



## Loss of Sabre Mk 31 A94-937

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### **Brief Account of the Accident**

On Tuesday, 12 April 1960 at 1453 hours a Sabre Mk31 was being flown by a student pilot at Number 2 (F) OCU Williamtown. He was engaged in a period of practice forced-landings on Williamtown airfield. He had initiated an overshoot from his third approach on Runway 12; he is recorded as having called over the Rtf "I think I have got a fire in the instrument panel. I am not sure. Smoke coming out of the nose." He was requested to repeat the message and he called "Mayday. Mayday. I have fire in the nose. Switching off the electric power." No further transmission was heard from him. The aircraft flew on for about one mile, then turned port through approximately 90 degrees and levelled out on a northerly heading at a height of 300-500 feet AGL. The canopy was jettisoned. The aircraft dipped the port wing and then rolled into the incipient stage of a spin to starboard at which time an unidentified object was seen to detach from it. The aircraft then entered a steep dive, struck the ground and exploded. The pilot, who was found in the wreckage area, was killed. The aircraft crashed one nautical mile from the eastern end of the 12/30 runway and on a bearing of 060 degrees M from the end of the runway.

### **Condition of the Pilot**

There was no evidence to indicate that

the pilot was not capable, both mentally and physically, of flying the exercise. A post-mortem examination revealed that the cause of death was multiple fractures of the skull and multiple injuries to the body.

### **Weather Conditions**

Meteorological records covering the time of the accident show the cloud as 3/8 at 16000 feet, wind velocity as east to east-north-east at six knots, low level turbulence as slight and intermittent and relative humidity at 67%. The importance of this humidity observation will be discussed further on in this Critique.

### **Pre-Flight Briefing and Authorization**

The pilot was briefed to fly Sabre Mission Number 5 in accordance with Number 2 (F) OCD Jet Training Syllabus Sabre. This exercise calls for a series of simulated forced-landing approaches, each followed by an overshoot. It

was expected that he would execute some five or six approaches during the period. He was briefed to land from his final practice forced-landing if he was satisfied with the approach.

### **Eye Witness Observations**

The Sabre had been airborne about 33

minutes when the pilot announced his intention to overshoot from his third practice approach. The aerodrome controller on duty in the control tower watched the aircraft fly past the tower and he estimated that it was about 100 feet AGL when it reached the end of the duty runway, Runway 12. At this time, 1454 hours, he heard a radio transmission from the pilot but was unsure of the exact message because of simultaneous transmissions from other aircraft on different frequencies. This message was picked up by the tape recorder in the tower. The controller asked the pilot to repeat the message and he heard the reply "Mayday. Mayday. I have fire in the nose, switching off the electric power." The controller then sounded the crash alarm. He estimated the aircraft at this time to be 150 feet AGL climbing on a heading of approximately 120 degrees M; he saw neither flame nor smoke coming from it. Because of other noises around him he was unable to tell whether the aircraft was still under power. He saw the aircraft commence a turn to port, and he then transmitted to the pilot that he was clear to land downwind if he wished. He heard no reply to this message. He then saw the aircraft straighten out from the port turn onto a northerly heading at about 300 feet AGL. He observed that the aircraft's attitude appeared to be nose high. As he watched he saw an object, which he took to be the canopy, detach from the aircraft, travel backwards, kick up end-first and strike the aircraft's fin. His attention was distracted momentarily and when he next saw the aircraft it turned to starboard, flicked on to its back and dived inverted to the ground. He thought that the canopy and aircraft separated but they fell in company and

struck the ground together. The time was 1455 hours.

The VHF duty operator agreed with this report adding that he estimated the distance separating the aircraft and the object falling with it, which he thought to be the canopy, to be about 20 feet. He stated that he estimated the total distance from the end of the port turn to the point where the aircraft crashed was about one mile.

From the time of the sounding of the crash alarm a number of civilians and a large number of the personnel stationed at RAAF Base William town watched the aircraft until it finally disappeared behind some low trees and crashed. The eye witnesses' accounts supplemented the observations of the duty aircraft controllers, the main additional points being:

(a.) Two witnesses saw a puff of smoke come from the aircraft at a time which coincided with the jettisoning of the canopy. Others heard several sharp reports: these reports were likened variously to rifle fire or Bofors gun fire.

(b.) Pieces of shiny material were seen to fall from the aircraft: several witnesses saw perspex on the ground as they proceeded to the scene of the accident.

(c.) An unidentified object was seen by many to leave the aircraft at about the time the aircraft commenced the final diving manoeuvre.

(d.) One civilian witness heard the major explosion followed instantaneously by a single sharp report.

The exact order of events following the ground impact was difficult to establish in view of the nature of the distribution of the wreckage, however, the accompanying diagram depicts the most likely flight path and sequence of events.

### **The Ejection Seat**

The seat which fired on impact came to rest on its port side some 30 feet away from the cockpit area. Stains on each of the shoulder harness straps were positively identified as being human bloodstains. The canopy jettison left hand lever was fully up and locked.

From the location of scorch marks on the ejection seat and evidence of unburnt grass under it, it was clear that the ejection seat was on the ground before the fire spread to that point.

