

# Technical Description

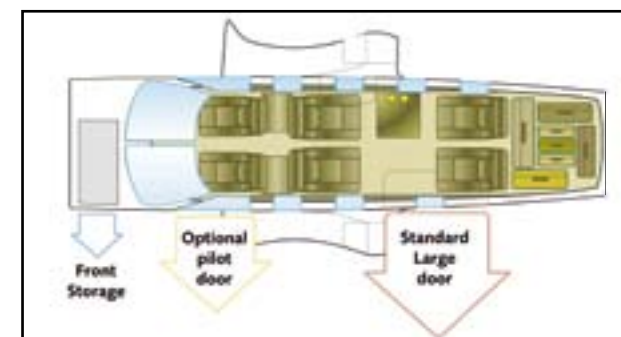


## Cabin

The TBM 850 cabin is 14.96 ft long from the forward pressure bulkhead to the aft pressure bulkhead. The constant section of the cabin provides a continuous width of 48 inches. Cabin height is 48 inches.

Seven rectangular windows (11 x 13.5 inches) are provided in the cabin with pleated pull down sun shades. The standard interior configuration of the aircraft consists of four seats and a two piece rear-bench seat (four forward and two aft facing). Each seat includes a headrest, a seat belt and a shoulder harness with inertial reel. Cabin lighting consists of dome lights, baggage compartment lights, access stair lighting, and individual reading lights at all seats.

Two separate baggage areas are provided for a total baggage capacity of 330 pounds. An interior baggage area is located behind the rear passenger seats. In this area, the weight limit is 220 pounds. The TBM 850 cabins contains the most elegant and luxurious environment as you would expect from the best European design and craftsmanship.



Accessing the cabin is easy thanks to a large electric door, stairs and a ramp. When you enter the TBM 850, you not only enter the fastest aircraft in its category, you also enter into a world of luxury and style. True European styling is on display throughout the cabin and supple leather and fine wood await you and your passengers.

Whether the passengers want to rest, work or entertain themselves the TBM 850 cabin offers the best amenities: comfortable leathers seats with adjustable backrests and folding armrest, individual fresh-air or warm-air vents, individual reading lights, a large folding executive table, 14/24V power outlets, CD or XM satellite music or radio, and many storage cabinets.



**The TBM 850 offers spacious, quiet and comfortable cabin and environment.**

## Airframe

The TBM 850 airframe design employs several fail-safe structural design techniques, including the use of multiple load paths and a crack-stopper band to maximize sub-system reliability/durability and structural life. The TBM 850 aircraft is essentially identical to that of the TBM 700C2 model. The TBM 850 airframe designers carefully chose a variety of aluminum alloys, high strength steel (including titanium) as well as advanced composite materials to maximize structural strength and durability while minimizing aircraft weight and both acquisition and life-cycle support costs. The majority of the TBM 850 structure is manufactured from conventional aluminum alloys. The exceptionally strong wing spars, flap tracks and windshield frames are machined from solid bars of aluminum.



Fail-safe Spar Design

Over the past 10 years, EADS SOCATA has thoroughly validated the TBM aircraft structural design by performing rigorous strength and durability tests – the results of which are summarized in Table 1.

### Fatigue Test Results

Pressurization Cycles .....	38,568
Equivalent Simulated Flying Hours .....	68,352
Equivalent Simulated Landings .....	136,800
<b>G-Load Test results</b>	
Positive G-Force Limit .....	+6.1g
Negative G-Force Limit .....	-4.1 g
Extreme Positive G-Force Limit .....	+9 g
Extreme Negative G-Force Limit .....	-6 g
Certified Positive Flight Load Factor Limit .....	+3.8 g
Certified Negative Flight Load Factor Limit .....	-1.5 g
Structural Life Limit .....	12,000 flights / 16,200 flying hours (subject to future increases)

## Wings

The TBM 850's aerodynamically optimized wings incorporate fail-safe technology and offer superior handling qualities throughout the flight envelope. The TBM 850 wings are built around two wing spars, one forward and one aft, that are milled from a block of aircraft aluminum alloy. Two milled aluminum carry-through spars provide additional rigidity and strength. Placement of the TBM 850 wings aft of the pilot's field of vision substantially improves the ease of operation – especially during landings. The TBM 850's has a wing-loading in excess of 38 pounds per square foot and combined with its 6.5° wing dihedral provides a stable ride in turbulent conditions.

