

Transportation Safety Board  
of Canada



Bureau de la sécurité des transports  
du Canada

**AVIATION INVESTIGATION REPORT  
A11W0180**



**CONTROLLED FLIGHT INTO TERRAIN**

**TREK AERIAL SURVEYS  
CESSNA 185E C-FXJN  
FORT ST. JOHN, BRITISH COLUMBIA, 12 NM E  
30 NOVEMBER 2011**

**Canada**

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

## Aviation Investigation Report

### Controlled Flight into Terrain

Trek Aerial Surveys

Cessna 185E C-FXJN

Fort St. John, British Columbia, 12 nm E

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Report Number A11W0180

### *Synopsis*

A Trek Aerial Surveys Cessna 185E (registration C-FXJN, serial number 1851258) was on a night visual flight rules flight from Peace River Airport, Alberta, to Fort St. John Airport, British Columbia. At approximately 1817 Mountain Standard Time, the aircraft struck the ground 12 nautical miles east of the Fort St. John Airport. The pilot, and sole occupant, of the aircraft sustained fatal injuries. The aircraft was destroyed by impact forces and there was no post-impact fire. The 406 MHz emergency locator transmitter activated on impact.

*Ce rapport est également disponible en français.*

## *Factual Information*

### *History of Flight*

The pilot departed Fort St. John Airport at 0843<sup>1</sup> and flew to Peace River Airport, Alberta, arriving at 0940. A single passenger was picked up and they departed Peace River Airport at 1043 for Fort Vermilion, Alberta. The aircraft was refueled in Fort Vermilion and then departed at 1359, flying along the Peace River to the Vermilion Chutes before returning to the Peace River Airport to drop off the passenger. Prior to arriving at Peace River Airport, the pilot was in contact with the company operations manager via cell phone to update the flight's progress. The pilot was aware of the need to be back in Fort St. John before night.<sup>2</sup>

While on the ground at Peace River Airport, the pilot revised his estimated time of arrival at Fort St. John Airport to 1813 with the Edmonton Flight Information Centre (FIC). The pilot then departed at 1706, reporting westbound at 4500 feet above sea level (asl). Between 1719 and 1755, the pilot engaged in 2 text message exchanges and conducted 5 voice cell phone communications totalling 28 minutes.<sup>3</sup> The pilot received a final text message at 1806, 11 minutes before the accident (Appendix A).

At 1807, C-FXJN was 26 nm east of Fort St. John Airport at 4400 feet asl<sup>4</sup> (Appendix B). At 1809, 23 nm east of the Fort St. John Airport, the aircraft began a gradual descent of approximately 170 feet per minute, with a ground speed of 90 knots. (Ground elevation was approximately 2400 feet asl at the accident site.) The aircraft was 18 nm east at 3200 feet asl at 1813 when the pilot was in contact with the Fort St. John Flight Service Station (FSS). The pilot was advised that the winds were 210° magnetic (M) at 15 knots, the altimeter setting was 30.31 inches of mercury (in Hg) and that the preferred runway was 20. The pilot acknowledged this information. There were no further communications with the FSS.

From 1815 to 1816, the pilot momentarily leveled off at 2900 feet asl, 15 nm east of the airport, before resuming the descent. The descent continued uninterrupted until the last radar contact at 1817, 12 nm from the airport at 2400 feet asl.

### *Wreckage Information*

The accident site elevation was approximately 2400 feet asl. It was covered by scrub brush consisting predominantly of thin aspen trees 1 to 2 inches in diameter and approximately 10 feet tall. Sporadically within the stand were larger aspen trees about 50 to 80 feet tall with trunk

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<sup>1</sup> All times Mountain Standard Time (Coordinated Universal Time minus 7 hours) unless otherwise noted.

<sup>2</sup> Sunset for Fort St. John on 30 November 2011 was 1633. Official night was 1703.

<sup>3</sup> The pilot was engaged in numerous cell phone communications, not only during this leg of the trip, but throughout the entire day. The pilot was in contact with 12 individuals on 17 occasions.

