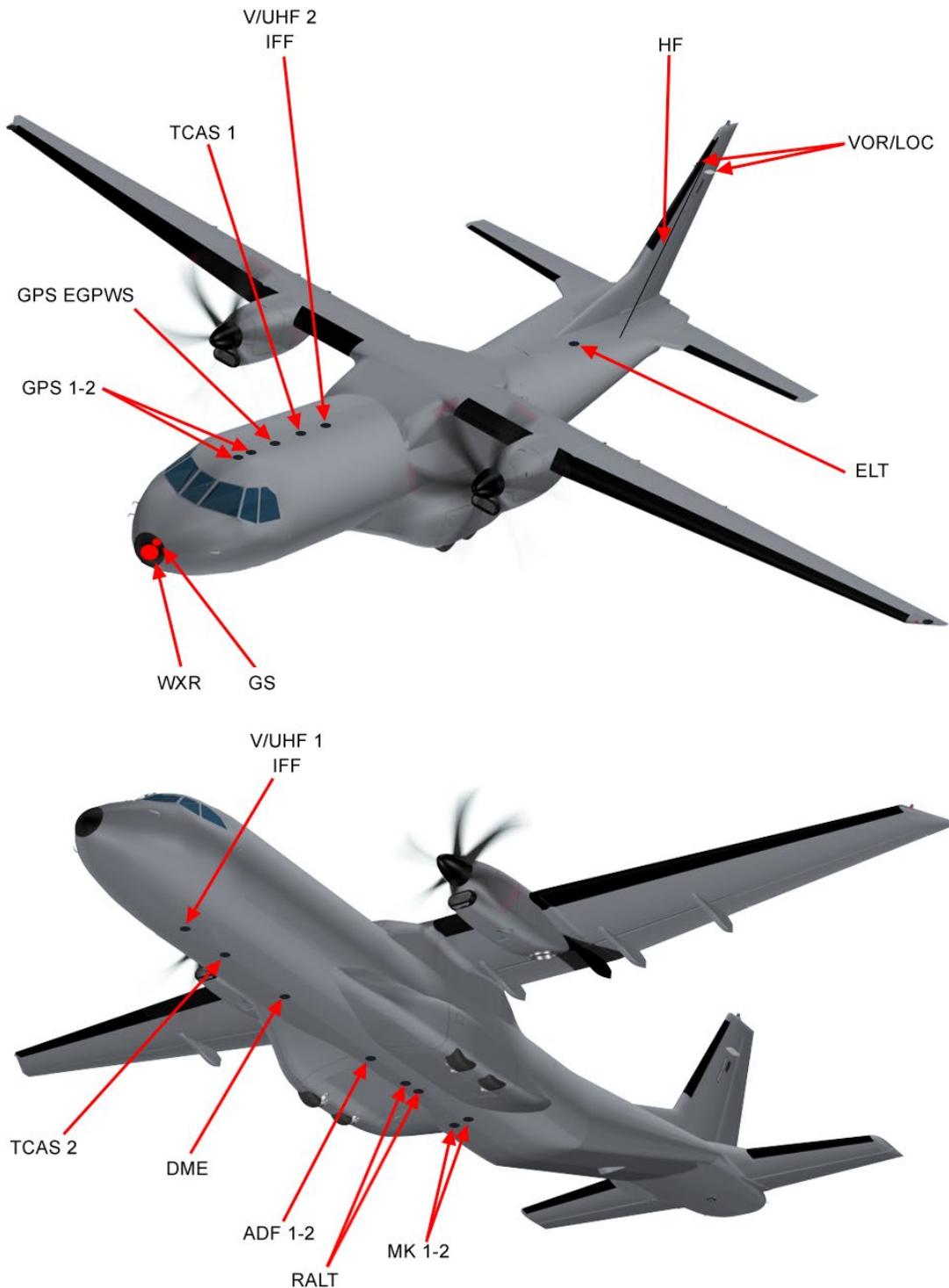


Figure 1-11 Aircraft Antennas

## DIMENSIONS AND AREAS

The main dimensions of the aircraft are presented in this section and are given in feet and inches with equivalents in metres. Areas are given in square feet with equivalents in square metres:

