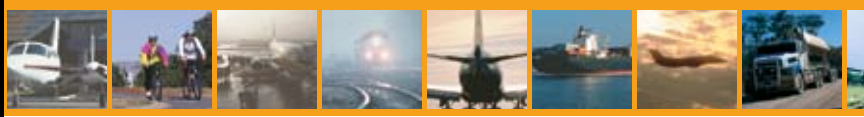
Australian Government
Australian Transport Safety Bureau

The Australian



Executive Director's Message

Progress on Lockhart River investigation

Memorial services at Bamaga, Lockhart River and Cairns commemorated the recent anniversary of the May 2005 Lockhart River tragedy in North Queensland in which 13 passengers and two crew members lost their lives. The ATSB's investigator-in-charge was able to attend the Cairns service in association with investigation duties.

Given the evidentiary challenges including lack of useable CVR data, the ATSB investigation of this tragedy is progressing well and in line with the expected 18 month timing for an RPT accident of this magnitude and complexity.

Progress to date includes issuance of a Preliminary Factual report, an Interim Factual report and related recommendations. On 24 January 2006 the ATSB issued two recommendations to CASA seeking review and clarification of crew qualifications for instrument approaches during air transport operations and the potential safety benefit of autopilots. On 3 April 2006 CASA advised the ATSB that it has amended a Civil Aviation Order to clarify the requirement for all instrument rating holders to hold an endorsement for any navigation aid being used to navigate an aircraft (including instrument approaches) of which they are a crew member. The ATSB has accepted the CASA response and the recommendation is now closed. CASA also advised the ATSB that it is currently reviewing Civil Aviation Order (CAO) 20.18 and examining the history of changes and international best practice as they relate to the fitment of autopilot equipment.

On 10 February 2006 the ATSB issued another recommendation to CASA to review maintenance requirements for Cockpit Voice Recordings (CVRs) and Flight Data Recorders (FDRs) against international standards with the aim of improving reliability and availability of data. The ATSB also issued a recommendation to the Department to review legislation covering copying and disclosure of CVRs to ensure that this can be done for legitimate maintenance purposes.

The ATSB is now undertaking the analysis and final report drafting phase of the investigation and expects to issue its final report before the end of 2006.

Final report on the Mount Hotham fatal accident

On 11 May 2006 the Australian Transport Safety Bureau (ATSB) released its Final Investigation Report on the fatal aviation accident near Mount Hotham airport on 8 July 2005 that claimed the lives of the pilot and two passengers on board. The accident involved a Piper Navajo Chieftain aircraft registered VH-OAO which was being operated on a charter flight. The Chieftain was found on a tree covered ridge, approximately 5km south-east of the aerodrome at an elevation of 4,600 ft above mean sea level. The aircraft had broken into several large sections and an intense fire had consumed most of the cabin.

The ATSB has reported that extreme weather and unsafe pilot attitudes and practices led to the 'controlled flight into terrain' accident at Mt Hotham in July 2005. The weather conditions included sleet and snow showers, and were conducive to visual illusions associated with a 'flat light' phenomenon. The aircraft was not equipped for flight in icing conditions. The ATSB in its final report was unable to determine why the pilot, after acknowledging that the weather was unsuitable, persisted with his attempt to land at Mt Hotham in accordance with neither the VFR nor proposed IFR procedures, but apparently seeking to follow the highway. However, it is possible that overconfidence as a result of previously avoiding accidents despite risk-taking, and commercial or family pressures, influenced the pilot's decision making.

Civil Aviation Safety Authority (CASA) Field Office staff had held concerns about aspects of the operator's performance for some time. As a result, CASA staff continued to monitor the operator. However, formal surveillance of the operator in the two years prior to the accident had not identified any significant operational issues that would have warranted CASA taking action against the operator. In that situation, the safety of the flight was reliant on the safety culture of the operator, and ultimately depended on the operational decision-making of the pilot in command.

As a result of this investigation, the ATSB has recommended that CASA publish educational material, to promote greater awareness of the flat light phenomenon for pilots operating in susceptible areas. The ATSB has also recommended that CASA review its surveillance methods, which may include cooperation with Airservices Australia, for the detection of patterns of unsafe practices and non-compliance with regulatory requirements. CASA has advised the ATSB that it is taking safety action including enhancing its operator risk assessment processes to enable it to more clearly identify and quantify operators presenting risks to aviation safety.

