

MDEXPLORER

SYSTEM DESCRIPTION

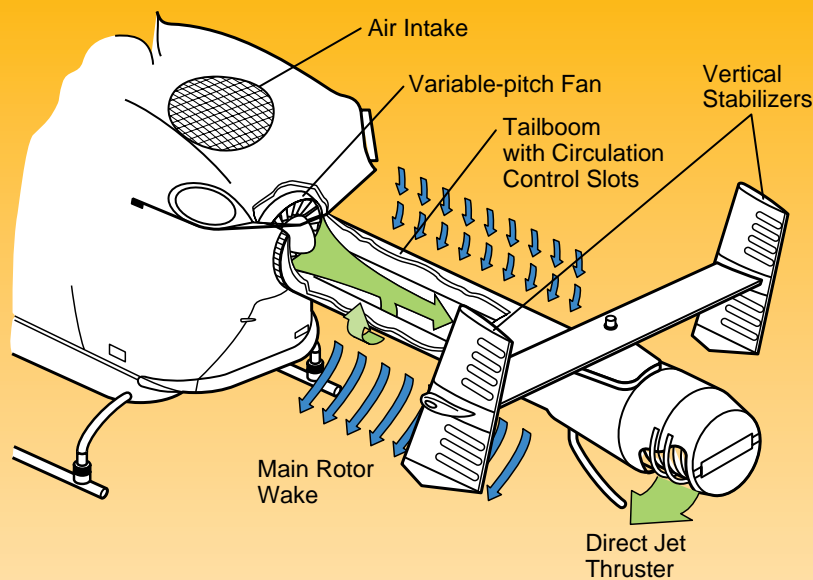
3.5 NOTAR® anti-torque system.

3.5.1 NOTAR® system operation.

Using the natural characteristics of helicopter aerodynamics, the NOTAR® anti-torque system provides safe, quiet, responsive, FOD-resistant directional control. The enclosed variable-pitch composite blade fan produces a low pressure, high volume of ambient air to pressurize the composite tailboom. The air is expelled through two slots which run the length of the tailboom on the starboard (right) side, causing a boundary-layer control called the “Coanda Effect.” The result is that the tailboom becomes a “wing,” flying in the downwash of the rotor system, producing up to 70 percent of the anti-torque required in a hover. The balance of the directional control is accomplished by a rotating thruster.

In forward flight, the vertical stabilizers provide the majority of the anti-torque, however directional control remains a function of the jet thruster.

The NOTAR® anti-torque system eliminates all of the mechanical disadvantages of a tail rotor, including long drive shafts, hanger bearings, intermediate gearboxes and ninety-degree gearboxes.



NOTAR® System Circulation Control

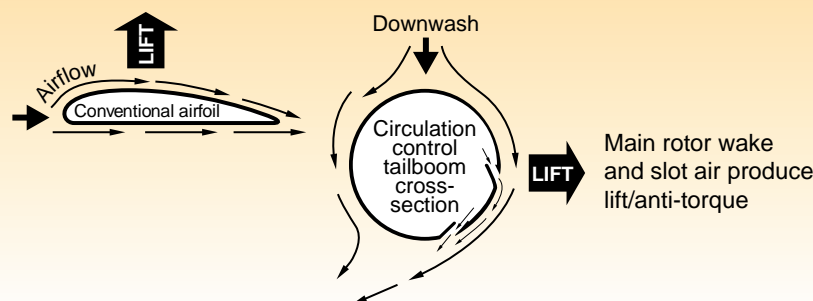


Figure 9. NOTAR® Anti-torque system is a trademark of The Boeing Company.

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3.5.2 NOTAR® fan data.

Number of blades	13	
Direction of rotation	Counterclockwise, viewed looking forward	
Diameter.....	1.83 ft	(0.56 m)
Blade chord.....	0.325 ft	(0.10 m)
Blade RPM, 100% NR	5,412	

3.6 Fuselage.

The lower fuselage is composed of a composite shell and two deep composite keel beams that run the entire length of the aircraft. This structure is designed to absorb energy in an emergency landing by yielding progressively. Rising above the keel beams is a modified “A-frame” of aluminum, within which all of the passenger compartment is enclosed, and to which the crew stations are attached. The outer shell is a one-piece semi-monocoque composite structure, within which is embedded a very fine, expanded aluminum mesh (“AstroStrike”) for lightning protection. All aluminum parts are coated with primer paint for protection, and all exposed aluminum parts are painted. “Wet” rivets and integral fiber-glass barrier strips are used to connect composite skins to the structural frame to prevent galvanic corrosion. Built-in steps, handholds and generous work platforms permit ease of daily pre-flight inspections.