### COMPLETE AIRCRAFT. EXTERNAL DIMENSIONS.

- Wingspan: 25.810 m (84.68 feet)
- Total Length: 24.495 m (80.36 feet)
- Height: 8.663 m (28.42 feet)

### WING

- Type: High Cantilever Wing
- Lengthening (length) ratio: 10.156
- Mean Aerodynamic Chord: 2.561 m (8.4 feet)
- Root chord: 3.00 m (9.84 feet)
- Tip chord: 1.20 m (3.94 feet)
- Total area (with flaps and ailerons): 74.00 sqm (796.5 sqf)

### HORIZONTAL STABILIZER

- Span: 10.60 m (34.78 feet)
- Lengthening ratio: 5.3
- Mean Aerodynamic Chord: 2.082 m (6 feet 10 inches)
- Chord: 1.850 m (6 feet 1 inch)
- Tip chord: 1.3528 m (4.43 feet)
- Total area (with elevators): 21.200 sqm (228.2 sqf)

### VERTICAL STABILIZER

- Total Span: 5.10 m (16.73 feet)
- Tip chord: 1.55 m (5.1 feet)
- Total area: 12.09 sqm (130.1 sqf)

### MAIN LANDING GEAR:

- Landing gear gauge: 4.012 m (13.16 feet)
- Landing gear wheelbase: 8.431 m (27.66 feet)

## CARGO COMPARTMENT

- Length: 12.694 m (41.65 feet)
- Maximum Width: 2.70 m (8.86 feet)
- Height: 1.903 m (6.24 feet)
- Floor Area: 30.03 sqm (323.29 sqf)
- Ramp/Cargo Door: 3.04 m x 2.30 m / 2.30 m x 1.72 m

