MINISTRY OF DEFENCE

Military Aircraft Accident Summary

MILITARY AIRCRAFT ACCIDENT SUMMARY

OF RAF BOARD OF INQUIRY

Aircraft Type:	**Harrier GR7 ZG475**
Date of Accident:	**1 June 1995**
Place of Accident:	**Burrow Head, Irish Sea**
Casualties/fatalities:	**Crew of 1 Pilot killed**

Synopsis

1. The Harrier left RAF Boscombe Down to conduct a low level sortie in the Burrow Head area. After an uneventful high level transit, the pilot began his low level work in good weather conditions. At approximately 1130hours, having completed the majority of the required task, the aircraft crashed into the sea, south of Burrow Head. The pilot was not seen to eject and, unfortunately, was killed. The Inquiry concluded that the accident was caused by the failure of the pilot to prevent the aircraft from crashing into the sea. Despite a comprehensive investigation it was not possible to determine conclusively why this had happened.

Background

2. The Strike Attack Operational Evaluation Unit (SAOEU), based at RAF Boscombe Down, was tasked with conducting a trial to assess the effectiveness of a Ground Proximity Warning System (GPWS) for fast-jet aircraft. The Harrier pilot was involved in Stage 2 of the trial, to evaluate a Terrain Profile Matching System (TERPROM). This system uses the aircraft's Radar Altimeter (Radalt) to produce a terrain profile, which is then matched to a terrain database to establish the aircraft's position. Should the predicted aircraft flightpath go below the

clearance height set by the pilot, TERPROM will provide a visual warning on the pilot's Head Up Display (HUD).

Circumstances

3. On 30 May 1995, the pilot was briefed on the requirements of the trials sortie, the aim of which was to provide comparative data between normal low flying techniques and the avoidance profile of the GPWS. As part of the sortie, the pilot planned to fly a series of low level flights towards a small mast, first with the GPWS off and then with the system engaged. On 1 June 1995, the pilot completed his planning and took off to transit at high level, prior to descending to low level and heading for the Burrow Head area. Weather conditions and visibility were good. The pilot set the Low Altitude Warning (LAW) at 99ft for that portion of the sortie which required him to fly down to a Minimum Separation Distance of 100ft.

4. After 20 minutes of uneventful runs, the pilot commenced his final run against the mast. It appeared that the GPWS did not give any indications of the mast so he elected to point towards a 600ft mast further to the south. The pilot flew towards the mast and broke away from it in a climbing turn to the left. The pilot allowed the aircraft to climb to 1600ft, before overbanking to the right and lowering the nose. At 800ft, the pilot rolled wings level in a steady 7° nose down descent. Five seconds before impact, engine power was reduced by 5%. Less than a second before the crash, the LAW sounded as the aircraft passed 99ft. Full back stick and left aileron were applied, but the aircraft crashed into the sea.

Salvage operation

5. Within minutes of the crash, eyewitnesses had reported the accident to the authorities. The search was conducted by Search and Rescue helicopters, Lifeboat and Inshore Rescue boats, Mountain Rescue Teams, civil Police and Coastguard units. Due to poor underwater visibility and difficult tidal conditions, the salvage operation did not begin immediately, but approximately 70% of the aircraft, including the Accident Data Recorder (ADR), was later recovered.

Aircraft damage

6. Although the aircraft was completely destroyed on impact, the salvaged items were forwarded to the Department of Transport's Air Accidents Investigation Branch for analysis.

Investigation

7. As a result of examination of the recovered wreckage and analysis of the ADR, the investigation was able to eliminate technical fault, structural failure and birdstrike as possible causes of the accident. The investigation focused, therefore, on the human factor aspects. Although there was no evidence to suggest that the pilot had been medically incapacitated, the Inquiry could not rule out the possibility that he may have been partially incapacitated for a period before the application of full back stick. It also considered feasible that the pilot may have been distracted by other in-cockpit tasks during the descent and did not notice the proximity of the sea.

8. The Inquiry did conclude, however, that the aircraft would not have recovered from the dive even if recovery action had been initiated immediately the LAW sounded, as there was insufficient height remaining in which to do so, given the angle and speed of the aircraft. Consequently, although the pilot had the correct LAW setting selected on his Radalt, the lack of adequate warning from the Radalt was considered to be a contributory factor. The Inquiry also concluded that the GPWS probably generated a visual warning in the HUD as the aircraft passed 390ft, the height at which recovery would have been possible, again, given the angle and speed of the aircraft, but it was not registered by the pilot.

Safety recommendations

9. A decision to fit GPWS to all RAF single-seat fast-jet aircraft was already under consideration at the time of the accident. The programme to embody the system into the Jaguar aircraft began in January 1996 and the Harrier is expected to receive a GPWS in 1997. It is planned that Eurofighter 2000 will enter service with a GPWS fitted.

May 1996