Extracts from DDAAFS Safety Magazine
"SIFTING THROUGH THE EVIDENCE"

28 January 1986 (F-111C A8-139) – 5th F-111 accident – sea impact off coast of Moruya

Overview

During a night simulated maritime strike attack, the aircraft crashed into the ocean approximately 52 nm east of Moruya, NSW. Both crew members were killed.

The incident crew were leading a fleet support maritime strike mission involving four F-111 aircraft. Approximately 1800 lbs of wreckage (about 3% of the aircraft's total weight) was recovered from the ocean surface,[1] with indications that an ejection was not attempted and that both crew members died on impact. Weather at the time was 6/8 cloud cover with a base of 2500 ft and tops of 5500 ft. Conditions were very dark, with the moonrise (full moon) due to occur approximately 20 minutes after the accident.

Crew

Pilot: Cat C – 861.1 hrs total time / 523 hrs F-111; night uncurrent

Navigator: Cat C – 1372 total time / 1177 hrs F-111; limited night currency (USAF Exchange Officer)

Note: Neither crew (nor any of the formation members) had flown a dedicated maritime strike mission in the last 90 days due to a previous squadron focus on working up for, and competing in, a US RED FLAG Exercise; the extended reduced activity period and the squadron grounding.[2] The pilot had only flown 4.3 hrs night in the last 90 days, with no night hours in the last 30 days. The navigator similarly lacked sufficient night currency, with only 2.3 hrs night in the last 90 days, of which 2.0 hrs night had been accomplished in the last seven days.

Accident summary

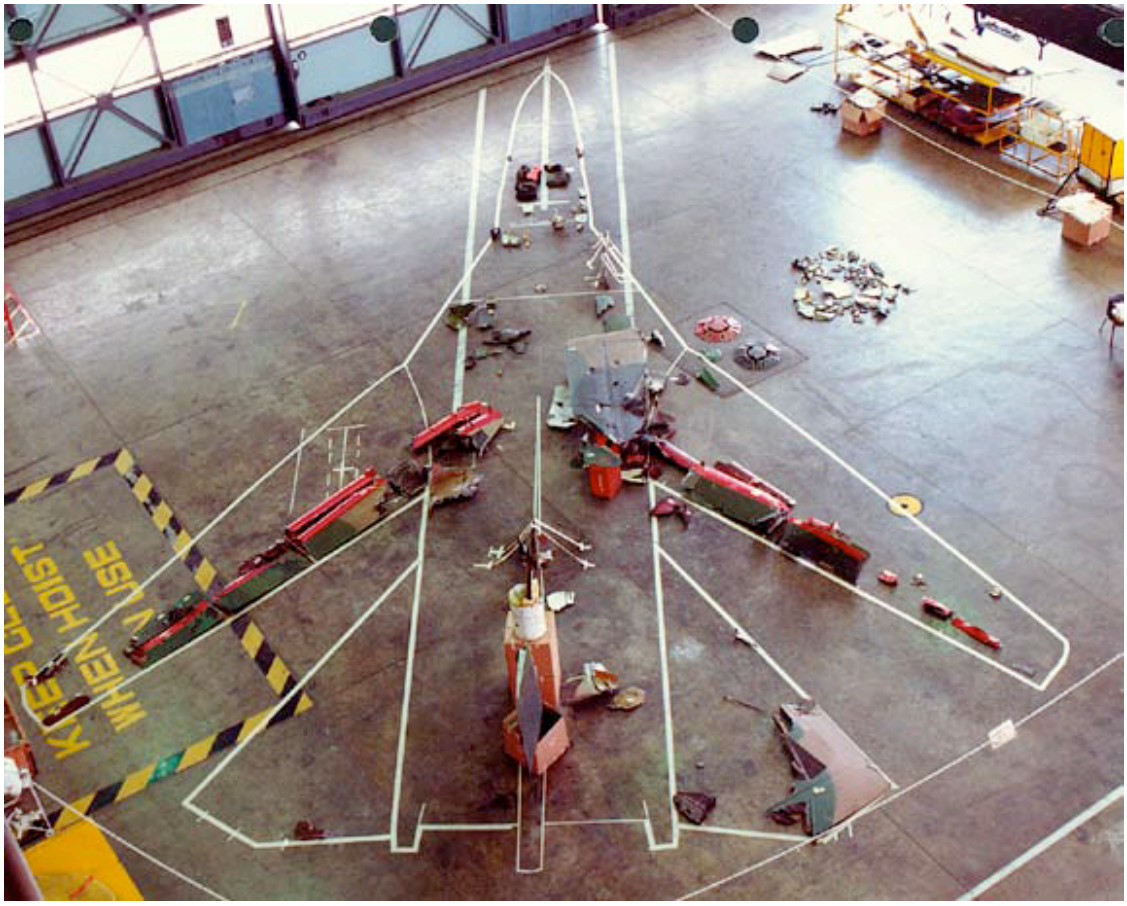
The mission involved simulated AGM-84 Harpoon anti-ship missile attacks by F-111 aircraft against three RAN ships operating in the Jervis Bay naval exercise area. Three of the F-111 aircraft were to conduct the attacks, with the fourth aircraft providing strike direction (i.e. targeting information). The incident crew were lead for the mission, however the sortie was effectively conducted as single-ship operations as take-off times for the attacking aircraft were separated by thirty minutes. The pilot, although relatively junior, was the squadron Maritime Strike Officer responsible for specialising in and developing maritime tactics for squadron use.[3] The majority of the

[1] The ocean depth at the accident site, being in excess of 1100 fathoms, precluded attempts to recover wreckage from the ocean floor.

