Harrier pilot inquest confirms PDR theory

SALISBURY

The inquest into the death of British Aerospace test pilot Taylor Scott has confirmed that the firing of the Harrier GR.5 ejection seat's parachute-deployment rocket was the most likely cause of the accident on October 22 last year.

The Harrier GR.5 was the sixth production aircraft (ZD325), and was nearing the end of a series of production test flights in preparation for handover to the RAF. The flight was being made to clear outstanding items on the test schedule, primarily concerning the oxygen system.

The aircraft took off from Dunsfold at 1659 and climbed to the west as planned. At 1706 in the Boscombe Down area Scott checked in with London Military Radar and acknowledged, in a normal voice, a slight overshoot in his assigned Flight Level. The secondary radar height readout was seen to unwind to 30,000ft. From this point the height readout remained constant as the Harrier flew westwards.

There was no further radio contact with the aircraft, which was scheduled to remain at 30,000ft for about 15min during the oxygen system checks. At 1733 London Military attempted to contact the Harrier, but there was no response to any call, including relay attempts by other aircraft.

Eventually a westbound USAF C-5 Galaxy was vectored to an intercept about 140 n.m. west of Boscombe Down. The very badly damaged parachute was still attached, and his oxygen mask hose was detached from his Personal Equipment Connector. (The PEC is a metal block, which connects the oxygen, g-suit, and mic-tel leads to the aircraft via the seat, and is designed to pull away on man-seat separation after ejection).

Several items of equipment and fragments of the aircraft canopy were found roughly distributed along the aircraft's track within 3 n.m. of the pilot's body. An extensive search failed to find the aircraft wreckage.

The evidence available showed that the seat harness had been released, and that the parachute-deployment rocket of the Martin-Baker Mk. 12H ejection seat had fired through the canopy. The most plausible explanation was that the manual override had been activated (see Flight, March 19, page 9, and November 7, page 9).

There was no evidence to suggest that the seat was other than serviceable for the flight. Nevertheless, all perceived causes for firing of the manual separation cartridge were examined.

Three possible causes emerged. First, because Scott's oxygen hose was found disconnected, the possibility of hypoxia had to be considered. A postulated sequence was that, because the hose was disconnected, Scott became hypoxic and therefore confused following cockpit depressurisation (one of the required tests), and tried to eject. If the seat had failed to fire, Scott might have pulled the manual override (MOR) handle in a last-ditch attempt to abandon the aircraft.

But this sequence requires a combination of four independent human errors and system failures, and was considered to be very unlikely. In particular, this theory necessitates that either Scott did not connect the hose initially or that it became disconnected. If this was the case, the oxygen flow indicators would not have worked and Scott, who had an above-average knowledge of the oxygen system, would therefore have had to have ignored the primary constituent of the sortie, i.e. monitoring the oxygen system performance.

Also, tests showed that a partially disconnected hose was unlikely to become disconnected as a result of rapid decompression such as was planned on this sortie. There was no evidence of damage to the hose from flailing; therefore the violent ground impact appears to have caused the hose disconnection.

The second hypothesis is that, because of failure of designed automatic selection of emergency oxygen (D2) during the scheduled flight test item, or following a fault in the main oxygen supply, Scott needed to select EO2 manually. He might then have pulled the manual override instead of the EO2 handle which, as a different shaped handle mounted on the opposite side of the seat. The manual override handle cannot be pulled unless the seat firing handle has been pulled first, unless the interlock which prevents this was set incorrectly. This theory thus requires at least three independent faults and errors.

The investigators stress that there was no evidence that any foreign objects were either present in the cockpit when Scott accepted the aircraft, or were introduced by him, but another possibility was that of a loose article, lodging under the MOR operating rod on the right-hand side of the seat. This article could have dislodged the MOR handle to the gas cartridge firing unit seat, and the action of lowering the seat, with a foreign object between the sides of the seat and the cockpit wall, might have distorted the MOR rod, withdrawn the sear, and fired the cartridge.

On this sortie the aircraft was heading into sun, and when Scott levelled off he would have been almost facing the glare of the sun. This is likely to have hindered his ability to see the central warning panel (which he needed to observe, as seen by the oxygen warning caption illuminated), to enable him to complete the scheduled test on the oxygen system. With autopilot selected and less time therefore needed to be devoted to the Hud, it is wholly conceivable, say the investigators, that Scott lowered his seat to cut down the sun glare.

Tests confirmed the possibility of MOR sear removal because of rod jamming by a loose article, and also established that the cockpit wander lamp, if it had fallen, retained clip into a particular