First flown in 1986 the Piaggio P180 Avanti traces its roots back to the 1970s, when the world was in the midst of an oil crisis. Back then, the business aircraft market comprised two distinct segments, jet and turboprop. Rocketing fuel prices had pushed jet aircraft operating expenses skyward, with no relief in sight. Turboprops had lower operating costs, but were slower and lacked the panache of jet aircraft.

Italy's Rinaldo Piaggio designed the Avanti to combine the best of both segments: jet-like speeds at turboprop costs. Italian and US certification was obtained in 1990, but sales were weak, and the firm's aviation division entered receivership. Piaggio Aero Industries was formed in 1998 under the leadership of Piero Ferrari, vice-chairman of the performance car manufacturer. In addition to continuing production of the P166 twin-turboprop utility aircraft, the new company sought to reinvigorate the innovative Avanti. Flight International was able to see if Piaggio has hit its mark during a flight from Genoa.

The Avanti's unusual three lifting-surface configuration is a result of Piaggio's desire to develop an economical high-speed turboprop with a spacious and quiet cabin. To minimise drag, a laminar-flow wing was positioned at the midpoint of the fuselage, aft of the cabin to prevent the spar intruding into the passenger compartment. The aft placement of the wing required a foreplane to balance the lifting moment generated in flight. For pitch control, a tailplane was placed atop the vertical fin.

In a classic canard configuration, the foreplane serves as both horizontal stabiliser and pitch control surface. At first glance the Avanti may look like a canard, but the foreplane is fixed and does not incorporate an elevator. Pitch control and stabilisation is provided by the T-tail's horizontal stabiliser and elevator.

An extra flying surface would seem to be at odds with the goal of producing a lightweight, low drag aircraft. But in practical applications, a pure canard will have a higher stall speed than a conventional aircraft optimised for same cruise condition. Higher stall speeds in turn have an adverse affect on field length requirements. The increased wing area needed in a pure canard to achieve acceptable field performance would have resulted in less than optimal cruise speeds, leading Piaggio to employ a three lifting-surface configuration for the Avanti. Piaggio chief pilot Giuliano Currado says the Avanti is more like a stagger-wing biplane than a canard.

Striking feature

After its wing configuration, the most striking feature of the Avanti is the pusher engines - two Pratt & Whitney Canada PT6A-66s, each flat-rated to 635kW (850shp) and driving a 2.16m (7.1ft)-diameter, five-blade, constant-speed propeller mounted aft of the wing. The pusher configuration has advantages over the traditional tractor layout. Propwash does not interfere with laminar flow over the wing and turbine exhaust gas heats the propeller blades, eliminating the need for de-icing.

From a comfort standpoint, the aft-mounted engines place the counter-rotating propellers several metres behind the rearmost passenger seat, minimising their acoustical effect on the cabin.

As we conducted the preflight I was impressed by the smoothness of the aircraft's surface. Production of the Avanti is accomplished at Piaggio's Genoa factory, where the fuselage skin is formed and held to the desired contour in a vacuum jig. Internal stringers and ribs are then flush-riveted in place. The result is a smooth and ripple-free surface that reduces drag. The walk-around itself was straightforward, and I noted the two ventral delta fins, designed to provide a nose-down pitching moment at slow speeds. Entry to