



Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT

Aviation Occurrence Report – 200601640

Interim Factual

**Collision with terrain
4 km ENE Archerfield Aerodrome, Qld
31 March 2006
VH-BST
Amateur built Lancair 320**



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Postal address: PO Box 967, Civic Square ACT 2608
Office location: 15 Mort Street, Canberra City, Australian Capital Territory
Telephone: 1800 621 372; from overseas + 61 2 6274 6590
Accident and serious incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6274 6474; from overseas + 61 2 6274 6474
E-mail: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

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Collision with terrain - 4 km ENE Archerfield Aerodrome, Qld, 31 March 2006, VH-BST, Amateur built Lancair 320

Prepared by

Australian Transport Safety Bureau
PO Box 967, Civic Square ACT 2608 Australia
www.atsb.gov.au

Abstract

At 0728 Eastern Standard Time on 31 March 2006, an amateur-built Lancair 320 aircraft, registered VH-BST, departed Townsville, Qld, on a private flight to Archerfield Aerodrome, Qld. The pilot, who owned the aircraft and was the sole occupant, had earlier submitted a visual flight rules (VFR) flight plan for the flight.

At 1048.30, the pilot contacted the Archerfield Aerodrome Controller and reported that he was 19 miles (35 km) from the aerodrome and inbound. He said that he was new to the area and would appreciate any help. The controller advised the pilot to report at the TV towers, a VFR reporting point 13 km north-west of Archerfield. The aircraft was maintaining about 3,700 ft AMSL (above mean sea level).

The pilot reported at the TV towers but had difficulties finding the aerodrome. Radar data showed that the aircraft was 2 km north of the aerodrome at 1,700 ft AMSL, and tracking south-south-east. At 1058.11, the controller asked the pilot if he had the aerodrome in sight. The pilot said that he did not, and said 'I feel I've overflown it'. The controller advised that radar information indicated that the aircraft was north of the aerodrome, and he suggested that the pilot continue to turn left. The pilot then acknowledged that transmission. No further radio transmissions were received from the pilot.

Witnesses reported seeing the aircraft's left wing drop and the aircraft appeared to enter a spin before descending straight down, colliding with a tree and then a creek running parallel to Kessels Road, Coopers Plains. The aircraft was destroyed and the impact was not survivable.

The investigation is continuing.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal Bureau within the Australian Government Department of Transport and Regional Services. ATSB investigations are independent of regulatory, operator or other external bodies.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations. Accordingly, the ATSB also conducts investigations and studies of the transport system to identify underlying factors and trends that have the potential to adversely affect safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and, where applicable, relevant international agreements. The object of a safety investigation is to determine the circumstances in order to prevent other similar events. The results of these determinations form the basis for safety action, including recommendations where necessary. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations.

It is not the object of an investigation to determine blame or liability. However, it should be recognised that an investigation report must include factual material of sufficient weight to support the analysis and findings. That material will at times contain information reflecting on the performance of individuals and organisations, and how their actions may have contributed to the outcomes of the matter under investigation. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. While the Bureau issues recommendations to regulatory authorities, industry, or other agencies in order to address safety issues, its preference is for organisations to make safety enhancements during the course of an investigation. The Bureau prefers to report positive safety action in its final reports rather than making formal recommendations. Recommendations may be issued in conjunction with ATSB reports or independently. A safety issue may lead to a number of similar recommendations, each issued to a different agency.

The ATSB does not have the resources to carry out a full cost-benefit analysis of each safety recommendation. The cost of a recommendation must be balanced against its benefits to safety, and transport safety involves the whole community. Such analysis is a matter for the body to which the recommendation is addressed (for example, the relevant regulatory authority in aviation, marine or rail in consultation with the industry).

FACTUAL INFORMATION

History of the flight

At 0728 Eastern Standard Time¹ on 31 March 2006, an amateur-built Lancair 320² aircraft, registered VH-BST, departed Townsville, Qld, on a private flight to Archerfield Aerodrome, Qld. The pilot, who owned the aircraft and was the sole occupant, had earlier submitted a visual flight rules (VFR) flight plan for the flight.

The following chronology of events was obtained from radar data and recordings of the air traffic control communications with the pilot.