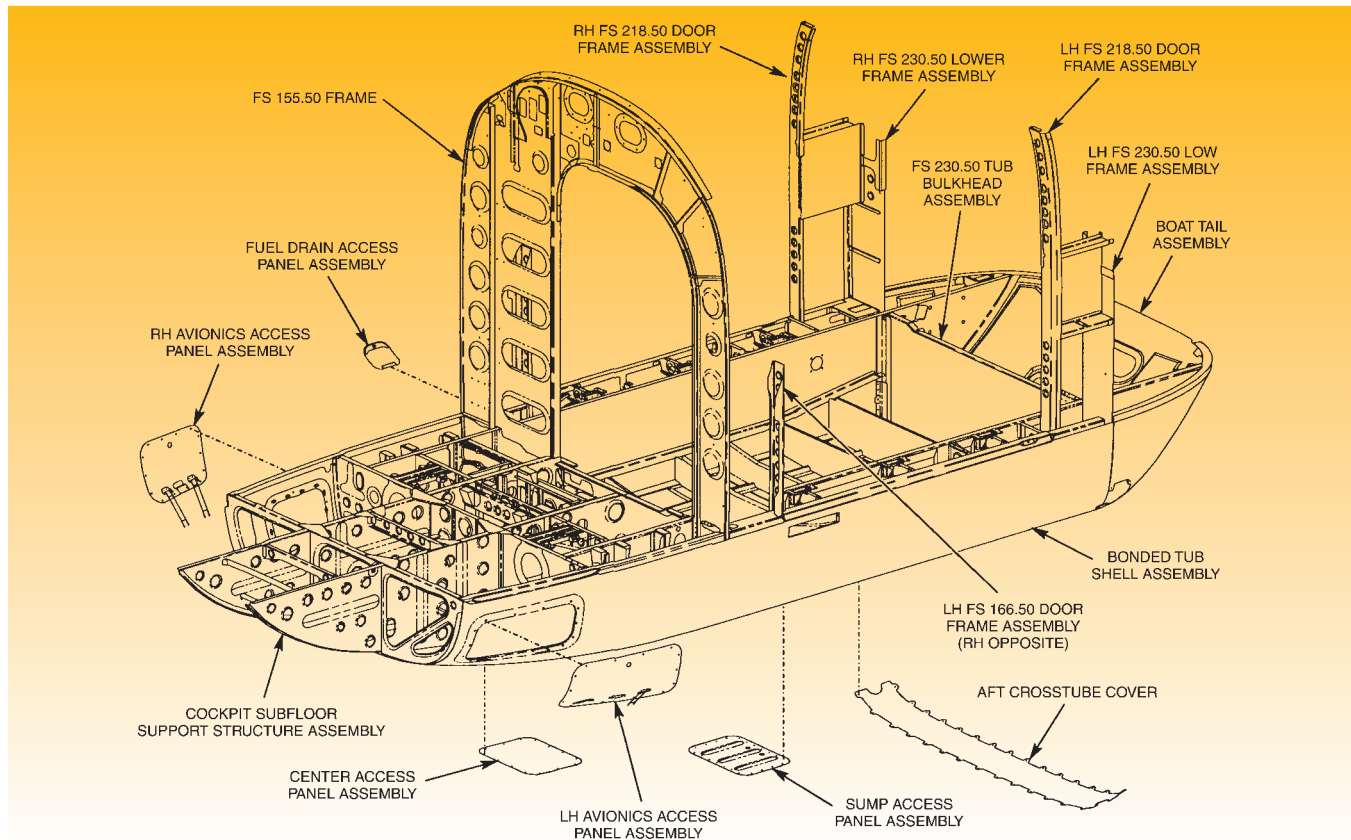


Figure 10. Lower Fuselage

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For discussion purposes, the fuselage will be divided into these major subsections:

- Nose
- Cockpit
- Cabin
- Engine deck
- Doors

3.6.1 Nose section.

Beneath a high-visibility set of tinted crew transparencies is the battery compartment, which is located for convenience at about waist high.

