02-50 ATA 50 – STRUCTURE

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INTRODUCTION

The structural design of the 900EX EASy airplane conforms to a fail-safe structural design concept. The airplane mainly employs high-strength aluminum alloys in its structure.

The structure design is based on fatigue and damage tolerance requirements.

The fuselage is a fully monocoque structure made of high strength aluminium alloy. The airplane structure also includes other high technology materials such as titanium, corrosion resistant steel, and carbon composites for primary structures, fiberglass, and Kevlar for the secondary components.

The primary airplane structure has a structural life limit of 30,000 flights or 45,000 flight hours.

The main airplane structure consists of fuselage, wings, powerplant pylons, landing gear and empennage.

The fuselage includes the main entry door, the baggage compartment and the mechanic servicing compartment doors, windows, access panels and the emergency exit.

PRINCIPAL DIMENSIONS

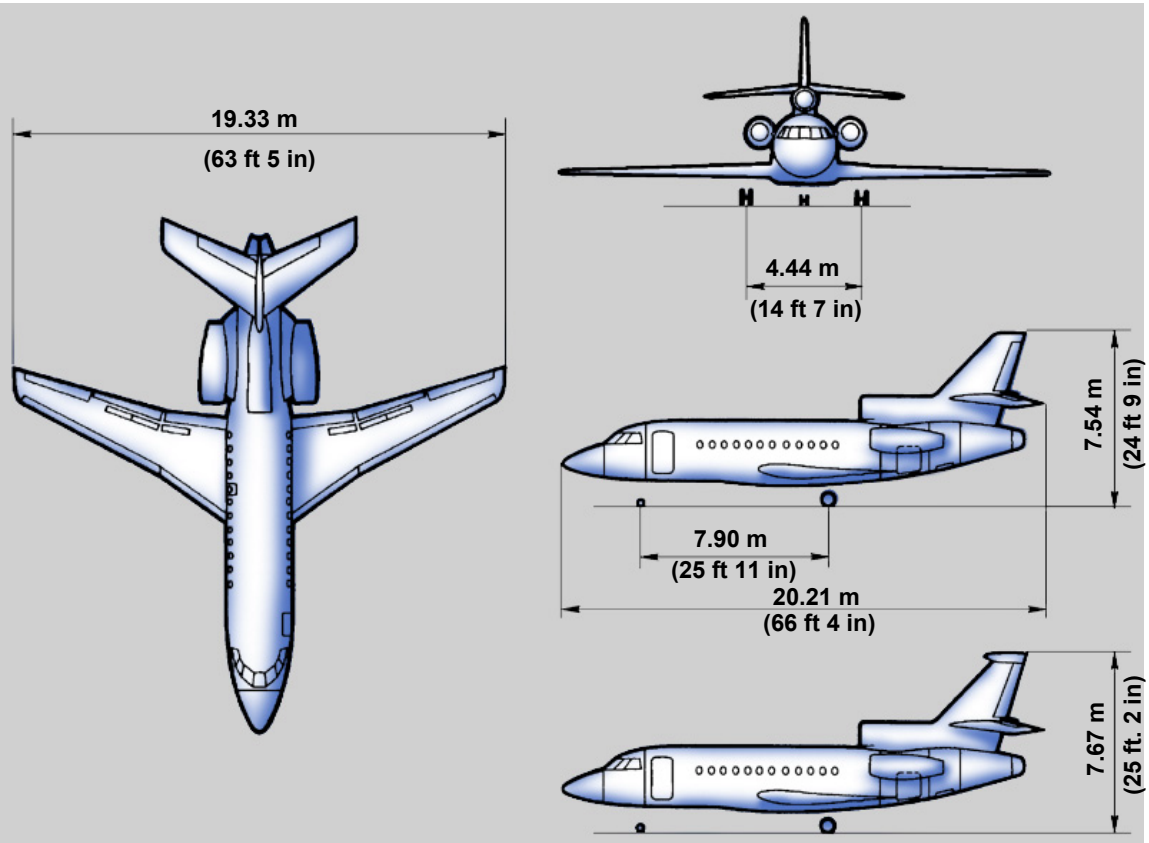

FIGURE 02-50-05-00 PRINCIPAL DIMENSIONS

OVERALL LAYOUT

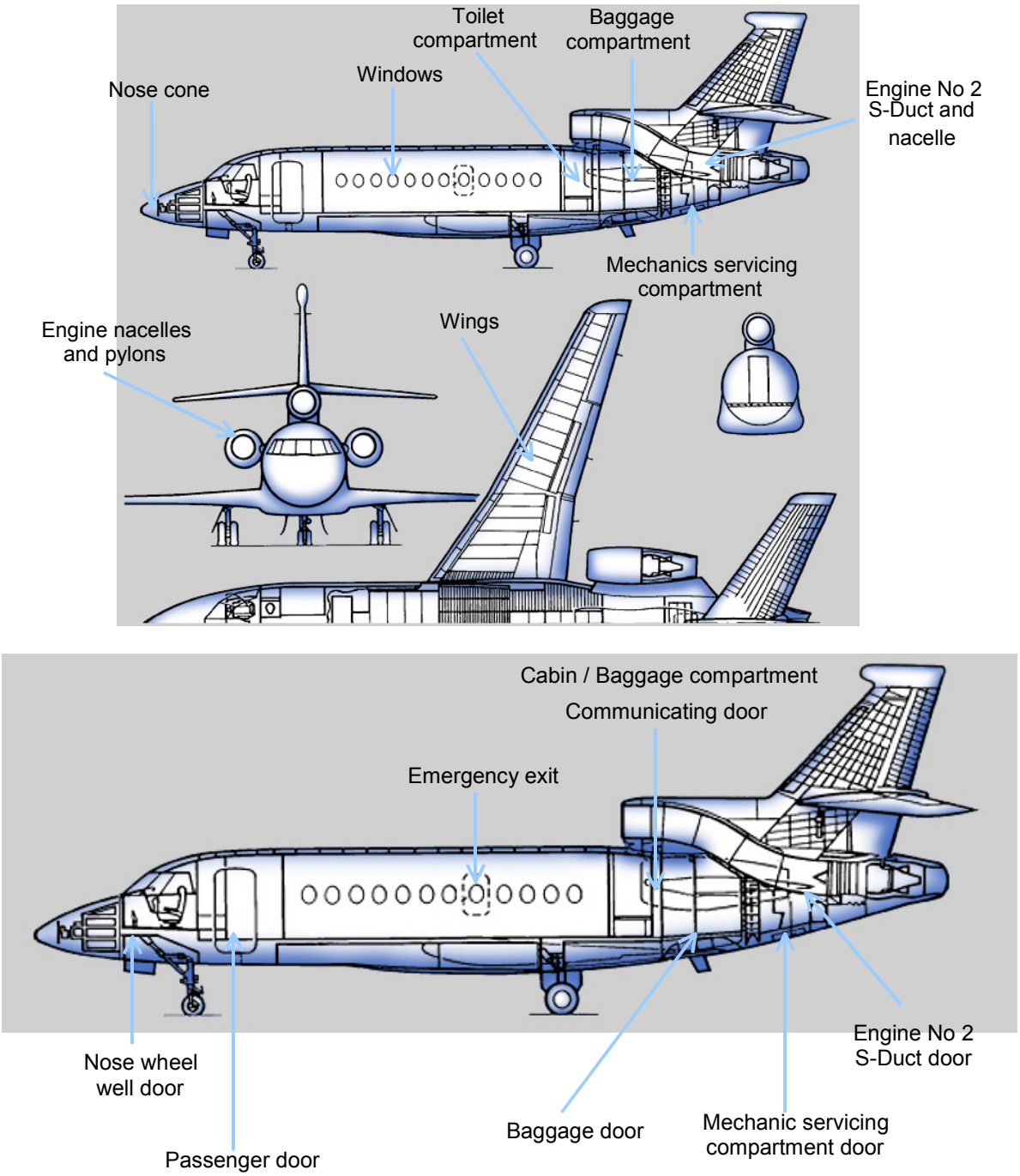

FIGURE 02-50-05-01 THREE VIEW DRAWING

CABIN LAYOUT

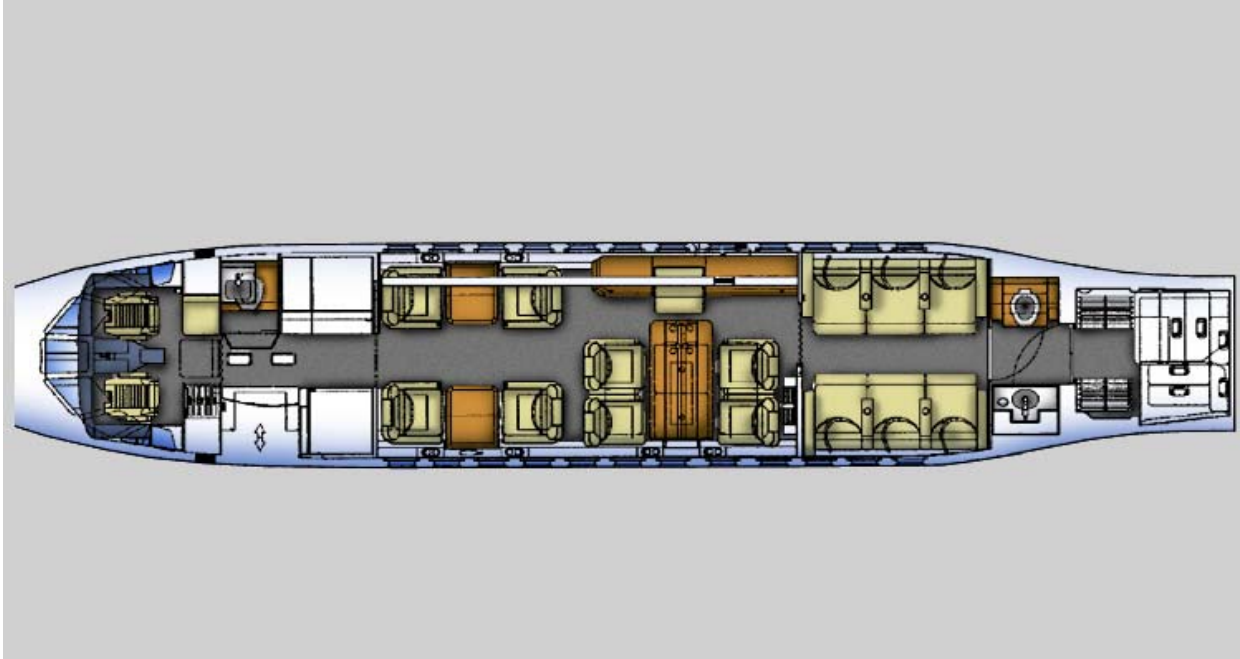

FIGURE 02-50-05-02 EXAMPLE OF CABIN OVERVIEW

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FUSELAGE

The fuselage is an all-metal fully monocoque structure with circular bulkheads.

