# MILITARY AIRCRAFT ACCIDENT SUMMARY

## AIRCRAFT ACCIDENT TO ROYAL AIR FORCE

## JAGUAR T2A XX843 INVOLVING CESSNA F152 G-BMHI

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| Date: | 29 August 1991 |
| Parent Airfield: | RAF Coltishall |
| Place of Accident: | Carno, Powys. |
| Crew: | Jaguar - 2<br>Cessna - 1 |
| Casualties: | Jaguar - 1 Major and 1 Fatal<br>Cessna - 1 Fatal |

## INTRODUCTION

1. A Jaguar T2A on a low flying training sortie and a Cessna F152 collided near the western edge of the village of Carno in mid-Wales. The Cessna pilot was killed in the accident and, although both Jaguar pilots ejected, the front-seat pilot did not survive. Both aircraft were destroyed.

## CIRCUMSTANCES

2. The Jaguar sortie was planned as a medium-level transit to Wales, followed by low flying at 250 feet minimum separation distance, and a return to base at medium level. The front-seat pilot was experienced on type, with almost 1000 hours flying in the Jaguar, and was assessed as being capable of flying the aircraft solo by his supervisors, although he held only a passenger medical category. The aircraft Captain, another highly experienced Jaguar pilot, was occupying the rear seat, a routine occurrence, and was content for the front-seat pilot to fly the sortie under his supervision. The crew checked the Notices to Airmen (NOTAMs) and other restrictions as part of their pre-flight briefing; there were no warnings of civilian aircraft operations in the vicinity of Carno. The sortie was uneventful until the collision. Approximately 20 seconds prior to impact, the Jaguar turned down a valley on to a south-easterly heading towards the village of Carno; the sun was high on the right hand side and visibility was in excess of 10km with no significant cloud. The front-seat pilot was flying the aircraft between 300-400 feet above ground level (agl), with reference to the radar-altimeter, at approximately 450kts. The Captain was concentrating his lookout in the forward hemisphere, but did not see any other aircraft during this phase of the sortie. His last recollection in the air was of pointing out to the front-seat pilot a typical reconnaissance training target, a red telephone box, on their left side.

3. The Cessna F152 had been based at Halfpenny Green aerodrome, near Bridgenorth, to carry out a series of aerial photography flights. The pilot flew solo and normally carried a trigger-operated, hand-held camera which he used to take photographs of properties through the left-side cabin window.

4. The Cessna pilot departed from Halfpenny Green without filing a flight plan but informed the tower that he was conducting an aerial survey flight over mid-Wales with a flight endurance of 6 hours. After leaving the Halfpenny Green frequency, no further calls were received from the Cessna by any Air Traffic Control (ATC) authority. About 45 minutes after take-off, witnesses on the ground noticed the aircraft flying a succession of low level orbits in the area of Carno. Some 1½ hours later, at 1254 hrs, the Jaguar struck the Cessna on its left side from approximately 35° behind the Cessna's wing axis. About 10 seconds prior to impact, the Cessna had rolled out of a left turn and was climbing straight ahead on an easterly heading. The Jaguar had about 30° of bank applied at impact and was in a position where it would have had to start a left turn to negotiate the terrain ahead. Its estimated track was south-easterly. There was no reliable evidence of any avoiding action taken by either crew.

CAUSE

5. The RAF investigation was carried out in parallel with that of the Air Accidents Investigation Branch (AAIB) of the Department of Transport. The accident occurred in uncontrolled airspace at low level and in good visibility. There was no evidence to suggest that the RAF aircrew's ability, weather, cockpit workload, medical incapacity of any crew member, or any technical problem contributed to the accident. The front-seat pilot's medical category was not considered to be a contributory factor.

6. The cause of the accident was considered to be the failure of the Jaguar crew and the pilot of the Cessna to see each other's aircraft in time to take avoiding action. There was also a number of contributory factors.

7. Planning. The Jaguar pilots were considered to have planned and briefed their sortie correctly. Civil aircraft operators who intend to carry out aerial work at altitudes of 500 feet agl, or below if permission has been obtained, can notify such flights to the London ATC Centre (Military) Tactical Booking Cell (TBC). The Cessna pilot did not do this; it was not possible to establish why not. If he had done so, either a warning under the terms of the Civil Aircraft Notification Procedure (CANP) or a 'UK Low Bravo' NOTAM would have been issued and the Jaguar would have been required to avoid the notified area. The Cessna pilot's omission to contact the TBC was considered to be a contributory factor to this accident.

8. Regulations. The Jaguar was assessed as being between 300 and 400 feet agl at the time of the collision and complying with military low flying regulations. The Cessna should have been operating in

accordance with the Air Navigation Order, Rules of the Air Regulation 1990, the pertinent section being:

Rule 5(1)(e) Low-Flying. An aircraft shall not fly closer than 500 feet to any person, vessel, vehicle or structure.

At the time of the collision, the Cessna was being flown in contravention of this rule. This was also considered to be a contributory factor to the accident.

9. Probability of Detection and Cockpit Visibility. With both aircraft flying about 350 feet agl, the Cessna would have remained hidden from the Jaguar pilots by the terrain until about 10 seconds before collision. At between 10 and 5 seconds to collision, the theoretical chance of the Jaguar pilots detecting the Cessna was about 60%, assuming a continuous, unrestricted search. However, the pilots were probably looking to the left of track and the probability of detection was further reduced because the Cessna was 10.5° right of the Jaguar's nose: in this position the Cessna would have been partly obscured by the windscreen and Head-Up Display support struts in the front and rear cockpits respectively. In the last 5 seconds before the collision, the chance of detection rose significantly but was still adversely affected by the canopy obstructions. It was extremely unlikely that the Cessna pilot would have seen the Jaguar approaching from a constant bearing in his rear left quarter, when his attention was most likely focused on the ground ahead. The restrictions to visibility in the Jaguar cockpit and the physical circumstances of the accident, which eroded the Jaguar pilots' possibility of detecting the Cessna, were considered to be contributory factors to the accident.

10. Distraction. Despite the high theoretical probability of detection in the last 5 seconds, the Jaguar Captain has no recollection of seeing the Cessna, which could suggest that the attention of one or both Jaguar pilots was directed away from the Cessna for at least part of the critical period. However, the only evidence for this is the Captain's last clear recollection, prior to impact, of a red telephone box, to which he drew the front-seat pilot's attention. Considerable efforts were made to establish that the telephone box in question was the one on the outskirts of the village of Carno, and that it was probably detected 3 seconds before impact. It was judged as reasonable for the Jaguar pilots to have been looking to the left of track as they approached Carno in order to clear a helicopter landing site and to negotiate the turn into the valley ahead; the sighting of the telephone box was therefore discounted as a causal factor. The weight of expert psychologist opinion maintains that a minimum of 5 seconds is required to detect and avoid another aircraft. Therefore, the collision was probably already unavoidable when the telephone box was sighted.

## SUBSEQUENT ACTION

11. Subsequent action following the AAIB and RAF investigations have led to the CANP system being reviewed and re-publicised to the civil aviation community. To improve civil pilots' awareness of

military low flying activity and the United Kingdom Low Flying System (UKLFS), more detailed information was published in a civil Air Information Circular (AIC) on 25 June 1992. The AIC highlights the areas of high intensity military flying and provides advice to civil pilots on how to reduce the risk of confliction with military low flying aircraft. Uni-directional flow arrows, which tend to concentrate traffic within areas of the UKLFS, are to be publicised shortly to civil aviators.

CLAIMS

12. It is estimated that claims to the value of some £68,600 will be settled in respect of damage caused by this accident.