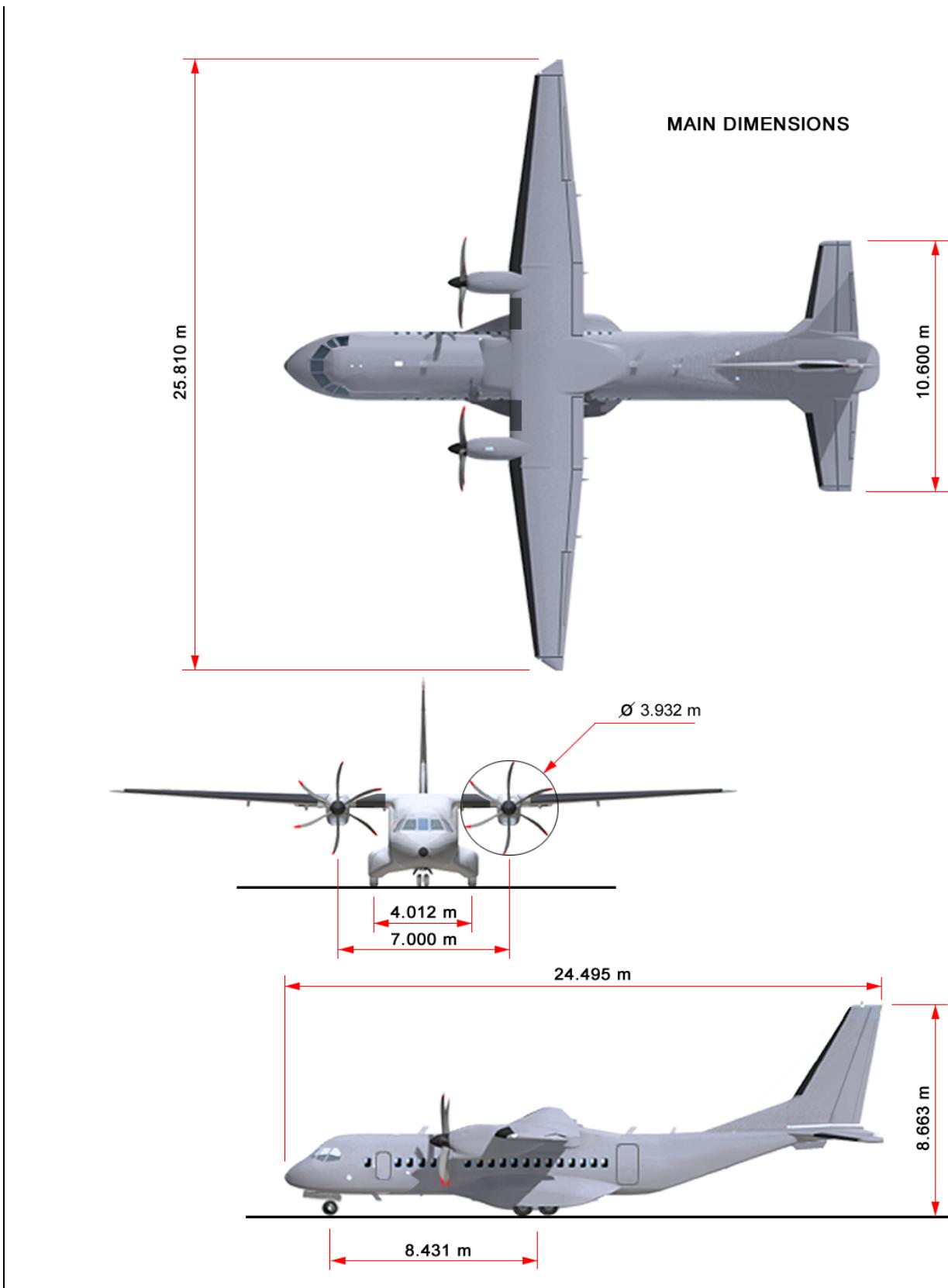


Figure 1-12 Aircraft Dimensions

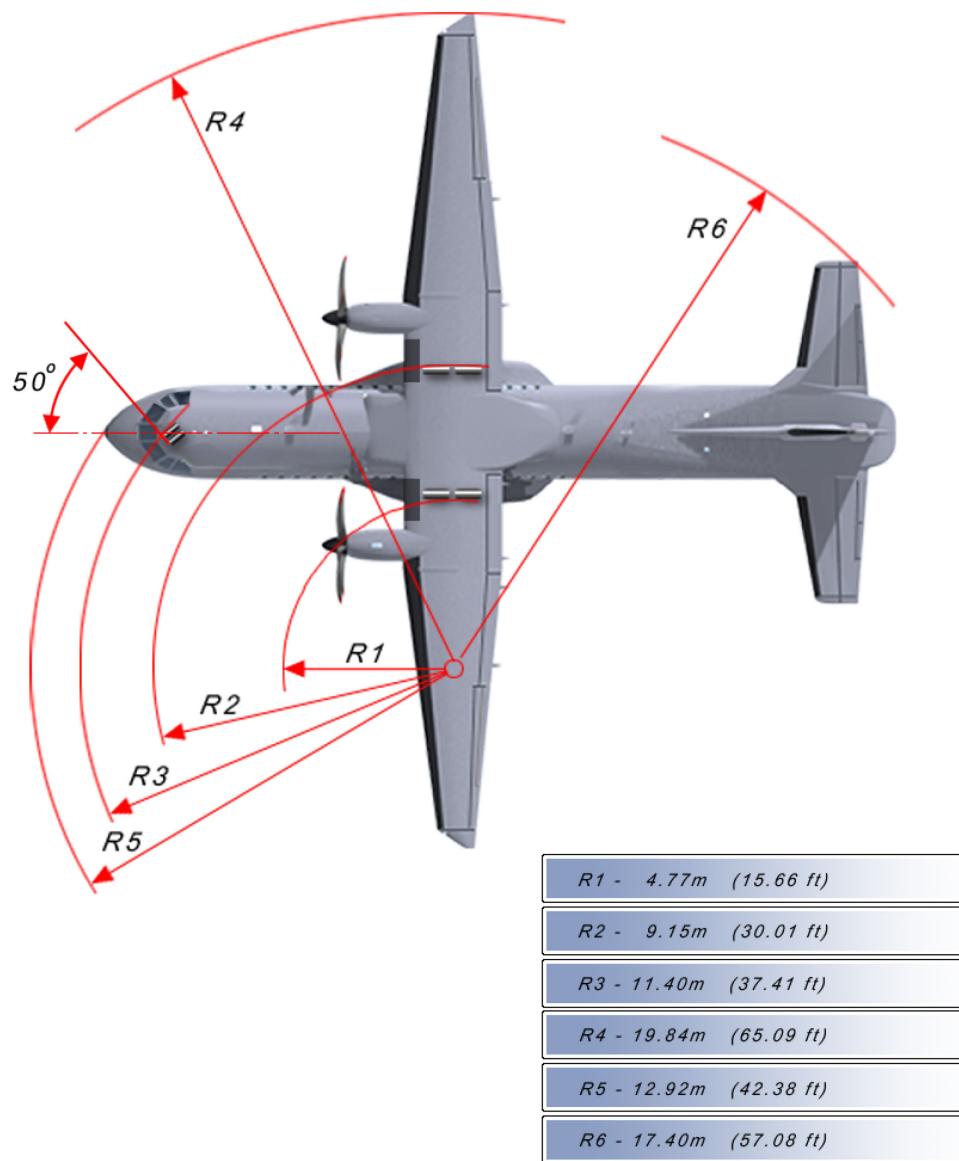


Figure 1-13 Turning Radii

## SERVICING

The figures below show the servicing points for every item that can be activated while being used or controlled by the crew.

