

MILITARY AIRCRAFT ACCIDENT SUMMARY
OF RAF BOARD OF INQUIRY

Aircraft: Tornado GR1A ZA397
Date of Accident: 1 August 1994
Place of Accident: 20 nm east of
La Grande Rivière, Canada .
Casualties: 2 minor

Synopsis

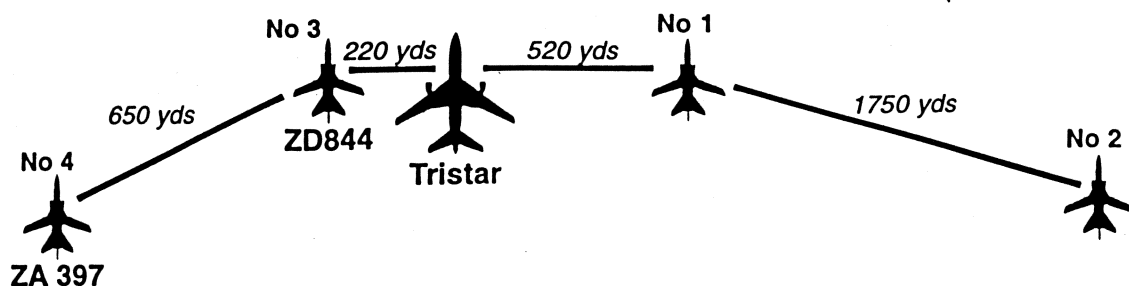
1. ZA397 was one of a formation of four Tornados being ferried across Canada, accompanied by a Tristar tanker aircraft. Some 5½ hours into the flight, ZA397 collided with ZD844, one of the other Tornados in the formation. The crew of ZA397 ejected successfully and the aircraft crashed into a large reservoir. The crew of ZD844 were able to recover their badly damaged aircraft to the civil airfield at La Grande Rivière. The inquiry concluded that the accident was caused by the crew of ZA397 failing to maintain safe separation from the other aircraft.

Background

2. The four Tornados were returning from Exercise COPE THUNDER in Alaska to their detachment base at Goose Bay, Canada. The RAF detaches a number of Tornados to Goose Bay each Spring for operational flying training; this detachment also acts as a pool from which aircraft are drawn to participate in other activities in North America. The length of this particular flight required the use of a Tristar air-to-air refuelling aircraft.

Circumstances

3. Some 5½ hours into the flight, all three air-to-air refuelling rendezvous had been completed successfully and the four Tornados were flying in loose formation with the Tristar aircraft (shown in the diagram below) as they approached the turning point at La Grande Rivière. ZD844 and ZA397 were



occupying the Nos 3 and 4 positions respectively. The weather was excellent with clear horizon. At the turning point, the Tristar began a gentle turn to the left, its pilot transmitting a message that the aircraft was to roll out "on heading 095"; he did not indicate, however, whether this heading was to be True or Magnetic, and rolled out on a heading of 093° Magnetic. The Tornados, which invariably fly with reference to True headings, all rolled out closer to 093° True and, because of magnetic variation, the two Tornados on the left of the formation began to converge with the Tristar. The pilot of ZD844, however, realising that the Tristar had not yet completed its turn, made a series of port turns in order to maintain separation. His attention was then drawn to a minor problem with the aircraft's autopilot, which he tried to resolve with the assistance of his navigator. Meanwhile, the pilot of ZA397, having initially checked that his aircraft was not converging with ZD844, looked into the cockpit to examine maps and diversion tables. His navigator then drew his attention to some ground features that he had noticed during the turn. The navigator suddenly became aware of the close proximity of ZD844 and shouted a warning to his pilot, who immediately rolled the aircraft to the left. In spite of this,

the aircraft collided. The pilot of ZD844 also sensed that a collision was imminent and initiated a roll to the right; this too was insufficient to prevent the collision.

4. After the collision, ZA397 caught fire and the crew ejected; the aircraft was seen to crash into a large reservoir. The Tornado formation leader carried out a visual inspection of ZD844, and in the light of his damage report, the crew decided to divert to the nearest suitable airfield, the civil airport at La Grande Rivière.

Rescue/Salvage operation

5. Both ejection sequences were normal. The crew landed in a large reservoir and boarded their liferafts. The Canadian rescue services were alerted and began to co-ordinate the rescue mission. A Canadian Forces C-130 Hercules dropped additional survival equipment and remained on station until a Canadian Forces Search and Rescue helicopter was able to effect a rescue. Because of the remoteness of the location, the rescue operation took over eight hours from the time of the ejection. Civilian personnel from La Grande Rivière attempted to locate the crew and the wreckage almost immediately but were unsuccessful and had to call off their search as darkness fell. Subsequently, attempts were made to salvage ZA397 but its precise location could not be determined and the operation was called off. ZD844 was air-freighted back to the United Kingdom for damage assessment.

Aircraft Damage

6. As a result of the collision, ZD844 lost a number of external stores and sustained varying degrees of damage to the left hand engine intake, engine bay door, main landing gear, the fuselage and left wing. Repairs are being carried out

using Ministry of Defence and Services resources, and the aircraft is expected to re-enter service in 1997.

Investigation

7. The Board of Inquiry had access to witness accounts, expert evidence, the damaged ZD844 and its Accident Data Recorder. From this information it was evident that the cause of the accident was the failure of the crew of ZA397 to maintain safe separation between their aircraft and ZD844. The investigation also concluded that the assumption, by the Tornado crews, that the Tristar was going to roll out onto a True heading led directly to the convergence on the port side of the formation and that their misinterpretation of the Tristar's heading reference was a contributory factor in the accident. In addition, the Inquiry concluded that, as the collision occurred over 5½ hours into the sortie, the boredom of the transit resulted in a lack of stimulus in the Tornado crews and this low mental stimulation was also assessed to be a contributory factor.

Safety recommendations

8. National instructions governing the procedures for air-to-air refuelling have been amended so that tanker crews must now specify the heading reference in use. The hazards associated with losses of concentration on even the simplest of flights have been highlighted to all RAF aircrew.