## Empennage

The empennage consists of a vertical stabilizer with rudder and a 6.5° dihedral horizontal stabilizer with elevator for superb maneuverability at high and low speeds. Mechanical push/pull tubes assure reliable actuation of the TBM 850's control surfaces throughout the flight envelope.

## Landing Gear and Braking System

The tricycle landing gear system is electrically controlled and hydraulically actuated. The main gear retracts inboard into the wings. The nose gear retracts rearward into the lower engine compartment and is completely enclosed by the gear doors when retracted. An audible (horn) warning system in the cockpit will sound either if the power lever is reduced within half inch of the aft stop, or if the flaps are extended to the landing position when the gear is in the retracted position. In the unlikely event the primary gear extension system fails, a hand-pump linked to an emergency hydraulic reservoir is available for the pilot to use in manually extending the gear. Landing gear braking is provided to each main wheel via hydraulic discs which can be

augmented with engine thrust reverse power to enable a fully loaded aircraft to stop in much less than 1500 feet.

## Powerplant

The TBM 850 is powered by the Pratt & Whitney Canada PT6A engine. Variants of the PT6A are in use on more than 100 different types of aircraft. Safety proven, from years of regional airliner and commercial aircraft operations with over 33,000 engines in the field (spanning over 280 million flight hours), the PT6A is recognized as one of the most reliable aircraft powerplants ever built. The PT6A-66D model used on the TBM 850 has a thermodynamic rating of 1,825 horsepower and a flat-rated output of 850 shaft horsepower making it the most powerful PT6A (in terms of thermodynamic power) yet built.

P&WC PT6A Turboprop  
Over 280 million  
flying hours in service



## Fuel System

The two TBM 850 fuel tanks are located in the wings and have a total usable fuel capacity of 291.6 gallons. A capacitance-type fuel gauging system provides accurate readings at all flight attitudes. Every 10 minutes in flight, and every 70 seconds on the ground an electrical sequencing unit automatically switches from one tank to the other and continuously maintains tank balance without increasing the pilot's workload. The high-pressure engine-driven pump is capable of operation alone. However, a low boost mechanical pump is pressuring the fuel line. As a back-up, a high boost electrical pump is located after the firewall in case of failure of the low boost pump. The primary Fuel Control selector is electric and completely automatic. If necessary, the pilot can manually control fuel flow. The fuel tanks are coated to provide maximum protection against microorganism damage.

## Pressurization and Environmental System

The dual zone pressurization and air conditioning systems utilize engine bleed air to pressurize, heat/cool, and defog the cabin and cockpit windows. The pressurization controller, conveniently located on the central panel between the pilots, provides variable cabin altitude and rate of change control. The system is capable of maintaining a 9,350 ft cabin altitude at 31,000 ft and a 6,400 ft cabin altitude at 25,000 ft. Sea level cabin altitude can be maintained up to 14,430 ft. The cabin temperature is controlled from the cockpit for the two zones or separately with a controller located in the rear of the cabin. The engine-driven compressor air conditioning system is fully automatic and can quickly cool the aircraft on hot days as soon as the engine is running.

## Anti-Icing System

The TBM 850 anti-icing system uses a combination of engine exhaust gas, an engine inertial separator, electrical windshields, electric propeller de-ice, electric stall warning heating along with pneumatic boots keep the wings, flight control surfaces, wind screens (front and side), propeller, pitot-static and stall warning system free of ice. A high speed, automatic cycling, pneumatic boot system is used to deice the leading edges of the wings, horizontal stabilizer and vertical stabilizer. The TBM 850 deice boot design virtually eliminates ice bridging in flight due to its automatic cycling every 67 seconds. A wing inspection light is provided to monitor ice buildup during night flight.

## Cockpit Controls

The TBM 850 comes equipped with dual controls as standard equipment. The control system includes two control wheel columns, adjustable rudder pedals, hydraulic brakes and mechanical nose gear steering. Pushrod and cable systems are used to actuate the rudder, elevator, spoilers and ailerons. Primary pitch and yaw

trim are electrically powered through switches mounted on the pilot's control wheel, and electric aileron trim and manual pitch trim are on the central pedestal. The TBM 850 has a full set of flight instruments for each crew position independently fed from separate Pitot and Static systems. The engine instruments are located on the left side of the central panel allowing good visibility for both crewmembers. The crew seats include the standard three-point restraint harness and are fully adjustable allowing the pilot and co-pilot a high level of comfort on long flying days. Instrument lighting includes cockpit floodlights, blue/white background lighting for all instruments and switches, overhead map lights and control yoke map lights.