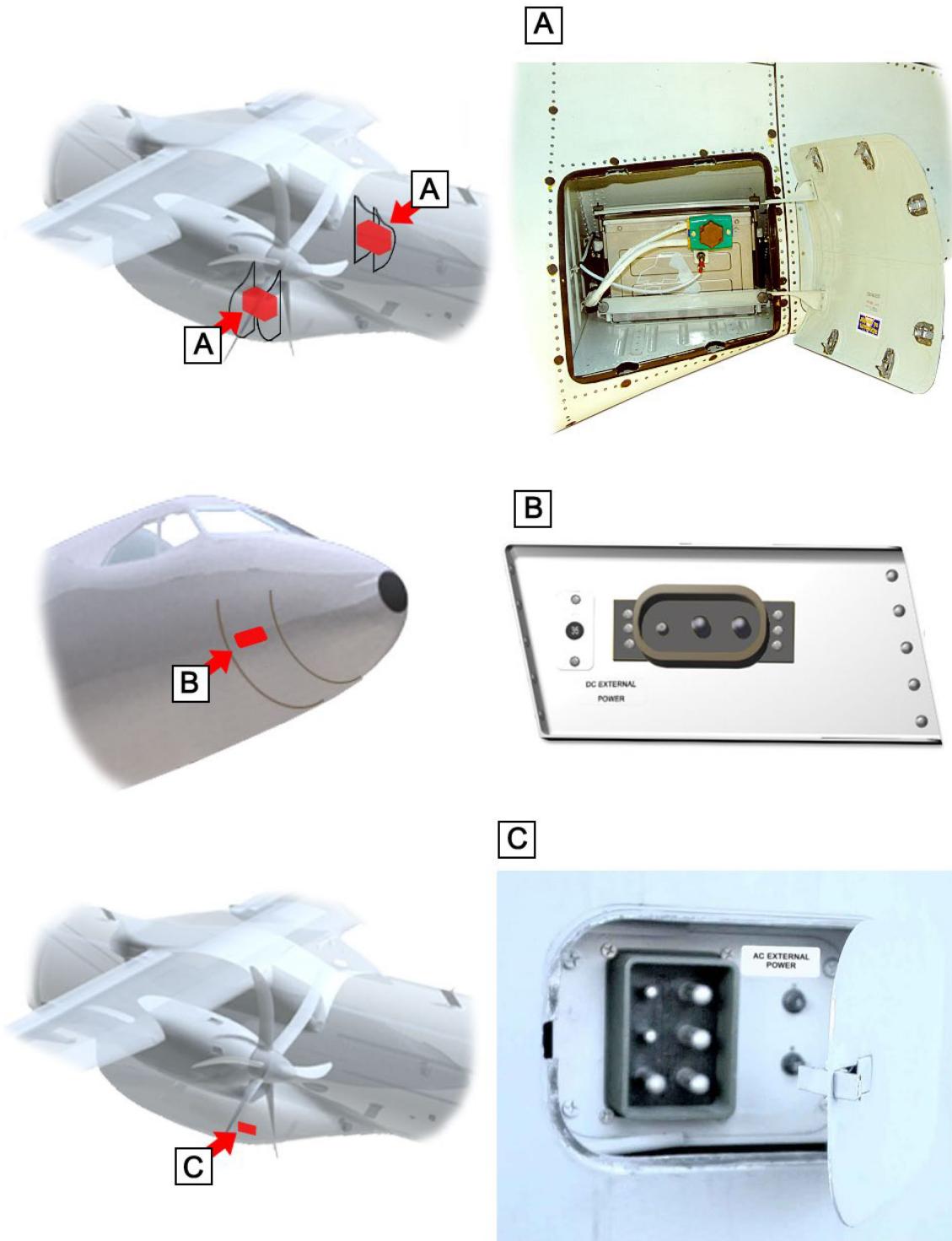


Figure 1-14 Electrical System Servicing Points

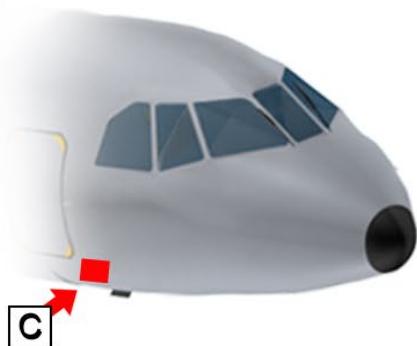
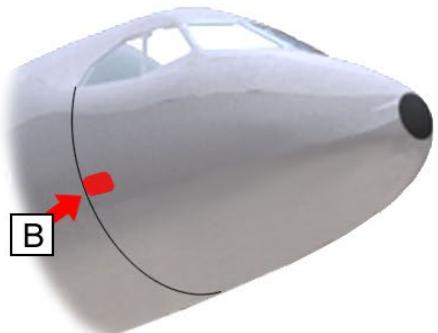
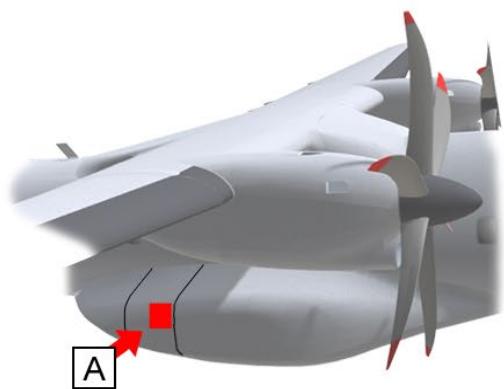


