

Extracts from DDAAFS Safety Magazine “SIFTING THROUGH THE EVIDENCE”

13 September 1993 (F-111C A8-127) – 7th F-111 accident – ground impact near Guyra

Overview

During the recovery from a night autotoss¹ weapon delivery profile against a simulated landstrike target near Guyra, NSW, the aircraft impacted the ground and disintegrated. Both crew members were killed instantly.

The sortie was the first of three F-111 aircraft, at 10 minute intervals, flying a night Auto TF strike mission. The accident occurred after 23 minutes of flight and at the first simulated target attack. The mission was designed to reinstate squadron proficiency in night operations as squadron aircrew had not conducted night operations for some time due to other squadron commitments. Weather in the target area noted by the second aircraft in 10 minutes trail, was 4/8 cloud cover at 400 ft AGL with 8/8 cloud cover entered soon after pull-up for the weapon delivery.

Crew

Pilot: Cat C – 1427 hrs total time / 225 hrs F-111; night uncurrent

Navigator: Cat C – 3809 hrs total time / 291 hrs F-111; night uncurrent

***Note:** The pilot had flown only 4.5 hrs night in the last 6 months and had not flown an autotoss/night-autotoss for 5 months. The navigator had only flown 6.9 hrs total in the last 30 days. They had only flown once together on the F-111 – approximately six months prior.*

Accident summary

The incident crew were assigned the task of briefing the mission as a wave brief for all three aircraft. The briefing, while satisfactory, was considered rushed which was uncharacteristic of the pilot. Completion of secondary duties (the pilot was the squadron Times Officer which has a high workload) may have reduced the pilot's flight preparation time as he was observed to be still completing the briefing slides 10 minutes before brief commencement.

¹ The autotoss manoeuvre is flown entirely by reference to flight instruments. It involves a run in to the target at 400 ft SCP and 540 kts in Auto TF. At the pre-determined pull-up point, the pilot depresses the bomb release button ('pickle'), overrides Auto TF (by depressing the 'paddle' autopilot release lever) and then commencing a pull-up (3G for 15 degree climb angle manoeuvres, 4G for 25 degree climb angle manoeuvres). This sequence is commonly verbalised as 'pickle, paddle, pull'. The time-to-go (TTG) readout counts down to zero where bomb release automatically occurs, at which time the reference changes to time-to-impact (TTI) – i.e. time to bomb impact. Following weapon release and once above start roll altitude (SRA), the pilot then turns away from the target using 110° angle of bank. With the aircraft in a descending turn, bank angle is reduced to 70° when, either the target safe altitude (TSA) is reached, or the aircraft's pitch attitude reaches the horizon, as indicated on the attitude display indicator (ADI). The reduced bank angle is maintained until the required heading change is achieved, at which time the aircraft is rolled to wings level, 1000 ft SCP is set on the TFR panel, and, once cleared for descent (TF fail lights out and good radar video returns), the Auto TF is re-engaged and the aircraft automatically descends back to low level.

Target ingress was conducted on Auto TFR. The pilot initiated pull-up to commence the weapon delivery profile (military power, 3G, 15° autotoss) and appeared to have difficulty achieving the required G (TF audio indicated aircraft dive commands). At 20–25 degrees nose up, the Auto TF system commanded a fail safe fly-up with accompanying TF fail audio (probably due to system loss of ‘data good’). The pilot then rolled the aircraft to the right in a climbing turn to complete the autotoss manoeuvre. Approaching the apex of the climb, the aircraft was overbanked and the Pave Tack system went into Memory Point Track thereby precluding tracking of the target by the navigator. The roll was then reversed to reduce bank angle with the aircraft reaching a nose down pitch attitude greater than 25°. As the pilot rolled out on egress heading, the aircraft impacted the ground. Impact parameters were approximately wings level, a 25° nose down pitch angle, 483 KTAS, 37° flight path angle below the horizon and a 30 000 ft per minute rate of descent. Throughout the manoeuvre, weapon release timing indications remained at time-to-go (TTG), with no transition to time-to-impact (TTI).



Impact crater – aircraft A8-127

Accident Investigation Team findings

The Accident Investigation Team (AIT) made the following findings:

1. The primary cause of the accident could not be determined.
2. The most probable cause of the accident was that the pilot, after omitting to disengage the Auto TF system on the pull-up² for the autotoss weapon delivery, through loss of situational awareness, placed the aircraft in a flight path vector from which impact with the ground was inevitable.
3. Factors that may have contributed to the accident were:
 - a. The pilot had not practised this particular kind of attack at night for the preceding five months.
 - b. The pilot's possible over-confidence which may have lulled him into having such faith in his own abilities that his preparedness for airborne problems was low. Consequently, when faced with a highly demanding situation, he was unable to cope with it.
 - c. The pilot may have been distracted when he possibly realised he had forgotten to disengage the Auto TF system on pull-up initiation during the attack, or by some other unknown factor such as an aircraft component or system failure.
 - d. The pilot may have suffered from channelised attention due to task saturation.
 - e. Confusion over the unexpected behaviour of the aircraft may have caused him to focus on what was going wrong, to the detriment of situational awareness and the primary task of flying the aircraft.
4. 82 Wing documentation, while detailing autotoss abort criteria, does not specify autotoss abort procedures. (Different F-111C pilots quoted different procedures.)

² During day attack profiles, the pilot had a habit of flying the aircraft manually rather than on Auto TF. In such circumstances, the pilot would simply authorise weapon release and pull-up at the required point. He would not have to disengage the TFR system as it would be turned off.

AIT recommendations

AIT recommendations included:

1. Review the 82 Wing categorisation scheme and currency requirements to reflect currency requirements for night flying and night weapon delivery profiles.
2. A standard 'patter' for the autotoss delivery should be used by all F-111C crews, this 'patter' should include the following:
 - a. The words 'pickle, paddle, pull' to indicate that the pilot has in fact paddled off, and
 - b. the words, 'three balls, rolling' to indicate that the pilot has in fact ensured that the three attitude indicators have been checked and that they correspond.
3. Pilots should depress the paddle switch for all autotoss deliveries (i.e. including manual flight deliveries).
4. Abort procedures for autotoss deliveries be documented in the 82WG F-111 SOPs.
5. Air Command should introduce a formal risk management process that addresses crew/task matching.

Changes attributable to this accident

Changes to F-111 procedures and aircraft modifications that were more than likely influenced by this accident are as follows:

1. Introduction of a more formal categorisation and currency system which provides increased visibility of currency issues to flying supervisors.
2. Increased use of the F-111C simulator for toss currency training.
3. Mandated requirement to verbalise 'paddle, pull, pickle'³ and keep the paddle switch depressed for the duration of the toss (including VMC toss profiles where TFR is not used).
4. 'Loss of situational awareness' added to the list of toss abort criteria.
5. Techniques to be used for aborting the toss manoeuvre now specified in 82WG Standing Instructions.
6. 82WG Standing Instructions specify standard crew commentary to be used when conducting toss weapon deliveries including pilot actions required should the navigator advise that the Pave Tack system has entered memory point track (possible indication of incorrect aircraft attitude, toss profile not executed correctly).



Wreckage recovery - aircraft A8

³ The sequence order was changed to 'paddle, pull, pickle' to provide applicability to both GBU-10/12 Paveway II and GBU-24 Paveway III weapon deliveries.