- | | |
|---------|--|
| 1048.30 | The pilot contacted the Archerfield Aerodrome Controller and reported that he was 19 miles (35 km) from the aerodrome and inbound. He said that he was new to the area and would appreciate any help. The controller advised the pilot to report at the TV towers, a VFR reporting point 13 km north-west of Archerfield. The aircraft was maintaining about 3,700 ft AMSL (above mean sea level). |
| 1052.13 | The pilot reported that he was at the TV towers. The controller asked the pilot to confirm that he was able to fly visually to Archerfield, to which the pilot responded 'at this stage it looks like I can'. The aircraft was maintaining about 2,200 ft AMSL. |
| 1056.49 | The pilot requested the height of the cloud base at the aerodrome. The controller advised that the cloud base was probably 800 to 1,000 ft above ground level (AGL) (850 to 1,050 ft AMSL). The aircraft was at an altitude of 1,600 ft AMSL. |
| 1057.14 | The controller asked the pilot if he had the aerodrome in sight. The pilot replied that he had not identified the aerodrome. Radar data showed that the aircraft was 2 km north of the aerodrome at 1,700 ft AMSL, and tracking south-south-east. |
| 1058.11 | The controller asked the pilot if he had the aerodrome in sight. The pilot said that he did not, and said 'I feel I've overflown it'. The controller advised that radar information indicated that the aircraft was north of the aerodrome, and he suggested that the pilot continue to turn left. The pilot then acknowledged that transmission. No further radio transmissions were received from the pilot. |
| 1058.30 | The last valid radar information showed the aircraft about 4 km north-east of Archerfield aerodrome at 400 ft AMSL and tracking east-north-east. |

¹ The 24-hour clock is used in this report to describe the local time of day, Eastern Standard Time (EST), as particular events occurred. EST was Coordinated Universal Time (UTC) + 10 hours.

² The aircraft was built from a kit supplied by Neico Aviation Incorporated.

A witness located about 4 km north-east of Archerfield aerodrome saw the aircraft fly low over her house in straight and level flight tracking east-north-east towards the Queen Elizabeth II Stadium (612 ft AMSL) and Mt Gravatt (712 ft AMSL) (see Figure 1). She reported that as she watched the aircraft fly away from her, she heard the engine noise stop. The aircraft's left wing then dropped and it appeared to enter a spin to the left. Another witness, who was working in the grounds of the Queensland Health Scientific Services facility, reported seeing the aircraft flying straight and level, and low, directly towards him. He said the engine noise did not miss or change pitch. He then saw the aircraft bank right, then flip onto its left side and descend straight down, colliding with a tree and then a creek running parallel to Kessels Road, Coopers Plains.

The aircraft was destroyed and the impact was not survivable.

Figure 1: Accident location



Pilot information

The pilot passed his private pilot (aeroplane) license flight test on 22 March 2005. At that time, his total flying experience was reported as 188.3 hrs. Logbook records and the records of the accident flight indicate that his total flying experience at the time of the accident was 302.1 hrs. He had accrued 29.5 hrs in Lancair aircraft (all in BST), of which 21.7 hrs were as pilot in command. The pilot held a Class 2 aviation medical certificate valid till 28 January 2007. He did not hold any instrument rating.

The pilot purchased the accident aircraft during late 2005/early 2006. At that time, he had only flown Cessna 172 and 172RG aircraft. The previous owner of BST, who had built the aircraft, arranged for an instructor with experience in Lancair aircraft to conduct a series of training flights with the pilot. These training flights were conducted in BST at Bankstown aerodrome, NSW, during early January 2006

and totalled 7.8 hrs flight time. The instructor reportedly³ told the pilot that he should do a further 20 hrs of local flying in BST with a safety pilot before flying the Lancair solo.

Aircraft information

The Lancair 320 aircraft was a conventionally-configured, low-wing, two-seat aircraft constructed primarily of composite material. It was fitted with air-driven gyroscopic flight instruments and an angle of attack indicator. It was fitted with a single Very High Frequency radio transceiver and a fixed Global Positioning System (GPS) unit. The pilot was also carrying two portable GPS units.