<sup>4</sup> Track information for C-FXJN was derived from SKY Trac and NAV CANADA data.

diameters of about 18 inches. The ground was generally level and frozen, covered by 4 to 6 inches of snow.

The aircraft came into contact with an aspen tree at approximately 75 feet agl. The middle of the left wing strut was struck from below and slightly forward. This caused the strut to buckle upward, resulting in the strut's wing and fuselage fittings to fail due to the overload force exerted upon them. With the strut detached, the left wing lifted up and broke free of the fuselage at the wing attachment fittings. The left wing and strut were found approximately 209 feet from where the left wing had struck the trees.

After the left wing had separated from the aircraft, C-FXJN rolled to the left and continued to descend, impacting the ground on its left side 370 feet from where the left wing was found. C-FXJN bounced a further 40 feet before coming to rest on its back.

The cockpit instruments were largely destroyed as a result of the impact. The tachometer face was recovered indicating a power setting of 2400 rpm. The altimeter was not recovered; therefore, it could not be determined if it was set to the Fort St. John Airport altimeter setting.

A panel mounted Garmin GPSMAP695 unit was recovered from the wreckage and forwarded to the TSB Engineering Laboratory for examination. Track information including geographic position, altitude, heading and ground speed were recovered. This unit was also equipped with an aural terrain alert function, which would have been active when the unit was powered up. To what extent this function was utilized during the occurrence flight could not be determined.

Components of the left wing (the wing, inboard section of the aileron and flap) were found together. The left wing strut, left wing tip and left outboard fuel tank were also found in the immediate vicinity of the left wing. Damage to the wing was consistent with the wing coming into contact with the trees post-separation.

The aircraft was equipped with a wooden/composite propeller. Sections of the propeller were located at the initial ground impact site. The throttle and propeller controls were found in the forward position. The fuel valve was in the "both" position. There was no post-impact fire.

The pilot was restrained by a 4-point harness at the time of the accident.

## *Aircraft*

The occurrence aircraft was a Cessna 185E. The aircraft had been in service with Trek Aerial Surveys since January 2010 and was equipped for day and night VFR operations. The aircraft was not, nor was it required to be, equipped with a flight data recorder (FDR), cockpit voice recorder (CVR), terrain awareness warning systems (TAWS) or an autopilot. The aircraft, at the time of the occurrence, was maintained in accordance with the existing regulations. No outstanding defects had been reported. The aircraft was within the applicable weight and balance limitations for the flight. The occurrence aircraft was modified with a 3-bladed composite propeller, wheel/skis, short take-off and landing (STOL) kit and wing extensions with internal wing-tip fuel tanks.

## *Weather Information*

Weather conditions observed at 1800 at the Fort St. John Airport indicated that the wind was from 230° true at 14 knots. Visibility was 15 statute miles and the ceiling was 20 000 feet above ground level (agl). Temperature was -4°C and the dew point was -12°C. The altimeter setting was 30.34 in Hg. The forecast winds aloft at 6000 feet asl were 250° true at 65 knots. A pilot, in the vicinity of Cecil Lake, 8 nm northwest of the accident site, reported light turbulence which did not have an adverse effect of the conduct of the flight. Conditions at the time of the occurrence were conducive for night visual flight rules (VFR) flight. Approximately 34% of the moon's face was visible.

## *Company*

Trek Aerial Surveys operates under the Subparts 702 – Aerial Work and 703 – Air Taxi regulations of the *Canadian Aviation Regulations* (CAR). It operates a variety of single engine aircraft under daytime VFR. The company did not have, nor was it required by regulation, a safety management system in place at the time of the occurrence.

## *Flight Crew*

The occurrence pilot held a commercial pilot licence and was qualified in accordance with the regulations existing at the time of the occurrence. The pilot had accumulated approximately 2170 hours of flight time with about 182 hours on the occurrence aircraft. The pilot had completed recurrent training outside of the company to renew a multi-engine instrument rating on 25 November 2011. It could not be determined how many hours of night flying experience the pilot had, beyond that required for the issuance of the commercial pilot licence. The pilot had been employed with Trek Aerial Surveys since April 2011. Company training conducted included controlled flight into terrain (CFIT) awareness in the form of the FlightSafety International CFIT awareness video. As the company operates under day VFR, no night flight training was conducted. There were no indications that incapacitation or physiological factors affected the pilot's performance.