3.6.2 Cockpit.

The spacious cockpit was designed to provide a side-by-side seating arrangement for the pilot (on the right-hand side) and a passenger/copilot on the left. A small panel, allowing greater VFR visibility, yet adequate for basic utility up to single pilot IFR instrumentation, is made possible because of the combining of many functions into the IIDS. The only overhead item is the rotor brake, with all other switches and controls forward of the pilot's shoulder, and within easy reach. The crew seats are of a "stroking" energy-absorbing style that meet the new FAR Part 27.562, with five-point restraints, and are adjustable fore and aft. The anti-torque pedals are also adjustable. Beneath the cabin two large bays are available for remote avionics. A uniquely-shaped cyclic control, which hinges below the floor, allows the pilot to move the control to any extreme and still keep his or her forearm resting on his or her thigh. The collective controls incorporate a magnetic "clutch" which holds the last position in which it was placed by the pilot, and have "throttle-like" FADEC overrides which allow the pilots the option of direct mechanical control of the fuel control if desired. The placement of the control closet directly behind the pilot allows a view of the full interior by looking over the left shoulder.

3.6.3 Cabin compartment.

Although the MD Explorer® is categorized as a "light twin" (FAR Part 27), the 172.5 cubic foot cabin volume and six passenger seats are the equivalent of heavier "medium twins" (FAR Part 29). The 57-inch wide cabin gives each passenger 19 inches (48.3 cm) of shoulder room. The individual "stroking" (energy absorbing) seats are mounted both to the ceiling and floor, and also meet the requirements of FAR Part 27.562. They also protect the occupants when subjected to loads resulting from decelerations of 30 g's vertical and 18.4 g's forward. The seats are interchangeable and can be folded up for additional cargo storage, or removed or installed without tools, in about three minutes. Floor-to-ceiling clearance is 49 inches (124.5 cm). Sliding doors on each side are 52 inches (132.1 cm) wide, and incorporate large, jettisonable windows which provide extraordinary outside visibility. An additional hinged cabin access door is located aft, under the tailboom, for baggage or alternative loading of even the largest litter in current use. The floor is flat, with 24 recessed cargo tie-downs, and maximum static load is 115 pounds per foot² (561.5 kg/m²) to withstand 20 g's vertical in an emergency landing with 1,500 lb payload. Passengers have

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access to a thermostat control next to the right rear seat to adjust cabin heat. A passenger step is located on the right and left side. Easy access for daily inspection of the NOTAR® fan is provided just inside of the aft door, and a courtesy light is provided.

3.6.4 Engine deck.

The engine deck forms the roof of the cabin area, and acts as a firewall and sound attenuator. Retention supports for major mass items such as the two engines and transmission are rated at 17 g's vertically, well in excess of current FAA standards. Also located here are the dual hydraulic boost pumps, engine and transmission oil coolers, and the static mast support tubes. Cowlings are held open for hands-free inspection by pneumatic rods, which also prevent contact with the rotors should the closing mechanism be inadvertently left unlocked prior to flight.

3.6.5 Doors.

Two hinged doors are located next to the pilot and copilot/front passenger. These doors contain storage cases, and have individually adjustable fresh air ports. A pneumatic device holds the doors open, and protects against wind gust damage. The doors also may be removed for flight, and speed is then restricted to 100 knots.

A 52-inch (132.1 cm) sliding door on each side of the cabin provides easy entry and exiting and permits cargo and litter loading in full view of the pilot, away from engine exhaust and anti-torque devices. Large windows give passengers panoramic views, and are jettisonable for emergency egress. The doors may be secured open for flight, with speed restricted to 60 knots. The doors may be removed for flight with a speed limitation of 100 kts.

A trapezoidal hinged door is located under the tailboom for baggage or alternative litter loading into the main cabin area. This door may be removed for flight with no speed restrictions.

Keyed locks are on all door handles.