## Oxygen System

The emergency oxygen system is supplied by a 50.3 cubic foot composite external bottle that can sustain four passengers and two crew members for one hour above 15,000 feet. If cabin pressurization is lost, oxygen will be provided to the crew with two pressure-demand masks and with four constant-flow masks for the passengers. Passengers masks are automatically deployed in case of sudden depressurization with an option for manual deployment. The oxygen system was designed for safety and easy servicing by maintenance personnel by placing the oxygen bottle in the right cabin allowing access to the bottle without the need to enter the cabin area.

## Visibility from the Cockpit

The TBM 850 cockpit includes four large windshield sections that provide the pilot with over 180 degrees of maximum visibility from both crew positions. Since the TBM 850 wings are installed behind the cockpit, both crew positions also have an excellent downward visibility. Additionally, the TBM 850 has a negative deck angle in the landing configuration with full flaps extended which further improves forward visibility during the landing phase.

## Standard Cockpit Instruments and Avionics

### Classic Flightdeck

The TBM 700/850 is equipped with a state-of-the-art avionics system that includes Honeywell's EFIS 40 Flight Displays, a 3-axis autopilot, color weather radar, terrain avoidance system, in-flight traffic avoidance system (TCAS), dual Global Positioning System (GPS) and an engine health/trend monitoring system. All components selected for the TBM 850 have proven performance histories and are the most reliable and capable systems available today.



## Typical Instruments & Avionics

2 Tube Color EFIS (EHSI/EADI)

1 KFC 325 A/P (Auto-Pilot)

2 RVSM Approved Altimeters

2 Garmin GNS 530 (IFR Com/Nav GPS)

1 Radar Altimeter KRA 405B

1 Multi-Function Display Garmin GMX 2000 + GDL 69A XM Weather + XM Radio

2 Transponder Garmin GTX 327/330

1 Weather Radar Honeywell RDR 2000

Honeywell IAHS including :

- KMH 880 (TAS Traffic Alert System & TWAS Terrain Warning System)
- WX 500 Stormscope displayed on Garmin GMX 200 MFD

2 Airspeed Indicator

2 Vertical Speed Indicator

1 Electrical Attitude Indicator

1 Vacuum Stand-By Attitude Indicator

Engine Control Gauges

Electric Pitch and Rudder Trim

Gas Generator Tachometer

Shadin ETM 700 Engine Trent Monitoring System

Dual-Band ELT with Aircraft Identification

## All-Glass integrated Flightdeck

In 2008, EADS SOCATA introduced the TBM's all-glass integrated flightdeck, with the G1000 suite, which consists of the latest technology available today.

The TBM850 comes standard with the G1000 suite which includes the following:

- 2 GMA 1347 C Dual digital audio controller with integrated marker beacon receiver, intercom and public address capability on outer side for pilot and co-pilot side.
- 2 GDU 1040A, 10.4" PFD display with three axis flight dynamics, air speed, altitude, vertical speed, HIS with perspective modes, turn, bankside slip, NAV/COM frequencies indication and AP annunciation.
- 1 GDU 1500 15" multi-function display with engine (with optimum TRQ setting display), pressurization, electrical, fuel, flaps and trims indication, Crew alerting System (CAS), checklist, aircraft synoptic and super large navigation mapping system.
- 2 GIA 63W Nav/Com/ILS/WAAS GPS.
- 2 GEA 71 Engine and airframe interface unit.
- 2 GRS 77 Attitude and Heading Reference System (AHRS).
- 2 GMU 44 triaxial magnetometer.
- 2 GDC 74B digital air-data computers w/dual probe system.
- 1 GTX33 Mode S Transponder.
- 1 GCU 475 remote FMS control panel conveniently located on the central consol.
- 1 GMC 710 autopilot mode controller located in upper central panel.
- 4 GSA 81 torque flight servos (yaw, pitch, pitch and trim roll).
- 1 GTA 82 adapter for yaw auto trim device.
- 1 Sennheiser HMEC25 noise attenuating headset with ship-power connection.



With its large screen displays and digital presentation of data, the G1000 meets all the requirements of today's serious pilot and owners, for whom the very latest technology is a must. It integrates all primary flight, navigation, communication, terrain, traffic, weather and engine data on two large 10.4 inch and one 15-inch high resolution glass displays. The G1000 delivers at-a-glance awareness that is comprehensive and intuitive, and allows for an easy transition from the very popular Garmin GNS 530 NAV/COM/GPS. Everything from air data to engine instrumentation, traffic and terrain is displayed on the super large 15-inch

multi-function display, which is the largest available today on any business jet.