The occurrence flight was the pilot's first flight with the company in 30 days. At this time the total flight time accumulated for the day was approximately 7.1 hours.

## *Situational Awareness*

A loss of situational awareness could be the result of what is known as the “black-hole effect”. A black-hole approach typically occurs during a visual approach conducted on a moonless or overcast night over water or over dark, featureless terrain where the only visual stimuli are lights on and/or near the airport. The absence of visual references in the pilot's near vision affects depth perception and causes the illusion that the airport is closer than it actually is and, thus, that the aircraft is too high. The pilot may respond to this illusion by conducting an

approach below the correct flight path (i.e., a low approach). In the extreme, a black-hole approach can result in ground contact short of the runway.<sup>5</sup>

In June 2012, the TSB released its Watchlist identifying the safety issues investigated by the TSB that pose the greatest risk to Canadians. One of the safety issues identified was controlled flight into terrain (CFIT). CFIT accidents occur when an airworthy aircraft under the control of the pilot is inadvertently flown into the ground, water, or an obstacle. In these cases, pilots are unaware of the danger until it is too late. This type of accident often happens when visibility is low, at night, or during poor weather. Such conditions reduce a pilot's situational awareness of surroundings and make it difficult to tell whether the aircraft is too close to the ground. The risk is even greater for small aircraft, which venture further into remote wilderness or into mountainous terrain but are not required to have the same ground proximity warning equipment as large airliners.

Between 2000 and 2009, there have been 129 accidents of this type in Canada, resulting in 128 fatalities. Collisions with land and water account for 5% of accidents but nearly 25% of all fatalities.

In the events leading up to this occurrence the aircraft experienced several large altitude deviations while the pilot was using the cellphone. Cell phone use can distract operators from essential operational tasks. There have been no comprehensive studies regarding the use of cell phones as a distraction in an aviation context. The phenomenon has, however, been extensively studied in the automotive sector. The Canadian Council of Motor Transport Administrators defines driver distraction:

Distracted driving is the diversion of attention from driving, as a result of the driver focusing on a non-driving object, activity, event or person. This diversion reduces awareness, decision-making or performance leading to increased risk of driver error, near-crashes or crashes. The diversion of attention is not attributed to a medical condition, alcohol/drug use and/or fatigue<sup>6</sup>.

The following TSB Laboratory reports were completed:

LP175/2011 - GPS Analysis

LP176/2011 - Examination of Fractured Wing Strut Attachment

These reports are available from the Transportation Safety Board upon request.

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<sup>5</sup> Dan Gurney, "Learning From Experience: Night VMC". *Aviation Safety World*. July 2006.

<sup>6</sup> Alberta Infrastructure and Transportation. "Distracted Driving and Cell Phone Use While Driving". September 2007.

## *Analysis*

There was no indication that an aircraft system malfunction or pilot physiological issue contributed to this occurrence. There were no drastic changes in the aircraft's flight path and no emergency calls from the pilot to indicate that an inflight emergency was experienced. The gradual rate of descent, constant ground speed and flight path would also suggest that the aircraft was under the control of the pilot. As a result, the analysis will focus on the phenomenon of controlled flight into terrain.

The occurrence flight was over sparsely settled terrain at night, where the absence of visual reference or cues would deprive the pilot of context as to the position of the aircraft relative to the ground. This would have created a black-hole effect as the pilot approached the Fort St. John Airport.

The aircraft had experienced several large altitude deviations while the pilot was using his cellphone. While it did not appear that the pilot was actively engaged in cell phone communications during the last 11 minutes of the flight, this distraction was prevalent throughout the flight and in conjunction with the night conditions encountered, may have contributed to the CFIT event.