It is divided into three major sections:

- the nose section extends the length of the radome to the forward flight deck bulkhead,
- the center section is pressurized and extends from the forward flight deck bulkhead to the baggage compartment partition. It includes the flight deck, passenger cabin, lavatory, wing attach points, and front and rear fuel tanks,
- the aft section includes the baggage compartment and the rear structure, which supports the empennage, mechanic servicing compartment, APU, and the three-turbofan engines. The baggage compartment is pressurized and is accessible in flight at proper altitudes.

The nose cone, the passenger/crew door, the baggage compartment door and the mechanic servicing compartment door are locked by means of common key.

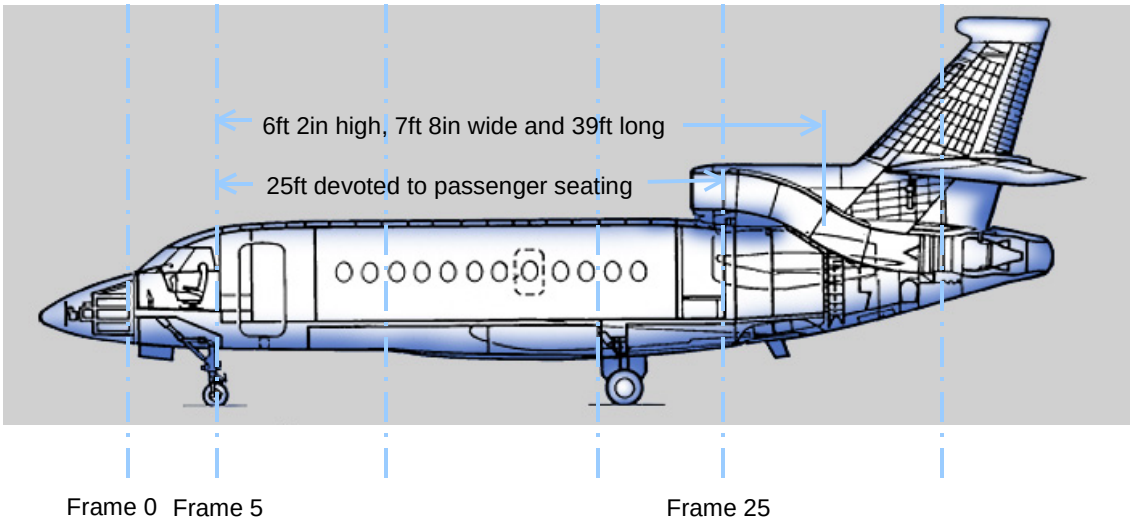


FIGURE 02-50-10-00 FUSELAGE FRAME DESCRIPTION

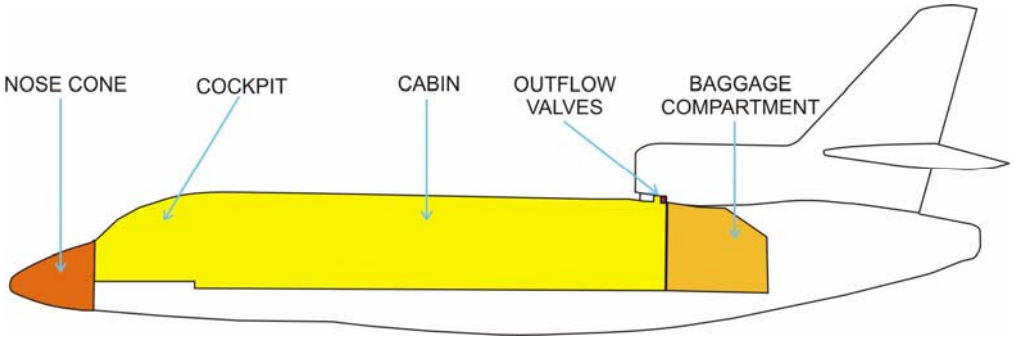


FIGURE 02-50-10-01 PRESSURIZED AREAS

NOSE CONE

The nose cone is a composite structure made. It is pressurized and can be slid forward and locked or lifted for better access and locked in open position by a compensating rod. The nose cone houses radar, avionics, and other optional equipment.

Pilots and components protection (electrical wirings or flight control system) behind frame 0 is provided by shields and energy absorption, during impact on avionics equipment installed on the chassis attached to frame 0.