The aircraft was first entered on the Australian aircraft register in 1994. In 2003, following repairs required after an off-airport forced landing, the aircraft was issued with an experimental certificate. At the time of the accident, the aircraft was operating with a valid maintenance release, which authorised flight by day under the visual flight rules only. No defects had been recorded on the maintenance release. At the time of the accident, the aircraft had accrued 583.7 hrs total time in service.

According to the flight manual in the aircraft, the aircraft stall speed with the flaps in the cruise position was 67 kts indicated airspeed.

The angle of attack indicator had been installed in the aircraft, shortly before it was sold to the accident pilot, but had not been calibrated. At the time of the training flights, the instructor telephoned the builder and asked whether the indicator could be turned off as the aural warnings were activating during landing and were distracting. The builder suggested that the unit be disconnected.

Wreckage examination

The accident site was near the northern boundary of the grounds of the Queensland Health Scientific Services facility. The aircraft initially collided with trees before coming to rest in a creek. Most of the aircraft components were located in or on the banks of the creek, with a few components recovered from Kessels Road (see Figure 2).

³ The instructor was fatally injured in an aircraft accident five days after the accident involving BST, and before he could be interviewed by ATSB investigators.

Figure 2: Accident site



An examination of the accident site and aircraft wreckage indicated that:

- the aircraft was in a steep nose-low, near vertical pitch attitude at the initial impact point
- damage to the propeller was consistent with the engine delivering power at the time of impact
- the frangible plastic drive shaft of the engine-driven vacuum pump was intact
- there was no evidence of any pre-impact structural or flight control defects
- the wing flaps were positioned at the cruise flight setting of -7 degrees⁴
- the aircraft altimeter subscale was set to 1015.

Laboratory examination of the electrical turn and bank indicator identified rotational scoring, which indicated that electrical power was available to the instrument at, or immediately prior to impact. Rotational scoring to the vacuum-driven gyroscope in the artificial horizon indicated that vacuum was available to the instrument at, or immediately prior to impact.

It was not possible to obtain any recorded information from either of the two portable GPS units that were on board the aircraft. One of these portable GPS units included a terrain and obstacle alerting feature.

Weather information

Forecast weather

The Australian Bureau of Meteorology (BoM) issued an aviation weather area forecast for the Brisbane area at 0128 on 31 March 2006, which was valid from 0300 to 1800. The forecast indicated that there would be rain areas developing by

⁴ The Lancair Pilot's Operating Handbook described a flap setting of -7 degrees as 'faired'. The aircraft flight manual specified the take-off flap setting as between 0 and 10 degrees, and the landing flap setting as 40 degrees.

0900, isolated thunderstorms after 1000, and patches of low cloud. The forecast indicated that cloud in the Brisbane area would include isolated cumulonimbus between 4,000 and 35,000 ft from 1000, broken⁵ stratus between 1,000 and 3,500 ft in rain, and scattered cumulus and stratocumulus between 2,500 and 9,000 ft near the coast. Expected weather included thunderstorms, showers and rain, and visibility was expected to be 2,000 m in thunderstorms and 4,000 m in rain and showers.

The BoM issued a Terminal Area Forecast (TAF) for Archerfield at 0420 which was valid from 0600 till 1800. The forecast included light rain, few at 1,200 ft, scattered at 3,000 ft, and broken at 10,000 ft. Between 0800 and 1800, there was expected be intermittent showers of rain with visibility reducing to 4,000 m and 5 to 7 oktas of cloud at 1,000 ft

Copies of the above area forecast and Archerfield TAF were recovered from the aircraft wreckage.

An amended Archerfield TAF issued at 0822 included a 30 percent probability of thunderstorms between 1000 and 1500.

Observed weather

Weather radar information provided by BoM showed that a band of moderate rain passed over Archerfield, moving east, at about 1000. At the time of the accident, the weather radar showed areas of light rain to the east of the aerodrome (see Figures 3 and 4).

⁵ Broken refers to 5 to 7 eighths (oktas) of the sky obscured by cloud, scattered refers to 3 to 4 oktas and few refers to 1 to 2 oktas.

