



MINISTRY OF DEFENCE
MILITARY AIRCRAFT ACCIDENT SUMMARY

AIRCRAFT ACCIDENT TO ROYAL AIR FORCE HARRIER GR7 ZD462

DATE: 25 November 1997
PARENT UNIT: No 1(F) Squadron, RAF Wittering
LOCATION OF ACCIDENT: HMS INVINCIBLE
CREW: 1
CASUALTIES: 1 Minor Injuries

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SYNOPSIS

1. On the evening of 25 November 1997, Harrier GR7 ZD462 was returning to the Royal Navy aircraft carrier HMS INVINCIBLE after a nighttime exercise as part of the work up for Operation BOLTON. INVINCIBLE had been darkened down for Electro-Optical (EO) Operations and during the final stages of a visual approach, the aircraft began a rapid descent and hit the sea. The pilot escaped from the aircraft shortly after it hit the water and was picked up by a Sea King Airborne Early Warning (AEW) helicopter. The aircraft was recovered from the water some time later.
2. The Inquiry concluded that the accident had been caused by the aircraft's rapid descent, during the final approach, which was not arrested in time to avoid crashing into the sea.

BACKGROUND

3. In preparation for possible operations against Iraq, No 1(F) Squadron had been embarked aboard HMS INVINCIBLE for 4 days before the accident. The activity on the evening of 25 November was the first full darkness sortie of the detachment.
4. Although very capable of operating from aircraft carriers, the Harrier GR7 possesses different performance characteristics to its sister aircraft, the Sea Harrier FA2. The

GR7's lower thrust / weight ratio means that a pilot landing onto an aircraft carrier must reduce the weight of the fuel on board his aircraft. The remaining fuel may be insufficient to divert. In addition, the pilot may have only one chance to attempt a landing within the normal engine limits; subsequent attempts could increase engine wear considerably. ZD462's engine, although suitable for deployment, was at the lower end of acceptable performance levels. The engine would have been replaced had INVINCIBLE entered the operational theatre, as its performance would have been degraded by the high temperatures prevalent in the Gulf.

CIRCUMSTANCES

5. ZD462 was the lead aircraft of a pair which had been conducting a night EO bombing exercise in preparation for possible involvement in Operation BOLTON. The evening Meteorological forecast had predicted poor operating conditions for GR7 night EO Operations: Low light levels, almost complete cloud cover obscuring the moonlight and high Absolute Humidity. Before taking off, ZD462's pilot and the Duty Authorising Officer had checked the conditions from INVINCIBLE's flight deck using Night Vision Goggles (NVGs). Having assessed the conditions, the pilot of ZD462, as formation leader, chose to fly the sortie.
6. On recovery to INVINCIBLE, the pair joined the ship's circuit pattern one minute early and entered the pattern as another aircraft taking part in a second EO sortie was taking off. Concerned for the separation between his formation and the aircraft taking off, the pilot of ZD462 modified his entry into the circuit by climbing briefly before descending to the pattern height of 600ft. As the aircraft made its final turn, it descended to 270ft before beginning a shallow climb to 500ft, a position much higher than normal. The aircraft then began to descend until, at 170ft, the pilot applied full power. However, the aircraft, in the hover configuration and with full power applied, continued to descend before impacting the sea 17° nose up with 10° left bank and left sideslip. No witnesses saw the pilot eject.

RESCUE AND SALVAGE OPERATION

7. Although the pilot could not recall initiating his ejection from the aircraft, examination of the cockpit area revealed that ejection had been initiated by the seat pan handle. INVINCIBLE's dedicated Search and Rescue (SAR) Sea King was on deck readiness but could not take off until the second Harrier of the pair had landed. In the absence of the SAR helicopter, the rescue was performed by a Sea King AEW helicopter already in the air. Although lacking night SAR capability, the crew acted

courageously in overcoming some severe difficulties and successfully recovered the pilot. The aircraft was retrieved from the water onto INVINCIBLE some time later.

AIRCRAFT DAMAGE

8. Although the aircraft was recovered from the sea intact, the damage caused by the impact, along with the effects of salt water warranted repair by a specialist organisation.

INVESTIGATION

9. ZD462's Accident Data Recorder (ADR) failed 2 minutes before the accident, but sufficient evidence was available from witness statements and the aircraft's Forward Looking Infra-Red (FLIR) video for the Inquiry to determine the cause of the accident. They concluded that the accident was due to poor handling compounded by several contributory factors. These included the aircraft's engine performance, the pilot's workload in the preceding days, the type of recovery being flown and the lack of suitable approach aids on HMS INVINCIBLE.

SAFETY RECOMMENDATIONS

10. Among the Board's recommendations, was the proposal to install a more powerful variant of the Pegasus engine in the GR7, to improve approach aids both on aircraft carriers and GR7 aircraft, along with modifications to GR7 regulations and training and changes to the procedures for embarked operations.