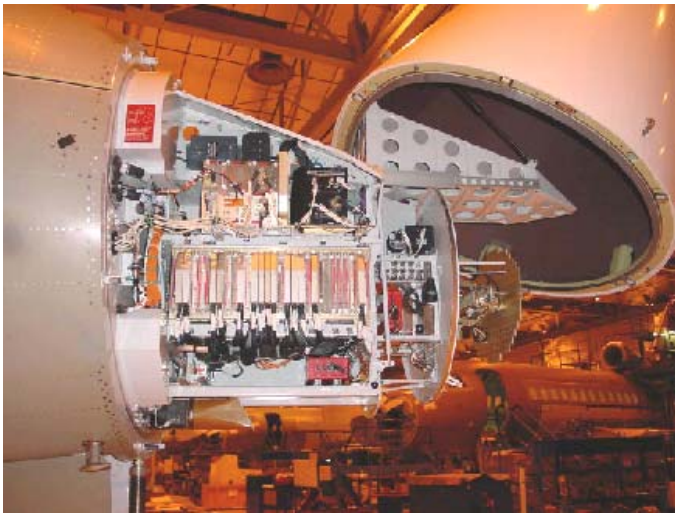
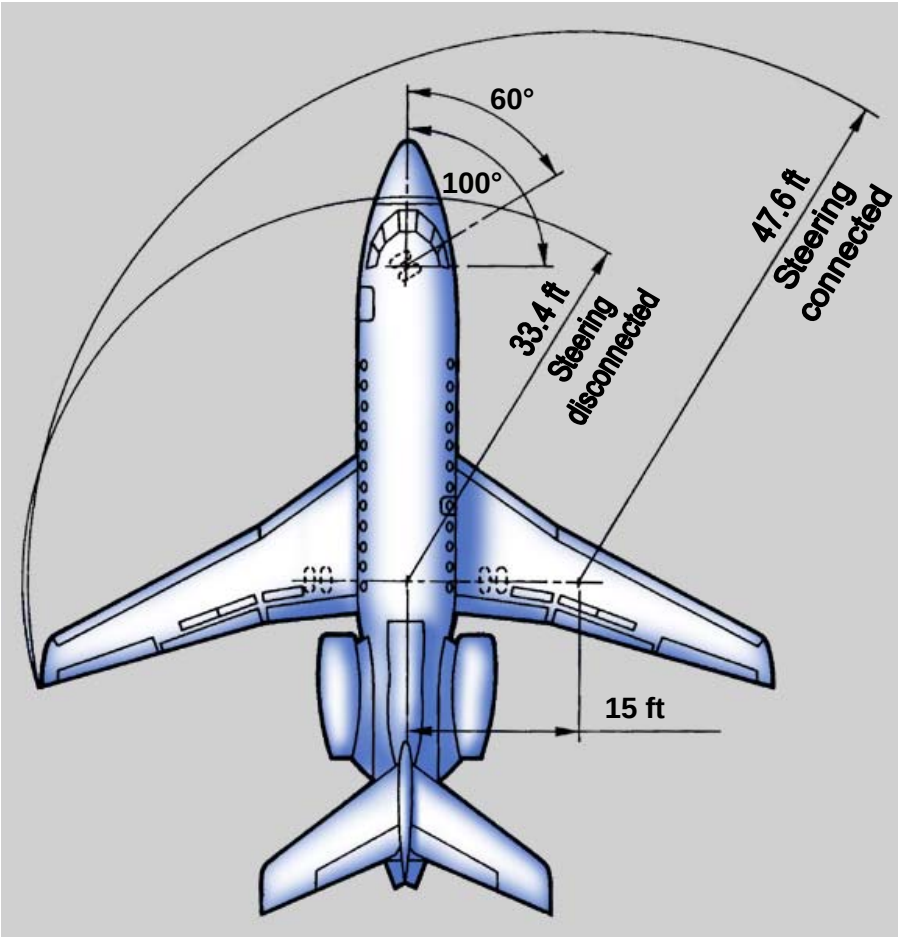


FIGURE 02-50-10-02 NOSE CONE OVERVIEW

LANDING GEAR

GENERAL



Landing gear:

- wheel base 25.9 ft
- wheel track 14.6 ft

FIGURE 02-50-10-03 GROUND MANEUVER CAPABILITY

The landing gear is a retractable tricycle-type with dual wheels on all landing gears. It is electrically controlled and hydraulically actuated. The hydraulic system powers the nose wheel steering, which is electrically controlled from the pilot station.

MAINTENANCE ACCESS DOOR

A maintenance access door, located in the ceiling of the nose wheel well, allows access to the instruments behind the instrument panel.

FIGURE 02-50-10-04 NOSE WHEEL WELL DOOR

CAUTION

No warning notices that this door is in place or locked.

FLIGHT DECK

The flight deck can seat two pilots and also an additional crew member with an optional jump seat.

The flight deck is separated from the passenger cabin by a partition and a sliding door. It is sound-proofed and has thermal insulation.

Two crew seats are adjusted for support and comfort. The seats include a quick-disconnect combination lap belt and shoulder harnesses with inertia reels, adjustable lumbar supports, and vertical / horizontal adjustments. The seat cushions are removable.

FLIGHT DECK WINDOWS

Flight deck windows include a three-part windshield, two side windows (the pilot side is sliding), and two rear windows. The windows are made of bird impact -resistant, chemically tempered glass sandwiched panels. They are electrically heated.

The pilot forward side window may be open on the ground. If necessary, the window may be open in flight to aid in evacuation of smoke and fumes or during landing if forward vision is obscured. The window has a positive lock on the inside of the window frame.

FIGURE 02-50-10-05 PILOT FORWARD SIDE WINDOW

PASSENGER DOOR

FIGURE 02-50-10-06 PASSENGER DOOR

The passenger door is located on the left side of the cabin, immediately aft of the flight deck.

It opens outward and down. Integral stairs and handrail are provided to access the airplane.

The door may be open from either the inside or outside. A key lock is provided on the exterior for security when the airplane is unattended.

A CAS message (DOOR PAX on ground, DOOR PAX during taxiing and in-flight) is displayed on the CAS window when the door is not fully closed and locked.