Figure 1-15 Hydraulic System and Oxygen System Servicing Points

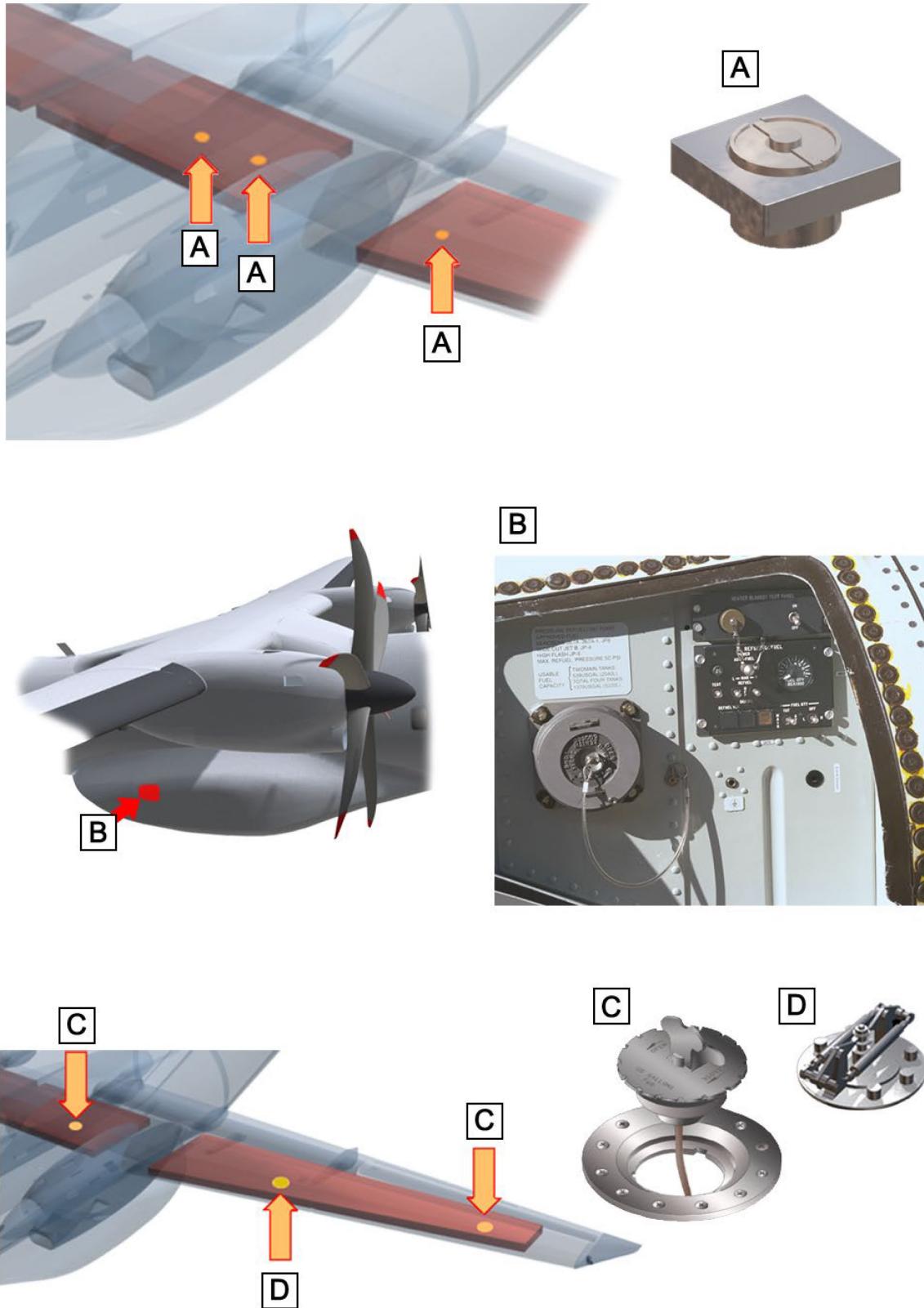


Figure 1-16 Fuel System Servicing Points

