

hydraulic, air management, ice and auxiliary power unit (APU) systems.

Avionics software maturity has proved a challenge and contributed to slippage of eight months in first deliveries from the end of 2002 to August this year. Version 9 is being flown and will be followed shortly by 10, which promises to address any remaining nuisance messages. Finally, the aircraft will deliver with Version 11 loaded. Thales is supplying the aircraft's back-up integrated electronic standby instrument housed in a separately powered, small liquid-crystal display. The aircraft will be cleared for Category 3A landings, with head-up display and enhanced vision a planned future option, along with datalink.

Triple redundant

The aircraft employs a triple-redundant electrical system comprising three 40kVA generators – two engine-mounted integrated drive units permitting unlimited flight time with one inoperative, and the third with the APU. There is also a drop-down 0.6m ram air turbine beneath the right-hand side of the nose and two nickel carbide batteries as a final back-up. Honeywell, in addition to supplying the generators and overall APU package, including a Goodrich-built tail cone, is also responsible for the air management.

Embraer has designed the aircraft around two wing fuel tanks holding up to 9,470kg (20,860lb) for the 170/175 and 13,000kg for the 190/195. There is room for extra tanks in the belly if a longer range version or the proposed ECJ-170 executive transport are pursued, which would demand a range of 7,400km. The fuel management system employs a motive flow system with ejector-type primary boost pumps backed up by AC motor-driven auxiliary pumps and a DC motor-driven pump for APU and engine start.

Redundancy has also been designed into the hydraulics, with three independent systems operating at 3,000lb/in² (207bar). Installed in the wing-to-fuselage fairing are systems one and two, both employing engine-driven AC electrical pumps, while system three is in the aft fuselage behind the rear pressure bulkhead and uses two AC pumps. "We did look at going to 5,000lb/in² to reduce weight, but it could have created extra cost for operators," says Affonso. "We wanted more mature technology and not a risk in terms of maintenance and support."

Key to selling the 170 is cost, of which maintenance accounts for 8% of the estimated \$2,748 direct operating cost of flying a 170 over a 925km sector in the USA. Airlines are looking to decrease aircraft turnaround time and lengthen the interval between maintenance visits. One powerful

DELIVERIES

Alitalia takes pole position

MAX KINGSLEY-JONES / LONDON

Although it did not place its Embraer 170 commitments until the middle of last year, Alitalia Express has found itself launch customer for the new regional jet following the deferral of deliveries to the original first operator, Swiss International Air Lines.

The Rome Fiumicino-based regional arm of Alitalia has six 170LRs (Long Range) on firm order along with six options, which can be taken up as any member of the 170/190 family. Delivery of the firm orders will begin in August and conclude early next year. Service entry is slated for October.

Operating a fleet of 12 ATR 42/72 turboprops and 11 Embraer ERJ-145s, Alitalia Express had a requirement for a 70-seat jet for its "marketability on high-yield sectors," says the airline's chief executive, Massimo Chieli. The timing was also helped by the availability of "good prices due to the situation in the market after 11 September 2001".

Despite the airline's existing Embraer affiliation, Chieli says a detailed evaluation of all the 70-seaters then available was made before the 170 was selected – the Bombardier CRJ700 and the now-defunct Fairchild Dornier 728. "Against the CRJ700 was the fact that the 170 was conceived as a 'real' 70-seater, rather than a stretch," he says.

Like the 170, the 728 was an all-new 70-seat design, but featured a five- rather than four-abreast cabin. Chieli says the 728 was rejected because it was "too flexible – it was not strictly a regional aircraft as it was quickly transferable into a mainline aircraft. It was more a medium-range aircraft than a regional jet."

Chieli says that flexibility of the 170's extended family of 80-, 90- and

100-seat models appeals, and he is studying whether to take up the options as one of the larger models. "Six aircraft is not a fleet – we need a minimum of eight to get a critical mass. I hope that we will be an early customer for the larger model."

Although there is no scope clause agreement with Alitalia pilots limiting the size of aircraft operating with Alitalia Express, Chieli does not expect the regional arm to operate aircraft with more than 99 seats in the short term.

He warns it is not certain that the options will be exercised. "I am not the only one making the decision," he says, as Alitalia Express is included in the strategic plan now being finalised by the mainline airline, which is due to be completed in the coming months.

The 170's network is still being designed, says Chieli. It will be used to expand international services, with possible destinations including Amsterdam, Copenhagen, Germany (Frankfurt or Munich), Switzerland, and "maybe" Prague and Poland. "Some domestic services may flow during the introduction," he adds.

The 170 could be used to help out its parent on low-demand routes, says Chieli. "It could substitute for an MD-80 on routes with low load factors, to keep slots and market presence."

The 170s are equipped with a 72 seat/32in (81cm) pitch cabin, but a mobile cabin divider will allow the airline to offer a two-class service. The airline expects its 170s to be certificated for Category 3B all-weather operations one year after introduction.

In its new role as launch operator, Alitalia Express is participating in the 170's Maturity test programme in June. These tests, which are required for certification, will involve the first production 170 (number seven).

The first production 170 will participate in Maturity tests in Italy next month