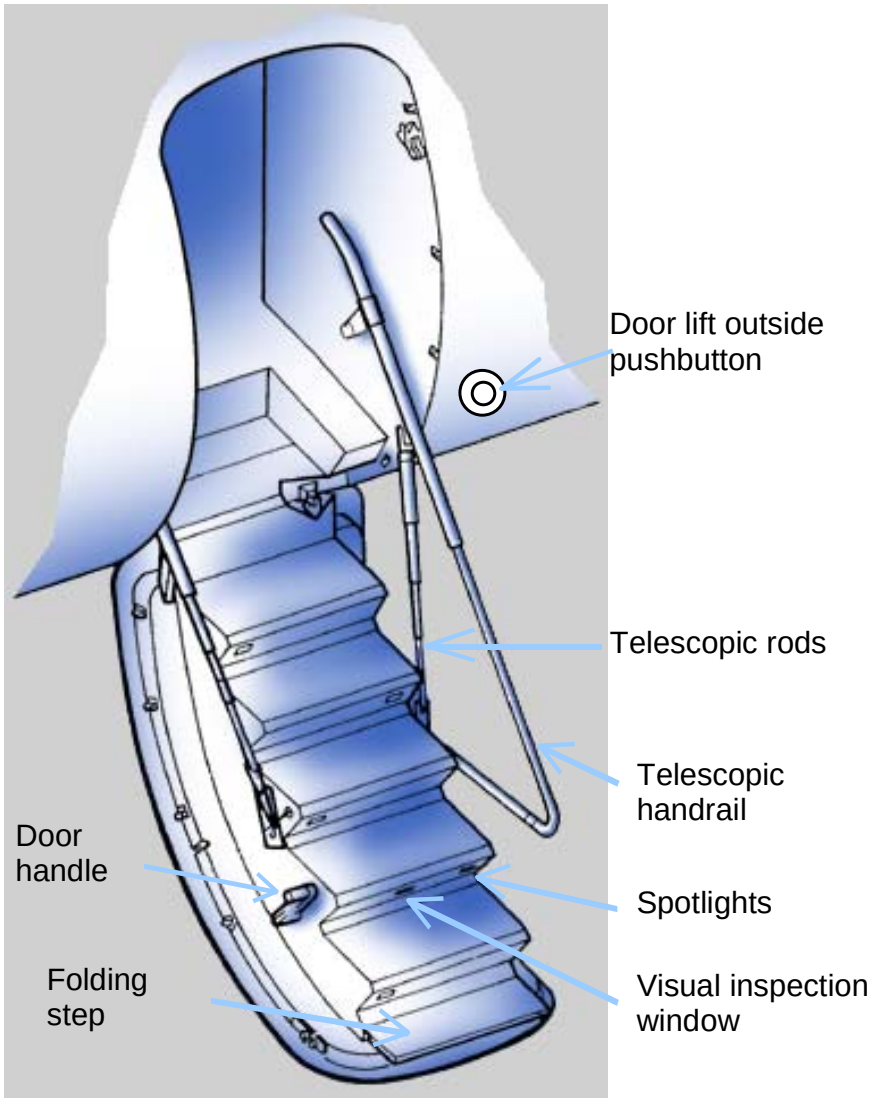


FIGURE 02-50-10-07 MAIN ELEMENTS

The door is electrically lifted (BAT bus power supply). The opening/closing function can be initiated from both inside and outside the airplane through the use of pushbuttons located on the airplane exterior and inside the airplane on a service strip at the top of the left hand cabinet.

FIGURE 02-50-10-08 DOOR LIFT OUTSIDE PUSHBUTTON

FIGURE 02-50-10-09 INSIDE PUSHBUTTONS

A lift inhibit function is provided in the event excessive loads are imposed on the electric door closing motor. The power supply for the motor is supplied from the battery bus but is not disabled by crash logic.

The door is equipped with two proximity sensors (one on each side). When the door is closed, the door rollers push the levers which take place just in front of the two proximity sensors.

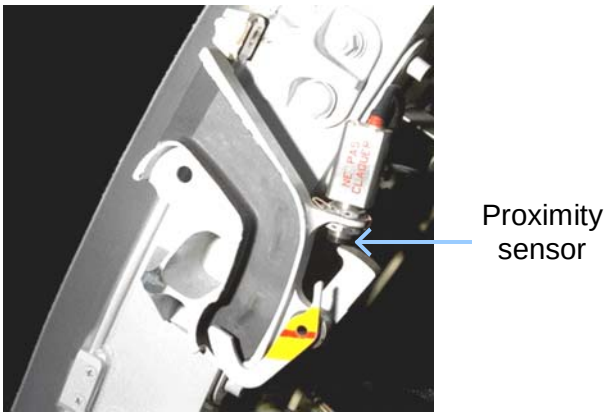


FIGURE 02-50-10-10 PROXIMITY SENSOR

FIGURE 02-50-10-11 ROLLER

The passenger door is also equipped with a visual inspection window. When the door is closed, the two arrows must be aligned.

FIGURE 02-50-10-12 VISUAL INSPECTION WINDOW

CABIN

The passenger cabin extends from the flight deck partition to the rear lavatory. It is thermally insulated and is equipped with side and ceiling panels, consoles, window trim panels, and passenger service units (oxygen masks, gaspers, passenger ordinance signs, and reading lights).

Interior seating arrangements are available for up to 19 passengers. Interior arrangements and furnishings vary among airplanes because of customer requirements and preferences.

The items, which can be customized and tailored for customers, include:

- the arrangement of decorating elements (furniture, partitions, seats, sofas, ...),
- the material used for trim paneling,
- cabin equipment (galley, stereo, video, refrigerator, bar, tables, etc.),
- cabin lighting,
- location of front and/or rear lavatory and the cabinetry,
- miscellaneous customer airplane certified equipment.

FIGURE 02-50-10-13 CABIN LAYOUT

CABIN WINDOWS

The passenger cabin features twenty-four elliptical windows formed of two stretched acrylic material panels. The eighth window aft of the right side is installed in the emergency exit.

FIGURE 02-50-10-14 CABIN WINDOWS

EMERGENCY EXIT

An emergency exit is located on the right side of the cabin, at the eight window aft, over the wing. The exit is locked in a frame and includes a quick-unlocking mechanism, which can be operated from either inside or outside the airplane. Unlocking is controlled from the inside with a handle and from the outside by means of a pushbutton, which is connected to the inside handle.

The emergency exit is not connected to the door (open) warning system. A REMOVE BEFORE FLIGHT pin can be installed for ground security to prevent a hatch opening.