The ATSB hopes that pilots with local knowledge that habitually take unnecessary risks will learn from this accident and not pay the ultimate price paid by the pilot and passengers of this aircraft. The full report including radar plots of the aircraft's track into the Mt Hotham area is available on www.atsb.gov.au. ■

Collision with ground

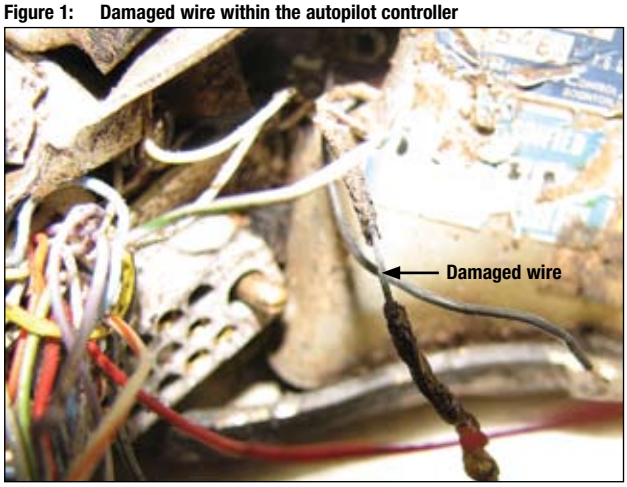
Interim Factual Report on fatal Cessna 310R crash near Tamworth

At about 1326 Eastern Daylight-saving Time on 7 March 2005, the pilot of a Cessna Aircraft Company 310R, registered VH-FIN, commenced takeoff from runway 30 right at Tamworth on a ferry flight to Scone, NSW. Witnesses reported that the pilot initially maintained the runway heading, as cleared by air traffic control (ATC). When the aircraft was between 800 and 1,000 ft above ground level (AGL) and while making a shallow banked turn to the left, the pilot broadcast to ATC that he was experiencing 'control difficulties'. Upon or shortly after reaching an early downwind position the aircraft was observed to enter a steep nose-down descent. While there were some inconsistencies in the available witness reports, it appeared that the aircraft may have rolled about its longitudinal axis at some stage on the final descent. The aircraft impacted the ground in a cleared paddock about 4 NM west-south-west of Tamworth airport, fatally injuring the sole occupant pilot of the aircraft. The aircraft was destroyed by the impact forces and post-impact fire.

The pilot was appropriately licensed and rated, held a valid class 1 medical certificate and was reported as being fit to fly. The results of post mortem examination and toxicology screening found no evidence of any physiological factor that may have impaired the pilot's performance during the occurrence flight.

The aircraft was maintained under a Civil Aviation Safety Authority (CASA) approved maintenance system. The aircraft had been subject to scheduled maintenance by a CASA approved maintenance facility immediately prior to the accident. The aircraft had a current maintenance release and there were no recorded defects at the time of the accident.

Figure 1: Damaged wire within the autopilot controller



The investigation calculated the aircraft's weight and balance based on fuel load records and estimated fuel burn rates for previous operations, including engine runs relating to the maintenance activity completed immediately prior to the occurrence flight. The investigation estimated that at the time of the occurrence, the aircraft was operating below the maximum permitted take-off weight and within the stipulated centre of gravity limits.

The Automatic Terminal Information Service (ATIS) current at the time of the occurrence, reported that the wind was variable at eight knots with occasional crosswind of eight knots, CAVOK1, temperature 27°C and a calculated mean sea level pressure datum (QNH) of 1019 hPa.

The wreckage trail extended over a distance of about 232 m. Ground impact marks and other physical evidence indicated that the aircraft struck the ground in an upright slightly right wing low, 35 to 50 degrees nose-down attitude, and that both engines were developing significant power at the time of impact.

During the on-site examination of the wreckage, investigators located a tool that would normally not be expected to be carried on the aircraft. Metallurgical analysis showed no evidence that the tool had been trapped within, or had in any way interfered with the control systems of the aircraft.

The pilot did not specifically transmit a distress call to ATC during the occurrence. The pilot advised that the aircraft was subject to 'control difficulties', that he was 'losing direction of the aircraft' and that the autopilot was 'not on'.

The aircraft was equipped with a Cessna 400B Nav-O-Matic Autopilot System. The autopilot controller recovered from the site showed evidence of thermal damage to a wire within the controller, consistent with current overload (Figure 1). That damage was inconsistent with post-impact fire damage. The ATSB is awaiting data from the manufacturer and other specialist agencies regarding the effect of the damaged wire on autopilot operation.