Dual RVSM-compliant air data computers (ADCs) and dual attitude and heading computers (AHCs) work in concert with the three-axis digital autopilot, and they supply complete flight management functionality through two conveniently located control panels. Traditional mechanical gyroscopic flight instruments are replaced by an advanced and modern architecture which provides accurate, digital output referencing the aircraft position, rate, vector, and acceleration data.

This data also provide the GMC 710, which is the first entirely new autopilot designed and certified for the 21st century, with all data necessary to navigate, including the ability to maintain airspeed references and optimise performance over the entire airspeed envelope. The G1000 suite is customized specifically to the TBM and offers easy to use information such as Max Cruise and Long Range optimum Torque setting display, checklist, or systems synoptics for fuel, and electrical systems.

This new avionics provides unprecedented situational awareness for weather, traffic and terrain, while the

complete flight management functionality eases cockpit workload. Flight information is easier to scan and process. Simplicity reduces the workload hence increasing security to a level never reached in that category of high performance aircraft.

The cockpit also features 3 stand-by pneumatic instruments which are the indicated airspeed indicator, the attitude indicator and the altitude indicator all conveniently and safely displayed just in front of the pilot as well as a magnetic compass.

## Supportability

The TBM 850 aircraft is designed, built and tested to operate safely and reliably throughout the world. When servicing, inspection and/or maintenance is required, service panels and doors are conveniently placed to enable technicians to access all systems and complete necessary inspection/servicing/repair actions in minimum time using standard FAA or EASA repair procedures.

## Scheduled Inspections

Scheduled inspection requirements and intervals have been established based on 18 years of experience with the TBM airframe and the PT6A engine. The shortest inspection interval is 100 flying/operating hours for a limited number of checks only. Other items are inspected at 300 hours, 600 hours and on an annual (calendar) basis. As each aircraft ages, especially if it is continually operated in harsh and humid environments, the manufacturer's maintenance program makes provision for the additional inspections necessary to ensure the continued serviceability of the aircraft. These inspections are normally performed at the first interval of 10 years or 6000 flight hours and the reafter every 5 years or 3000 flight hours. All inspection actions can be accomplished by any certified mechanic using EADS SOCATA provided inspection checklists.

## Spares

With a growing fleet of TBMs operating worldwide, EADS SOCATA has existing working relationships with component vendors and/or manufacturers. SOCATA's extensive parts inventory is strategically located at multiple area service centers (or spare parts dealers when territories are not covered by distributors), ensuring absolute minimum downtime for maintenance. When TBM aircraft components fail, EADS SOCATA authorized service centers complete Technical Trouble Reports (TTR) to allow EADS SOCATA and its vendors

to monitor and expedite component repair status, accumulate failure and repair data for trend analysis and to identify opportunities to improve component performance and reliability across the TBM fleet.

EADS SOCATA customers have access to the TBM 700/850 aircraft parts catalog online allowing them to look up parts and verify pricing in real time. EADS SOCATA was among the first to bring Internet technology to this kind of application in General Aviation. This is a sign EADS SOCATA's intent to use the best of information technology and offer the highest possible level of customer support.

## Field Service Representatives

EADS SOCATA Field Service Representatives regularly visit EADS SOCATA's nationwide network of distributors and service centers to provide them with the latest technical information, advice and assistance.

Field representatives are available 24/7. They provide direct and on-site technical support to assist customers and operators. They regularly visit the service centers to provide training and proper feedback to the factory with in-the-field experience. When a factory repair solution is needed, they will insure proper interface with the factory for the best quality and safety before returning an aircraft into service.

## Warranty

EADS SOCATA offers one of the best warranties in the industry as follows based on information from B/CA and other industry sources:

- Airframe (excluding systems and major components) - 7 years or 3,500 hours of aircraft operation
- Systems - 2 years or 1,000 hours
- Engine - 5 years or 2,500 hours of aircraft operation
- Hartzell propeller - 2 years or 1,000 hours of aircraft operation
- Paint and interior furnishings - 2 years or 1,000 hours of aircraft operation.
- Garmin Avionics - 2 years

## Training

In the USA, all initial TBM flight training is provided through EADS SOCATA's training partner Simcom International. Simcom utilizes a Level 5 certified flight training device based on a real TBM cockpit which is EFIS and GNS 530 equipped. Simcom also provides factory approved maintenance training on the TBM family.