FIGURE 02-50-10-15 EMERGENCY EXIT

WINGS

The airplane relies on a double sweep wing low-mounted on the fuselage.

It is a supercritical profile wing, allowing improvement of the aerodynamic elongation (wing aspect ratio) at 0.8 optimized cruise-Mach.

It includes machined front and rear spars sandwiched between milled upper and lower load-bearing skin panels.

Each wing is equipped with:

- one inboard and one outboard leading edge slats,
- three airbrake panels on the top surface,
- two flaps on the trailing edge,
- one aileron.

The wing box structure forms one large integral (wet) fuel tank in each wing. The rear spar of the box supports the main landing gear and the tracks for the flaps; the front spar supports the rollers for the leading-edge slats.

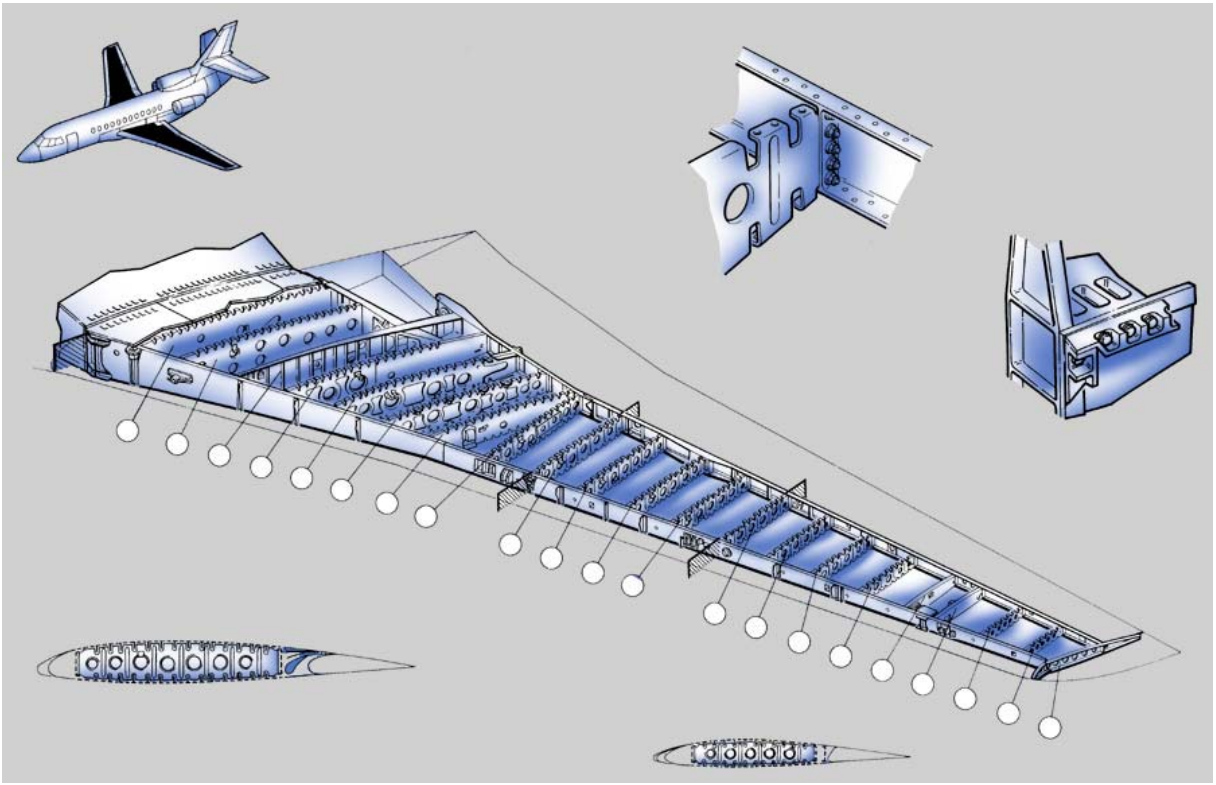


FIGURE 02-50-10-16 WINGS STRUCTURE

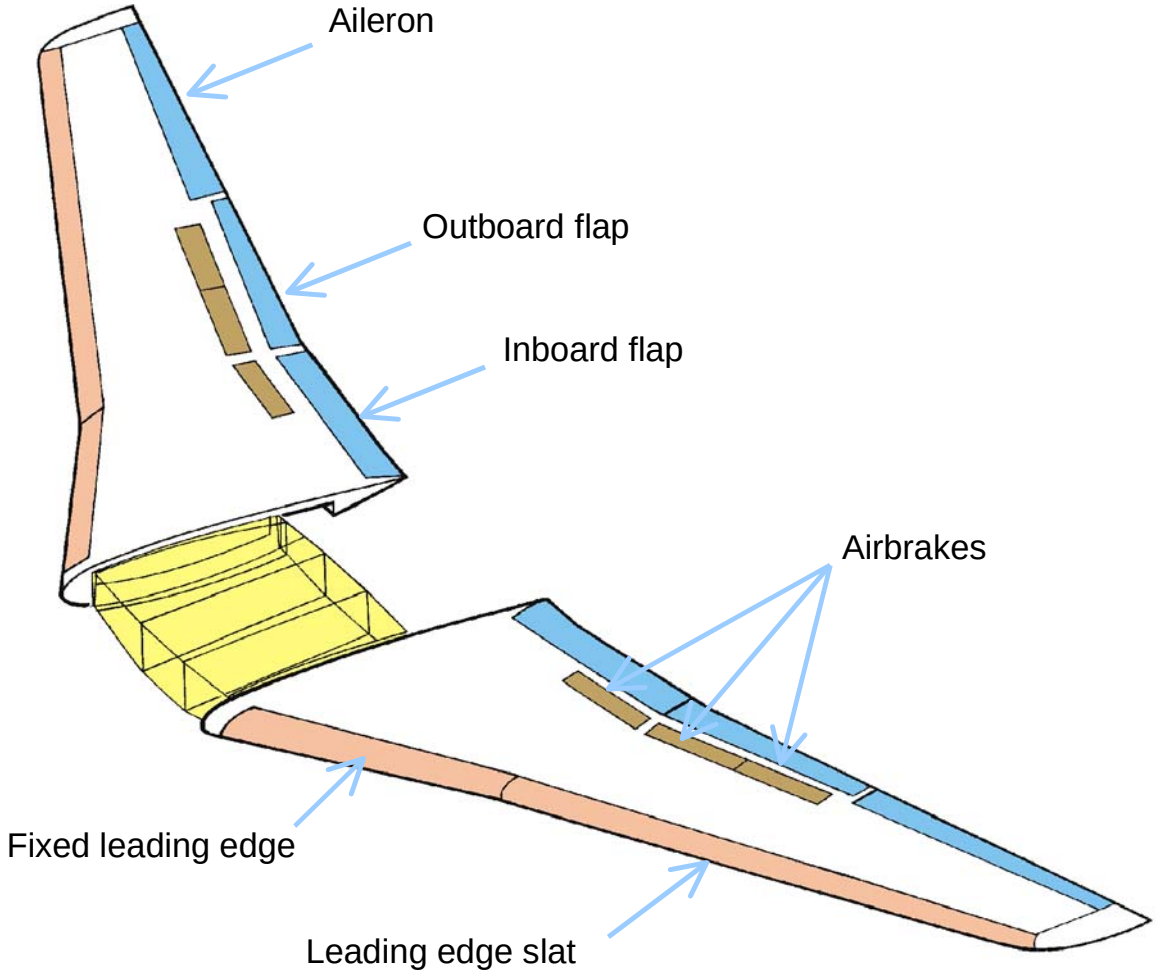


FIGURE 02-50-10-17 WINGS ASSEMBLY

BAGGAGE COMPARTMENT

The pressurized baggage compartment is located in the forward part of the aft section and is accessible in-flight at the proper altitudes.

The compartment volume is 127 cu.ft (3.6 m^3). The compartment is lined and features garment hanger racks in the forward area and folding shelves to maximize baggage storage.

Access to the pressurized baggage compartment is through the door located in the aft partition of the lavatory and left exterior door of the airplane. The exterior door closes electrically and has an integral ladder which, when stowed, contacts a micro-switch located under the third step, allowing the door motor to be powered. The door has a key lock for security.