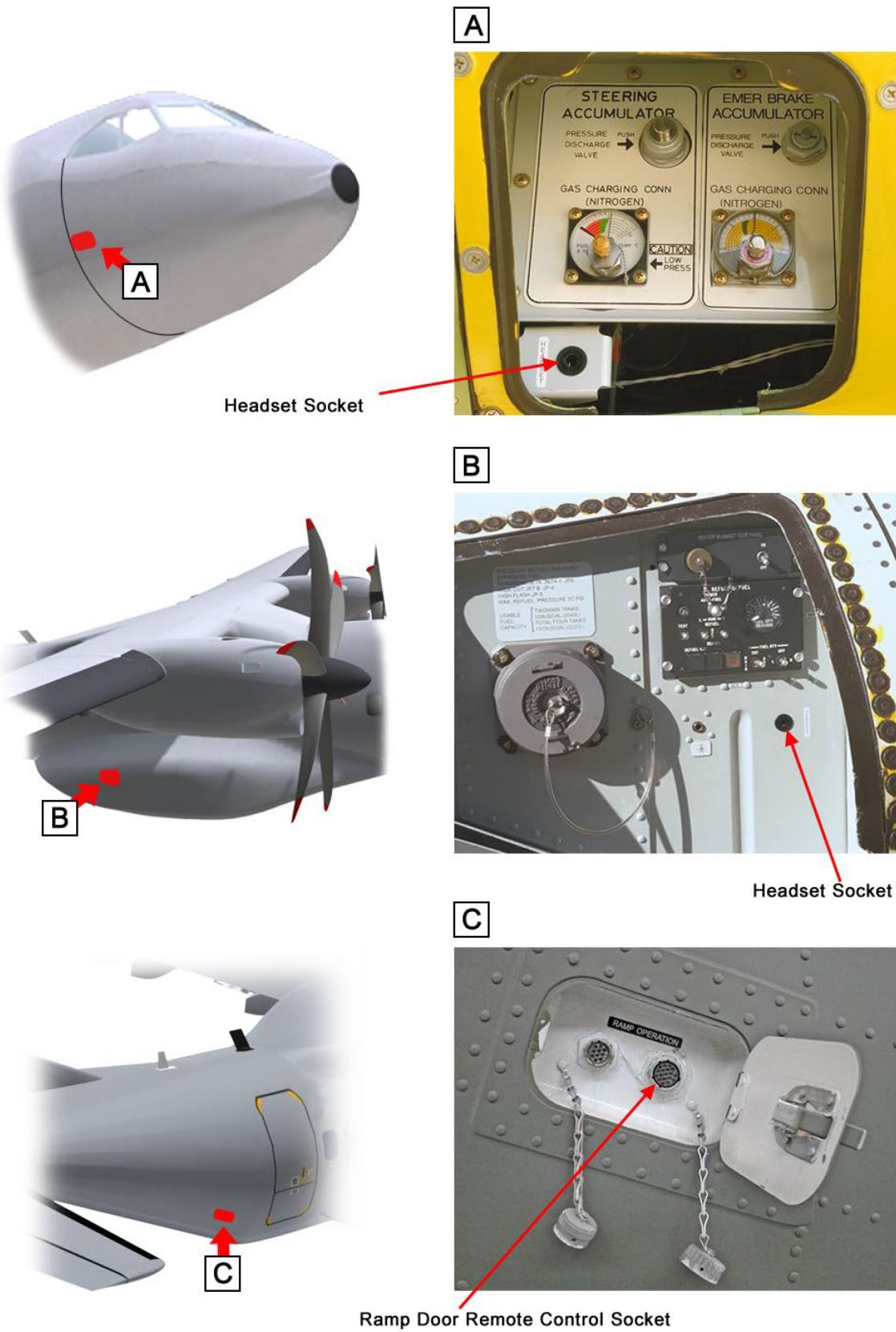


Figure 1-17 Headset and Ramp Door Remote Control Sockets

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