



# MINISTRY OF DEFENCE

## Military Aircraft Accident Summaries

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### ACCIDENT TO ROYAL AIR FORCE TORNADO GR1 ZA451

Date: 6 February 1984.  
Parent Airfield: RAF Laarbruch.  
Place of Accident: 15 miles SW Wilhelmshaven Federal Republic of Germany.  
Crew: 2 Pilot and Navigator.  
Casualties: 2 Major injuries.

#### CIRCUMSTANCES

1. On 6 February 1984, Tornado ZA451 was flying on a routine night training sortie over the North German Plain. Apart from occasional rain, the weather was generally good although isolated showers with hail had been forecast in the northern part of the area. Thunderstorm activity was not expected during the flight.
2. The sortie was uneventful until some 35 minutes after take-off, when the aircraft climbed to achieve a new en-route altitude. Having entered cloud, the Tornado encountered turbulence, and shortly thereafter the aircraft was struck by lightning. The navigator felt a mild electric shock through his left hand and was slightly dazed by a jolt to the side of his head. The pilot felt no physical symptoms, but he lost his night vision for a few seconds. He concentrated on his flight instruments, checked for any aircraft faults, and began a gentle descending turn in order to clear the cloud and to head towards the nearest airfield. Apart from a minor electronic fault which was of no safety significance, there were no apparent malfunctions resulting from the lightning strike. However, shortly after when the aircraft had levelled-off below the cloud at an altitude

turbulence. Simultaneously, the navigator saw a white flash; followed by a plume of flame from behind the inboard section of the right wing. He informed the pilot of the fire and the pilot pressed the push button to jettison the underwing fuel tanks, but omitted to release an override safety switch which had been set in accordance with regulations and which inhibited the jettison circuits. The pilot himself then became aware of a yellow flame adjacent to the fuselage, and believed that the aircraft was in imminent danger of exploding. Accordingly, he abandoned his attempt to jettison the fuel tanks; warned the navigator, made a brief emergency transmission, and initiated command ejection. The navigator was automatically ejected first; both ejections were successful and the aircraft crashed in woodlands. The crew were quickly rescued and flown by helicopter to hospital. Both were found to have sustained spinal injuries associated with their ejections and the pilot also had a broken collar bone.

#### CAUSE

3. Examination of the wreckage revealed that at the time of the initial lightning strike, the nose cone of the right hand underwing fuel tank had detached, presumably as a result of lightning induced ignition of residual fuel in the front section of the tank. About 1½ minutes later, an explosive detonation of the rear tank section is thought to have occurred. This explosion caused fuel in the centre section of the tank to ignite in the airstream behind the rear tank bulkhead, and it was this which was responsible for the plume of flame seen by the crew, which led to the decision to eject and the subsequent loss of the aircraft.

#### SUBSEQUENT ACTIONS

4. Improvements to the Tornado stores jettison system which will simplify emergency drills have been introduced. Additionally, research into methods of mitigating the effects of lightning strikes on aircraft systems in general and on externally carried fuel tanks in particular, has been given a fresh impetus as a result

of this accident. Specialists from the Royal Aircraft Establishment have been tasked to work with Industry to design additional protection measures with the aim of preventing sparking inside external fuel tanks.

CLAIMS

5. Several claims were received totalling DM 31613.83 (approximately £8300) the largest claim being for the removal of traffic control barriers.

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