The ongoing investigation will include examination of:

- the aircraft's autopilot and electric pitch trim systems
- the inspection requirements for wiring to critical systems
- the degree of autopilot system training provided during aircraft endorsement training. ■

Safety briefs

Australian Transport Safety Bureau

Engine failure

Occurrence 200402948

At 1435 Eastern Standard Time on 10 August 2004, a Boeing Company B717-200 aircraft, registered VH-VQA, was climbing to cruise altitude on a scheduled passenger service from Melbourne, Victoria to Hobart, Tasmania. As the aircraft passed through flight level 110, the crew heard a loud bang, with a corresponding increase in indicated left engine vibrations and the left engine began to spool down. The crew then shut the engine down in accordance with the operator's procedures and returned for a landing.

Post incident examination of the BR700-715 engine found metal fragments and metallisation in the exhaust area.

The engine was forwarded to the engine manufacturer for a detailed investigation that was supervised by a representative of the German Federal Bureau of Aircraft Accident Investigation. That investigation found that the engine failure was due to the release of a single blade from Stage-1 of the high pressure turbine (HPT), following the development of low-cycle fatigue cracking in its internal cooling passages. The manufacturer indicated that there had been four similar BR700-715 engine failures, with another engine failure under investigation.

Computer stress modelling, carried out by the manufacturer on the HPT blades, found stress levels in the blade's internal cooling passages, in the area of the occurrence blade's crack propagation, that were potentially in excess of the manufacturer's original design intent. The thickness of the vapour aluminised surface coating in the internal cooling passages was also variable. In certain operational conditions the coating could crack, with the subsequent growth of the crack into the parent material.

As a result of this and the other engine failures the operator and the engine manufacturer have completed a number of safety actions to prevent re-occurrence. ■

Flight Management System computer malfunction

Occurrence 200500285

The Boeing 717-200 was taxiing at Cairns Qld for a scheduled service to Brisbane Qld. As part of the preparation for the flight, the crew had entered flight plan details into the aircraft's flight management system (FMS). While taxiing, due to intermittent rain showers at Cairns, the 717 crew then programmed the FMS with wet runway speed figures for takeoff.

The crew reported that late in the take-off roll the manually entered wet speeds were lost from the airspeed tape on the primary flight display and FMS-generated speeds were displayed. At rotation 'MAP FAIL' appeared on both navigation displays.

The investigation found that flight management computer (FMC) 2 was unable to sequence the '400 ft course to altitude' leg associated with the SWIFT SIX standard instrument departure. Eventually, FMC 2 performed a software reset but was unable to recover and became unavailable for use by the crew. A similar progression then occurred for FMC 1 but, in accordance with its design, FMC 1 remained available for use but with the flight plan information cleared.

Eventually the crew were able to enter the instrument landing system frequency, but FMS operation did not appear to be reliable. The aircraft was radar vectored for a return to Cairns while maintaining visual meteorological conditions. The crew conducted a visual approach to runway 15 and the aircraft landed 32 minutes after takeoff.

The investigation determined that during the flight, the amount of generated VIA BITE data exceeded the memory size. As a result, BITE data from the event that initiated the FMS problem was overwritten and lost.

As a result of this occurrence the operator has advised that a Flight Operations Memo will be issued to all 717 pilots highlighting this incident and detailing the FMS modes which remain available during abnormal FMS operation. ■

Infringement of separation standards

Occurrence 200501628

At 0543 eastern standard time on 14 April 2005, an Aero Commander 500-S (Aero Commander) aircraft became airborne off runway 32 at Brisbane airport, QLD, on a non-scheduled flight to Maryborough, Qld. At 0544, a Boeing Company 737 (737) aircraft on a scheduled passenger service from Darwin, NT, was established on the final approach path to land on runway 19 at Brisbane airport.

The Brisbane aerodrome controller (ADC) accepted responsibility for separating the 737 with the Aero Commander once the 737 was established on the final approach path for a landing on runway 19. In consultation with the ADC, the approach controller assigned the pilot of the Aero Commander a heading of 090 degrees to comply with noise abatement procedures.

The ADC reported that he had a mental model that the Aero Commander was going to turn right onto a heading of 360 degrees, once airborne, even though he had assigned a heading of 090 degrees to the pilot of the Aero Commander. The ADC later reported that, if he had realised that he was assigning a heading of 090 degrees to the pilot of the Aero Commander, he would not have accepted responsibility for separation because he could not visually separate the Aero Commander with the inbound 737 on that heading.

A review of the recorded TAAATS data showed that separation reduced to a minimum of .95 NM horizontally, at which time vertical separation had reduced to 500 ft. The minimum radar separation standard was 3 NM, and the minimum vertical separation standard was 1,000 ft. There was an infringement of separation standards.