[2] The Officer Commanding had directed the squadron to cease the flying it had been conducting in early January as it was still the official Base stand-down period.

[3] The incident pilot was considered one of the more experienced non-executive squadron pilots compared to the relatively large number of inexperienced crews in the squadron. Witness statements indicated the incident pilot undertook the role of Maritime Strike Officer with 'enthusiasm'.

mission planning was left up to the lead crew, with assistance from the navigator of the third strike crew. Other formation members had limited input, mainly due to competing secondary duties.



Layout of total wreckage recovered – aircraft A8-139

The briefed tactics for the maritime strike included a climb from low level up to 8000 ft AMSL to acquire the target, simulate weapon launch and then fly the weapon's flight profile to provide the Navy maximum training value.[4] For the post-release descent, the pilot wanted to try a new 'non-standard' tactic of simulating the rapid free-fall descent of the missile (to the flight authorised altitude limit of 300 ft AMSL) and then accelerating at low level in accordance with known missile performance.[5] The only aspect of the descent profile briefed was the intention to use idle power with the speedbrake extended, however the use of the speedbrake was later rescinded following advice from the flight authorising officer that it would be impossible to achieve the missile's known speed during descent if the aircraft's speedbrake was extended. Target overflight was to be at 300 ft AMSL for aircraft conducting their first attack. The second (and last) attack for each aircraft, would be conducted simultaneously with the following F-111 (on their first attack) therefore, at 12 nm to run to the target, the

[4] For at least the last 18 months prior to the accident, the Navy had requested the F-111 crews fly the Harpoon missile flightpath for the benefit of their ships radar fire control systems.

[5] The squadron's maritime tactics were in a continual state of change, with new tactics often being employed (Harpoon was still relatively new to the F-111 community). The incident pilot was known to have been developing the immediate post-launch phase of the Harpoon missile profile. Squadron maritime tactics documentation was minimal due to their developmental and classified nature. The official F-111 tactics document was outdated having been written a number of years ago without any subsequent updates. However, the usual descent profile post simulated weapons release, was a shallow controlled descent with power set as needed to maintain required speed.

aircraft on second attack was to climb to 800 ft AMSL to provide 500 ft vertical separation between aircraft.

The incident crew completed the first attack to target overflight. During the subsequent second and coordinated attack, the incident crew transmitted the usual 'Bruiser' radio call indicating to the targeted ship that simulated Harpoon weapon release had been executed. A short time later the pilot of the fourth F-111 aircraft (i.e. the strike direction aircraft) noticed three fireballs on the ocean surface. Concerned for the safety of the other F-111 crews, the pilot of this aircraft initiated a formation radio check. No response was received from the lead crew. A mayday was declared and a search and rescue effort was then coordinated with the Navy.

Note – The second aircraft was unable to achieve the briefed descent parameters for simulating the Harpoon post-release flightpath and had to increase engine power setting to maintain the required speed. Post-accident flight profile reconstruction indicated that a very high rate of descent (20 000 ft per minute) and nose-down attitude (20°) would be required if the missile's known speed of descent was to be achieved with an idle F-111 engine power setting. The squadron CO, on hearing post-accident the briefed profile, had misgivings of the 'rashness' of such a plan.

Board findings

The Board made the following findings:

1. The primary cause of the accident could not be determined. For undetermined reasons the aircraft impacted the water.

2. The most probable cause of the accident was that the aircraft impacted the water at either the bottom of descent or shortly thereafter, when the crew were distracted by an internal or external occurrence which was of sufficient importance for the crew to fail to notice and initiate timely response to their immediate situation.[6]

3. Analysis of the limited wreckage recovered, indicated that that the crew may have been taking recovery action to avoid contacting the water at time of impact.

[6] The probable causes considered were related to the developmental nature of the planned manoeuvres and crew distraction during a critical phase of flight.

Board recommendations

Board recommendations included the provision of an auditory warning for the F-111 radar altimeter (RADALT) be investigated.

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 rate of descent limits for night/IMC manual descents over land and water (maximum of 3000 ft per minute for descents below 5000 ft) and the requirement for the aircraft to be in a wings level attitude for descents below 1000 ft ASL.

2. Eventual fitment of an auditory warning tone on illumination of the RADALT low light to provide additional cues to the aircrew that the aircraft had descended below the minimum altitude set by the crew on the RADALT bug.

3. Standardisation that crews are to set the RADALT 'bug' to 90% of the intended flight altitude for flight below 5000 ft AGL.[7]

4. Eventual rewrite (and update) of the F-111 tactical procedures (TACPROCs) manual including maritime strike tactics.

5. Defined F-111 maximum crew duty limits.[8]

[7] At the time of the accident, there was no squadron policy for setting the minimum altitude for the RADALT low bug.

[8] The Air Standing Instructions at the time did not specify a maximum crew duty limit and allowed judgement on the part of executive and authorising officers. While the incident pilot was within the generally accepted 15 hr limit, he had commenced duty at 0800 hrs on the day of the incident (crews typically turned up at lunchtime if they were night flying) and had been on duty for 12.5 hrs at the time of the accident.