



# MINISTRY OF DEFENCE

## Military Aircraft Accident Summaries

MAAS 16/85

15 August 1985

### ACCIDENT TO ROYAL AIR FORCE TORNADO GR1 ZA558

Date: 28 October 1983

Parent Airfield: RAF Marham, Norfolk

Place of Accident: The North Sea, 10 miles north of Sheringham, Norfolk

Crew: Two

Casualties: Navigator major injury, pilot missing believed killed.

### CIRCUMSTANCES

1. On 28 October 1983, Tornado ZA558 was flown by a pilot and navigator, who regularly flew together as a crew, on a routine training flight. The sortie was uneventful and, prior to returning to its base airfield, the crew completed their challenge and response pre-recovery checks at low level over the sea (in good weather conditions). Shortly thereafter, the navigator made some comment to the pilot but, despite insistent repetition, he failed to elicit any response. Meanwhile, the aircraft had entered a gentle right-hand descending turn and the navigator became alarmed at the reducing height above the water. When he realised that the radar altimeter height display indicated 90 ft, that the aircraft was still descending, and that he had had no response from the pilot, he ejected using the command ejection system to eject the pilot also. Seconds later the aircraft hit the sea.
2. Because of the very low ejection altitude, there was no time for the navigator to carry out his parachute descent drills. In addition he experienced difficulty in operating his survival equipment and eventually boarded his dinghy partially exhausted. Some 3½ hours later, when rescued, he was deeply unconscious and suffering from exposure. He subsequently made a satisfactory recovery in hospital under intensive care, but was found to have sustained a spinal injury which had been attributed to his ejection. Despite extensive Search and Rescue operations, no trace of the pilot was found. Subsequently, his ejection seat was recovered from the sea bed; it had apparently functioned correctly and it was determined that the pilot, together with his parachute, had successfully separated from the seat.

### CAUSE

3. Extensive salvage operations failed to locate the aircraft's Accident Data Recorder (ADR) but all major airframe components and both engines were recovered and subjected to detailed examination. All aircraft systems appeared to have been functioning normally at impact and there was no evidence of either a birdstrike or a structural failure before the aircraft hit the sea. These results, and the navigator's inability to obtain any response to his repeated queries using an ostensibly serviceable Intercom system, indicated that the pilot had probably

become unconscious in flight. The reason for such an impairment could not be established; exposure to toxic fumes was discounted on the grounds that both crew members would have been affected and only carbon monoxide could have caused loss of consciousness without the crew being aware of smoke or noxious fumes. However, no source of carbon monoxide within the cockpit environment or conditioning system could be identified. Pilot incapacitation resulting from a medical condition was thus thought to be the most likely cause of the accident. It was apparent that, conscious or not, the pilot would have been ejected automatically by the command ejection system shortly after the navigator's ejection seat fired. It was subsequently concluded that there had probably been insufficient height available for his parachute to deploy fully.

#### SUBSEQUENT ACTIONS

4. The accident gave fresh impetus to research into the causes and prevention of aircrew incapacitation in flight. Subsequently, the RAF Medical Branch advised that in order to ensure that no congenital or developing medical condition existed which could result in a loss of consciousness, additional tests should be carried out during the already stringent aircrew selection and routine periodic medical examinations. Several new tests were introduced in August 1984 and more will follow this year.