The investigation was unable to determine why the ADC had a mental model that he was assigning a heading of 360 degrees to the pilot of the Aero Commander. ■

Collision with ground

Occurrence 200504925

At about 1800 Central Standard Time on 6 October 2005, a Robinson Helicopter Company model R22 Beta helicopter (R22), registered VH-HUZ, departed Border Downs, NSW on a private flight to the pilot's property at Yalda Downs, NSW with the pilot and one passenger on board.

Witnesses at a number of properties along the route flown by the pilot reported that as the flight progressed, the pilot requested by radio for each of them to illuminate their external homestead lights. The owner of the property that included the accident site estimated that the helicopter was below 30 ft above ground level as it passed north of his property. Shortly after passing that property, the pilot commenced a climbing right U-turn before descending towards the ground at an estimated angle to the horizon of 20 to 30 degrees. The helicopter impacted the ground and was destroyed by impact forces and the post-impact fire. The pilot was fatally injured and the passenger suffered serious injuries.

The pilot was not qualified to undertake the night Visual Flight Rules (VFR) flight, and should not have been performing the duties authorised by his private pilot (helicopter) licence at the time of the accident. In addition, the helicopter was not equipped for flight under those flight rules.

The reported operating height of the helicopter minimised the time available for the pilot to recover from any disorientation in the dark night conditions before impacting the ground. In addition, it was likely that the climbing right U-turn eroded the already marginal outside references held by the pilot. The likely result was that the impact with the ground was almost inevitable. ■

Loss of control

Occurrence 200403006

At about 2017 Eastern Standard Time on 15 August 2004, a Mooney Aircraft Corporation M20K aircraft, registered VH-DXZ, descended into the ocean off Bokarina, Queensland. The pilot, who owned the aircraft and was the sole occupant, did not survive the impact.

The pilot held a private pilot (aeroplane) licence and a night visual flight rules (VFR) rating. His logbook recorded his total flying experience at the time of the accident as about 1800 hours, 142 of which were at night. The pilot last flew at night on 19 June 2004, and in actual or simulated instrument meteorological conditions, during 1998. His three most recent flight reviews were logged as day flights, with no instrument or night flight recorded.

The weather conditions in the area at the time of the occurrence were benign. Astronomical twilight occurred at 1846 and the moon set at 1637.

The wreckage was recovered 13 days after the accident. An examination revealed that at the time of impact; the engine was delivering high power, the instrument lights were receiving electrical power, and the gyroscopic instruments were receiving pneumatic power.

The circumstances of the accident are consistent with a loss of control due to the pilot becoming spatially disoriented after flying into an area of minimal surface and celestial illumination. Physiological and cognitive factors may have contributed to the development of the accident. However, the factors that contributed to the aircraft descending into the water could not be conclusively established.

This accident highlights the need for night VFR pilots to manage the risk of spatial disorientation in dark night conditions by maintaining proficiency in instrument flight. ■

STAR Non-Compliance

Occurrence 200504615

On 15 September 2005, the crew of a Boeing Company 767-300 (767) aircraft, registered OE-LAZ, was cleared by air traffic control to fly the ARBEY TWO Standard Arrival Route (STAR) procedures for an approach to runway 27 at Melbourne International Airport. As the aircraft flew the STAR procedure, the controllers observed it overfly the PAULA airspace fix and continue on the downwind leg instead of turning right onto the base leg for runway 27, as required. The controllers provided the crew with radar vectors to position the aircraft onto the runway 27 localiser, and the aircraft landed without further incident. When subsequently queried about the STAR non-compliance, the crew stated that they had been unsure about how to complete the procedure after overflying PAULA.

The procedure for the ARBEY TWO STAR for runway 27 specified that a right turn be made at PAULA to track to the Epping non directional radio beacon and intercept the localiser of the runway 27 instrument landing system. On 9 September 2005, another of the operators 767 aircraft was involved in a similar non-compliance with the ARBEY TWO STAR at Melbourne. On that occasion, the crew did not follow the published transition onto the STAR from the APPLE airspace fix to the north-west of Melbourne. On 17 September 2005, and again on 3 November 2005, controllers at Melbourne observed the operator's 767 aircraft overfly the PAULA airspace fix and continue on the downwind leg instead of turning right and tracking to Epping as required.

On 16 September 2005, the ATSB provided the Air Accident Investigation Branch, Flugunfalluntersuchungsstelle, of the Republic of Austria with details of the four 767 STAR non-compliance incidents at Melbourne.

On 23 December 2005, the Flugunfalluntersuchungsstelle advised the ATSB that it had held meetings with the operator to discuss the 767 STAR non-compliances at Melbourne. The ATSB has received no other reports of STAR non-compliances at Melbourne involving the operator's 767 aircraft subsequent to the 3 November 2005 occurrence. ■