Figure 3: Weather radar image at 1050

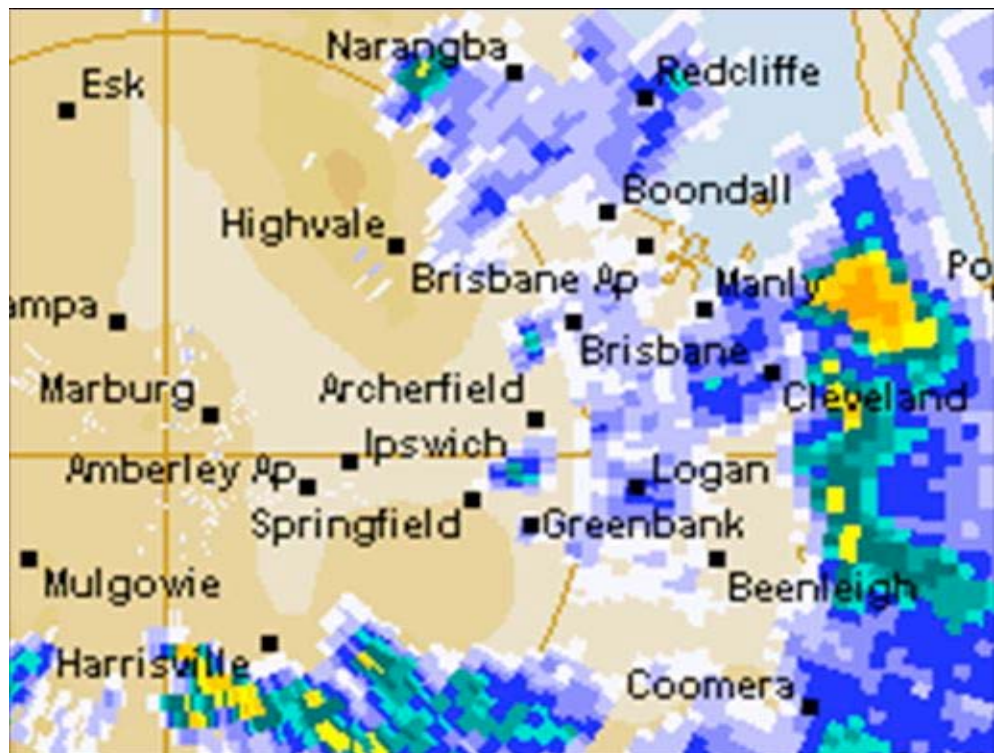


Figure 4: Weather radar image at 1100



Prior to 1056, Archerfield Automatic Terminal Information Service (ATIS) Echo broadcast that the wind was 160 degrees M at 10 kts, visibility was 4,000 m in rain, there was scattered cloud at 1,000 ft, and that the QNH was 1015 hPa. From 1056, Archerfield ATIS Foxtrot broadcast that the wind was 280 degrees M at 5 kts and there was broken cloud at 1,000 ft with lower patches.

The Archerfield Aerodrome Weather Information Service (AWIS) recorded that at 1100 there had been 0.2 mm of rain in the previous 10 minutes and that the QNH was 1013 hPa.

A pilot who flew into Archerfield from the south-east about 15 minutes before the accident reported that there was 2 to 3 oktas of cloud with a base of 800 ft and tops of 1,200 ft, and at least 6 oktas of cloud with a base of 1,600 ft. Another pilot, who was operating to the west of Archerfield about 5 minutes after the accident, reported 8 oktas of cloud with a base of 1,800 ft, and 4 to 5 oktas of cloud, with drizzle, with a base of 800 ft and tops of 1,000 ft.

A witness located close to the accident site reported that a heavy rain shower had just stopped, and that there was an unbroken cover of low cloud. There was cloud on the hills north of the accident site. Another witness reported that it was raining very lightly at the time of the accident.

Neither of the two controllers on duty in the Archerfield control tower saw the aircraft.

On-going investigation issues

The investigation is continuing and will include further work in the following areas:

- examination of radar information
- medical, post-mortem and toxicology information
- aircraft equipment
- review of aircraft operational documentation
- review of aircraft maintenance records
- examination of pilot training and flying records.

Issues related to the operation of experimental aircraft over populated areas are being considered in conjunction with the investigation of the fatal accident involving Lancair 360, VH-ZNZ, which occurred at Bankstown aerodrome, NSW, on 5 April 2006.