NOTE

Opening the baggage compartment external door from inside the airplane is not possible.

FIGURE 02-50-10-18 BAGGAGE COMPARTMENT OVERVIEW

The weights indicated below must not be exceeded when loading the airplane:

- baggage compartment: 2,866 lb (1,300 kg),
- not to exceed 123 lb/sq.ft (600 kg/m2).

FIGURE 02-50-10-19 CONTROL ACCESS PANEL

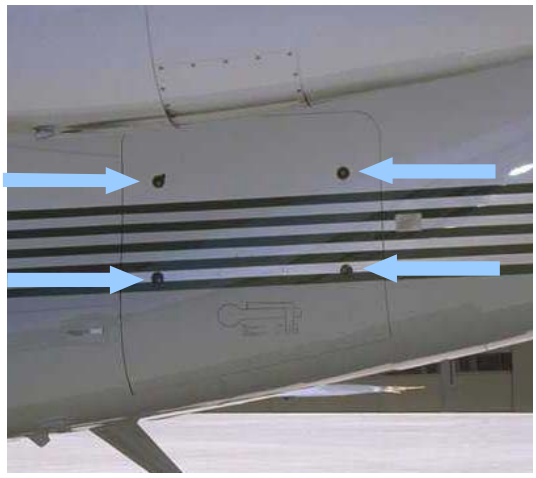
The baggage door is closed using the UP switch located inside the control access panel left of the door.

When the UP button is pushed, the motor runs for 15 seconds. Power to the motor can be stopped by positioning the locking handle to the horizontal position (LOCKED) or operating the DOWN button located inside the door access panel. Power for the motor is powered from the battery bus.

NOTE

The placard on the panel: BEFORE CLOSING DOOR STOW LOWER STEP. The door handle must be manually rotated to unlock and lock the door. The door is gravity open.

When the door is closed, four fluorescent red marks must appear, through the visual inspection windows. They confirm that the four latches are locked.



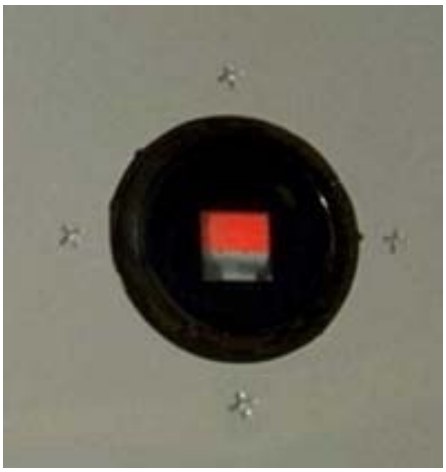


FIGURE 02-50-10-20 RED MARK AND VISUAL INSPECTION WINDOWS

MECHANIC SERVICING COMPARTMENT

The unpressurized mechanic servicing compartment is located immediately aft of the baggage compartment and houses hydraulic, air conditioning and miscellaneous components.

Access to the mechanic servicing compartment is through a door with an attached ladder on the underside of the airplane.