### **The Cockpit Canopy**

Pieces of canopy perspex, including the portion to which the rear vision mirror had been attached, demister pipe, and a piece of metal from the vertical stabiliser were found in a small area some 900 feet back from the point of impact. The main portion of the canopy frame was adjacent to the starboard wing tip whilst the canopy bow had tom away and was 155 feet further along the wreckage trail. Marks on the bow indicated that it had struck the tops of the ejection seat guide rails: scratching and scoring on the port inside lower edge was consistent with its having hooked on to the stabiliser; the vertical stabiliser was found to be gouged front and rear near the tip. A mark on the inside centre of the bow matched marks on the pilot's helmet visor rail. The canopy initiator was recovered and had been fired.

The findings indicate that the canopy remained attached to the aircraft stabilizer until ground impact and that the canopy bow was tom off and flicked away by the gyration of the tail assembly and engine. They further indicate that a major injury occurred to the pilot in the cockpit at the time he jettisoned the canopy.

### **The Pilot's Attempt to Eject**

Following a declared emergency at low level the pilot initiated the ejection sequence by jettisoning the cockpit canopy. He did not complete the sequence. Post-mortem examination revealed that he had suffered multiple fractures of the skull.

Stains on the seat safety harness shoulder straps show bleeding to have occurred whilst the pilot was still in the seat. It is clear that at the time he was sitting relatively erect, and therefore would have been struck by the canopy bow. This was unusual in the light of the briefings which had been given to pilots after the two previous Sabre fatal accidents, the ejection drill precis notes, and his participation in a canopy demonstration. Nevertheless, the evidence on this point was clear: the pilot failed to lean forward, as required, prior to canopy jettison initiation.

### **The Pilot's Seat Harness**

The pilot was found outside of but near the wreckage still with his parachute attached. Also attached to the pilot were items of the seat harness buckle mechanism which, in a correct and complete automatic ejection, should have been found attached to the ejection seat port lap strap. The most probable reason for this was that the safety harness was not fully secured at the time

the pilot strapped himself into the cockpit.

It is considered that through inexperience or distraction he omitted to complete his pre-flight strapping-in procedure in regard to the belt locking key mechanism. Subsequently, his flying clothing could have lightly snagged the release lever and thus undone the harness or, having sustained the head injuries at the time of jettisoning the canopy, some random movement of his body could have caused the safety harness lock to spring open leaving him free in the cockpit.

Evidence found within a few feet of the port wing tip indicated that the pilot first struck the ground on his back close to that point. The impact burst open the back type parachute. The body then bounced and travelled through the air a further 40 feet trailing the partly deployed parachute. The fire, started by sprayed fuel, was extinguished under the body at the point where the body finally stopped. This, coupled with the charring of the parachute from the ground upwards, indicated that the fire was already burning when the pilot and parachute arrived on the ground.

From this evidence it is deduced that the object seen to fall from the aircraft at about 300 feet AGL at the start of the final diving starboard turn was the unencumbered free falling pilot who had been thrown from the aircraft as a result of forces acting on him during the incipient stage of a starboard spin. Considering that the pilot and the aircraft separated at 300 feet and that the ejection seat remained with the aircraft until ground impact, the blood stains

found on the shoulder straps of the seat safety harness proved conclusively that the pilot had suffered severe injury whilst he was still in the aircraft. The direction of travel of the body through the bush and onwards from the point of first ground impact to where it came to rest was such as to render it impossible for the pilot to have been in the aircraft when the aircraft hit the ground.

### **Cockpit Pressurisation and Air Conditioning Units**

The possibility of the origin of smoke or other evidence of burning entering the cockpit by means of the pressurised air was given consideration. No evidence was found to support this.

A potential source of "smoke" in the cockpit was the air conditioning unit. It is known that this unit produces a bluish-white smoke-like vapour in the cockpit under certain conditions of engine RPM, ambient temperature and humidity. The smoke, in reality fog, appears firstly in wisps from vents at the front of the cockpit. The fog is produced usually when the air conditioning controls have been set to produce maximum cold air and the engine is running at high RPM. The effect of the appearance and the volume of this fog creates a general impression of smoke in the cockpit; this has been described by experienced Sabre pilots as "frightening." In fact, several emergencies have been declared in the past when smoke or fire was reported in the cockpit.

The possibility of an electrical fire behind the instrument panel is so improbable as to have been unlikely. No sudden load was placed on the aircraft electrical system at this stage of flight so that there was no new circumstance

introduced to increase the likelihood of cockpit fire. Sabre aircraft are not disposed towards defects of this nature.

Greater confidence is felt towards the theory of the air conditioning unit developing fog in the cockpit. The pilot had been obliged to overshoot on short final because of other traffic and so applied high engine power. The air conditioning system began producing fog which he mistook for smoke- and thus he assumed that there was an emergency. It is considered that it was such a situation which prompted his "Mayday" call and induced him to take the action he did.

### **Conclusion**

On the basis of the evidence available it is considered most likely that the pilot mistook fog from the air conditioning system for smoke and declared an emergency at low level. Following his stated intention he switched off the electric power. He also switched off the engine master switch; this action cut off fuel to the engine and thus brought about an actual emergency. The nature of the terrain forced the pilot to attempt to abandon the aircraft rather than force-land it.

As an essential preliminary to ejecting the pilot initiated the canopy jettison system and was struck on the head by the canopy bow. This rendered him incapable of completing the ejection sequence. Through an oversight during his initial strapping-in procedure the pilot had not completed his safety harness drill.

Subsequently, his harness became unfastened. This left him unsecured in the cockpit.

The aircraft stalled at about 300 feet AGL and rolled into an incipient spin to starboard. At this stage the pilot was thrown from the cockpit. The aircraft dived inverted into the ground, exploded and burned. The pilot's body fell into the wreckage area.