



## MINISTRY OF DEFENCE

### Military Aircraft Accident Summary of a Royal Air Force Board of Inquiry

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Aircraft:	Jaguar GR1A XZ373
Date of accident:	21 June 1995
Place of accident:	Adriatic Sea, 20nm north of Bari
Casualties:	1 slight

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#### Synopsis

1. XZ373 was the No2 of a pair of Jaguars from the detachment at the Italian Air Force Base at Gioia del Colle carrying out an Air Combat Training sortie over the Adriatic Sea. Shortly after the start of the first engagement, at a height of 10,000 feet, the aircraft departed controlled flight and the engines surged. Unable to regain control, the pilot ejected successfully and the aircraft crashed into the sea. The Inquiry concluded that the accident was caused by the pilot's error of judgement in carrying out a rolling manoeuvre. The situation was exacerbated by a failure in the fuel transfer mechanism and these elements in combination reduced the angle of attack at which the aircraft departed controlled flight.

#### Background

2. The pilot of XZ373 was a fully combat ready exchange officer serving with a RAF Squadron. There are a number of handling limitations imposed on the Jaguar, one of which concerns the need to avoid high roll rates when operating below 250 knots. Another advises that manoeuvres should be kept as gentle as possible in case of a failure of the fuel transfer system in one of the underwing fuel tanks. These limitations are designed to prevent the aircraft exceeding its asymmetric handling limits and

encountering sideslip, the aerodynamic effects of which could reduce the Jaguar's maximum angle of attack limit and increase its susceptibility to departure from controlled flight. In order to assist aircrew in understanding the particular handling characteristics associated with the Jaguar, a video was produced, "Handling at High Incidence", which augments the advice contained in the Aircrew Manual.

3. Although the pilot had been with the squadron for six months at the time of the accident, he had limited experience of air combat training with the aircraft in its heavyweight configuration. Furthermore, he had not viewed the Jaguar video.

### **Circumstances**

4. On the morning of the 21 June 95, and following an extensive briefing, the two pilots took off and transited to the exercise area. The sortie progressed satisfactorily until the leader decided to break a developing stalemate by commencing a right hand rolling manoeuvre towards the No2, who countered by turning towards him, accelerating and executing a slow 360° roll to the right. On completion of this roll, the No2 was at 10,000 feet and 200 knots when his aircraft began to show signs that departure from controlled flight was imminent. The pilot reacted by centralising the controls but, in spite of this, the aircraft flicked to the right and then began to yaw severely in both directions. Contrary to advice contained in the Aircrew Manual, which states that the control column should be released, the pilot maintained a stick central position and the aircraft flicked a second time, at which point the leader saw flames coming from both XZ373's engine air intakes, indicating that the engines had surged. The aircraft again began to yaw severely before flicking once again, this time more violently. Realising that the aircraft was still out of control and descending rapidly, the leader called the No2 to abandon his aircraft, whereupon he carried out a successful ejection.

## **Aircraft damage**

5. The aircraft broke up on impact with the water and was destroyed.

## **Rescue/salvage operation**

6. The leader informed the controlling authority of the accident and Royal Navy and US Navy aircraft were directed into the area. In the meantime, the crew of a Royal Navy Sea King helicopter from HMS Illustrious operating 20 miles away, heard the pilot's emergency beacon on the Guard frequency and turned for the area. The pilot was winched aboard the Sea King and taken to HMS Illustrious for initial medical examination. Initially, the Inquiry did not believe that recovery of the aircraft wreckage would be necessary; however, as the investigation proceeded, it became clear that a salvage would be required and some 95% of the wreckage was eventually recovered.

## **Investigation**

7. The Inquiry was able to draw on the statements of the pilots involved and the Department of Transport Air Accidents Investigation Branch (AAIB) examination of the wreckage; the Jaguar is not fitted with an Accident Data Recorder. The AAIB investigation revealed sufficient evidence to suggest that, unbeknown to the pilot, one of the underwing tanks had failed to feed, probably as he selected reheat at the start of the engagement. The Inquiry considered that, given this failure, the control inputs made by the pilot would have exceeded the aircraft's asymmetric handling limits and it was likely that the 360° roll would have generated significant sideslip as a result. There was no evidence of any other technical failure, although the possibility of an uncommanded flying control movement could not be ruled out completely. The Inquiry concluded, however, that the departure from controlled flight was consistent with the aircraft's angle of attack limits having been exceeded. It considered that

this had occurred because of the effects of sideslip, brought about by a combination of the pilot's ill-judged 360° roll and the failure of one of the fuel feed mechanisms.

### **Safety recommendations**

8. All air combat training on Jaguar aircraft was suspended whilst the need to practice low speed manoeuvres was addressed. The aircraft's handling characteristics have been given increased emphasis to all pilots and the handling video has been made a mandatory element of the Operational Conversion Unit course and re-shown on all operational squadrons. In addition, the syllabuses for air combat training on all RAF strike attack aircraft have been scrutinised to confirm that the courses maintain a safe and appropriate balance between risk and effectiveness. The recommendations from this review are being considered. The installation of a simple Accident Data Recorder in the Jaguar is under consideration and a programme of trials is due to begin shortly.

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