

## Fuel ingestion tests continue drive to get Concorde airborne

DAVID LEARMOUNT/LONDON

ENGINE failure caused by fuel ingestion is to be tested on a rig as a part of the continuing programme to win back airworthiness certificates (CofA) for the Aerospatiale/British Aerospace Concorde fleet. Rolls-Royce confirms that it will conduct the tests on an R-R/Snecma Olympus 593 engine at Shoeburyness, UK.

British Airways' chief Concorde pilot Capt Mike Bannister points out that in the second interim report from the Bureau Enquêtes-Accidents (BEA), it was made clear that ingestion of fuel from the ruptured wing tank was a prime cause of the loss of power in the No 1 engine in the 25 July 2000 crash.

High-speed taxi tests by an Air France Concorde at Istres, southern France, in late January, have confirmed the behaviour of vapour injected from underwing nozzles, making clear the need to test the rate that fuel can be ingested before engine performance is impaired. Bannister points out that this must be established to validate the effectiveness of the new Kevlar/rubber fuel tank lining, intended to reduce fuel leakage in the event of tank rupture to a rate which does not endanger the aircraft.

BA hopes for test results by early May, says Bannister, but R-R is reluctant to predict a schedule.

Both airlines are acting to ensure that they can get the fleet airborne again when the CofA is returned. BA has received the seats for the long-scheduled cabin refit, and has reopened its refurbished Concorde lounge at London Heathrow. BA pilots have begun to prepare for a test flight designed to confirm that the fuel tank liners have no adverse effects on the aircraft's operation.

Maintenance engineers have revealed that the failure to fit an undercarriage spacer, reported by the BEA after studying the wrecked port gear on the crash aircraft, skews the bogey by up to 3°. Skewing could cause the tyres to heat up, the engineers say. The BEA interim reports have not cited evidence of this. □

# Air France CF6 failure leads FAA to order modifications

GUY NORRIS/LOS ANGELES

THE US FEDERAL Aviation Administration has issued new airworthiness directives (AD) covering urgent inspections and modifications to General Electric CF6-50 engines following an uncontained failure on an Air France Boeing 747-300 on an engine that already complied with the current AD.

The failure on 4 February involved a CF6-50E2-powered 747-300 after the aircraft landed. The engine's second stage low pressure turbine (LPT) nozzle lock assemblies had been visually inspected and the borescope plug replaced with a new design.

The engine had not, however, been ultrasonically inspected or equipped with additional bolts on the LPT casing, as outlined in recommended actions contained in GE's service bulletins. These actions are mandated by the latest AD, and pave the way for the even-

tual replacement of a new CF6-80C2-based nozzle lock assembly design throughout the affected fleet of 1,600 engines, most dating from the 1970s and early 1980s.

The problems stem from three uncontained failures on CF6s which struck Continental Airlines McDonnell Douglas DC-10s from April to September 2000. The turbine break-ups were traced to failures of the second stage LPT nozzle lock studs which machined their way through the casing by the force of the gas exhaust.

Last October the FAA issued an AD ordering operators to inspect the locks on engines, and to replace missing or loose studs before the next flight. It also ordered that the new LPT borescope design be installed on the three rows of the affected LPT nozzle areas.

The latest AD embraces both earlier actions, GE's recommended service bulletin actions, and plans for longer-term corrective modifications. It includes installa-

tion of the solid borescope plug for engines that have not already complied with the earlier AD, initial and repetitive ultrasonic inspections of second stage LPT nozzle assembly lock studs made from Waspalloy. It also calls for lock assemblies to be replaced with the new design before further flight if they are found to be cracked, loose or have missing studs. Additional locks should also be bolted on "if no indications of nozzle rotation are found, as an interim action to allow time to arrange for a shop visit within 3,500 cycles in-service".

The AD also calls for inspection of the area around the borescope plug for buckling or cracks, inspection for loose/missing nozzle locks and LPT case cracking around the added locks every 750 hours time-in-service. It also calls for replacement of the nozzle lock assembly with the new design before further flight if any LPT case buckling or cracks, or evidence of nozzle segment rotation, are found. □

## Bomb suspected in explosion on parked Thai 737



A Thai Airways International Boeing 737-400 has been destroyed, apparently by a bomb, while parked on a stand at Bangkok International Airport on 3 March. One of the cabin crew was killed and seven crew and ground staff were injured.

The explosion and subsequent fire occurred about 35 min before Thailand's Prime Minister Thaksin Shinwatra was due to board the domestic flight to Chiang Mai. Damage suggests the explosion took place somewhere forward of the port wing.

The auxiliary power unit was running to provide power and air conditioning to the aircraft. The motive is unknown but local speculation centres on an assassination attempt or a business conflict within Thai or the Airports Authority of Thailand.