The door is connected with a sensor which activates a **DOOR: REAR COMP** CAS message to advise the service doors are still open prior to ground operation.

FIGURE 02-50-10-21 MECHANIC SERVICING DOOR

The mechanic servicing compartment gives access to the engine No 2 S-duct door.

FIGURE 02-50-10-22 ENGINE 2 S-DUCT DOOR

AUXILIARY POWER UNIT COMPARTMENT

The Auxiliary Power Unit (APU) is located in a fire-proof compartment under the No. 2 engine air intake.

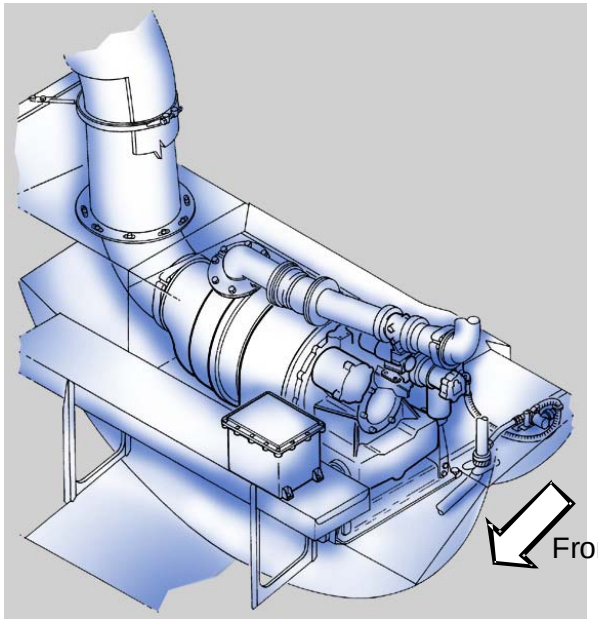


FIGURE 02-50-10-23 APU COMPARTMENT

EMPENNAGE

The empennage consists of the horizontal and vertical stabilizers.

The horizontal stabilizer is mounted midway on the vertical fin, away from disrupted airflow caused by the engines No 1 and 3 exhausts.

The horizontal stabilizer is made of high technology composite materials.

The entire horizontal stabilizer lift angle is adjustable for pitch trim and actuated by an electrically operated jack-screw.

The vertical stabilizer is metal-made and uses spars and stressed-skin construction.

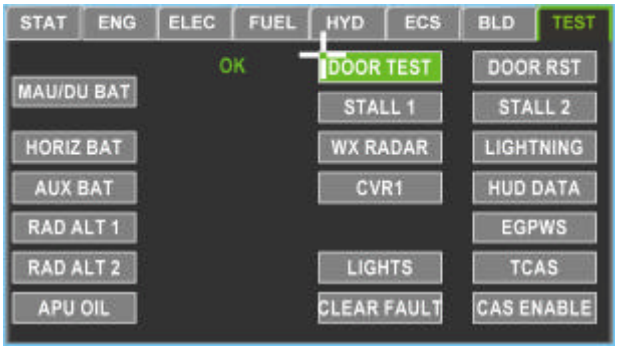
The rudder is trimmed through normal trim motor operation.

FIGURE 02-50-10-24 VERTICAL FIN AND HORIZONTAL STABILIZER

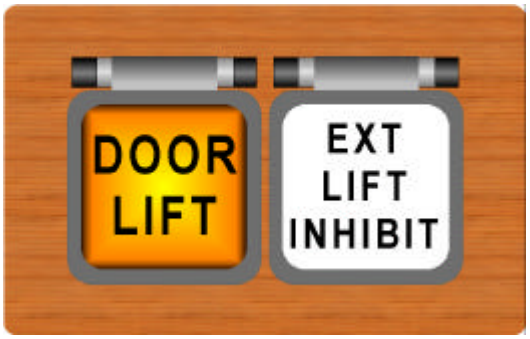
INDICATION

PASSENGER DOOR LIFT TEST

The passenger door guarded pushbuttons are located on the service trip at the top of the LH cabinet.

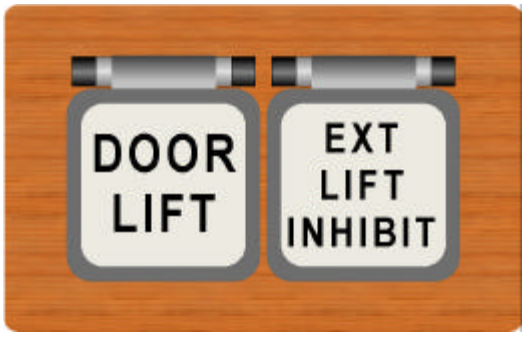


DOOR TEST soft key selected



DOOR LIFT and EXT. LIFT INHIBIT lighted

DOOR ReSeT soft key selected



DOOR LIFT and EXT. LIFT INHIBIT unlighted

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CAS MESSAGES

CAS MESSAGE	DEFINITION
DOOR PAX	In-flight, passenger door is not fully closed and locked
DOOR BAG	In-flight, baggage compartment external door is open
DOOR BAG+PAX	Taxiing and in-flight, passenger door and baggage compartment external door are open
DOOR: CABIN	Aft cabin isolation door is not locked open with fasten seat belts signal on
DOOR: BAG ACCESS	In-flight, baggage compartment access door is open in approach or when altitude > 41,000 ft
DOOR: FWD TOILET SERV	On ground, forward toilet servicing door is not locked
DOOR: REAR COMP	Mechanic servicing compartment door is not locked
DOOR BAG	On ground, baggage compartment external door is open
DOOR PAX	On ground, passenger door is not fully closed and locked
DOOR PAX+BAG	On park, passenger door and baggage compartment external door are open

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