When cockpit or data recordings are not available to an investigation, this may preclude the identification and communication of safety deficiencies to advance transportation safety.

## *Findings as to Causes and Contributing Factors*

1. For undetermined reasons, the pilot descended too low or was not aware of the descent and low altitude of the aircraft, which resulted in an impact with terrain.

## *Findings as to Risk*

1. Pilots who engage in non-essential text and voice cell phone communications while conducting flight operations may be distracted from flying the aircraft, placing crew and passengers at risk.
2. When cockpit or data recordings are not available to an investigation, this may preclude the identification and communication of safety deficiencies to advance transportation safety.

## *Other Findings*

1. The flight was conducted under night VFR conditions, when company operations were limited to day VFR.

## *Safety Action Taken*

Trek Aerial Survey has implemented the following policies/practices:

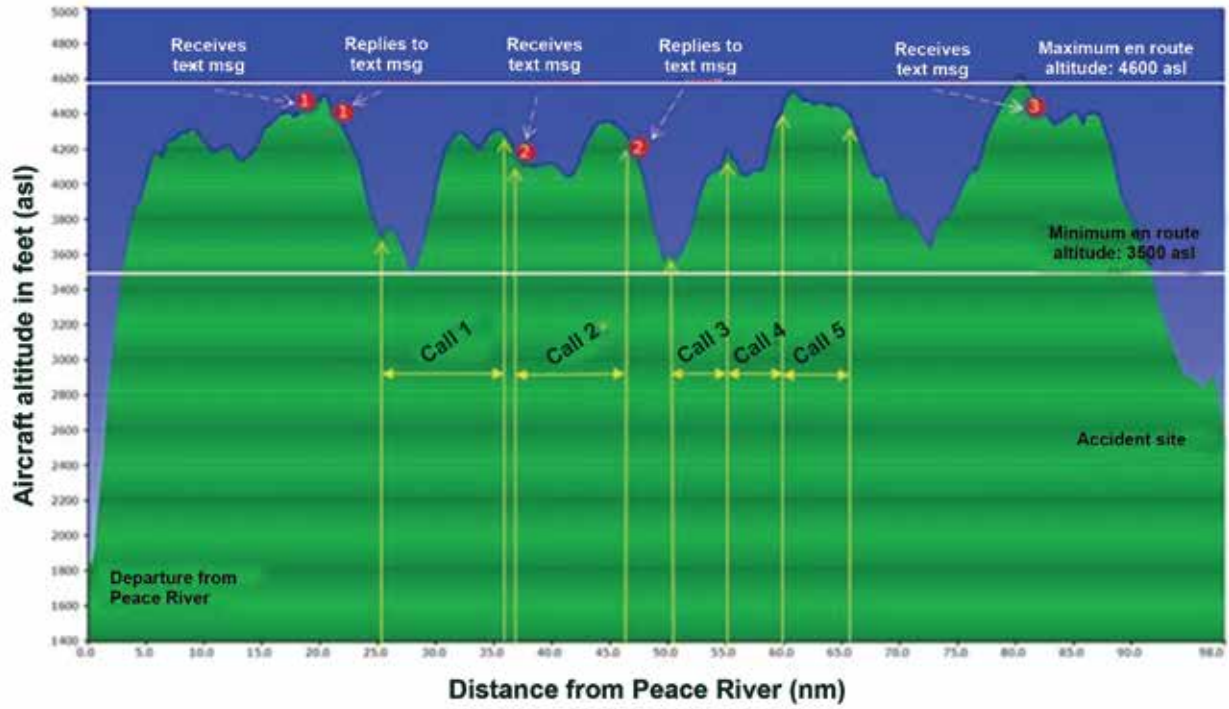
1. Implementation of an operational safety management system
2. Biannual aircraft recurrent training
3. Prohibition of any flights after sunset
4. Prohibition of the use of mobile/cell phone devices by pilots during flight, unless for an emergency.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 07 August 2012. It was officially released on 13 August 2012.*

*Visit the Transportation Safety Board's website ([www.bst-tsb.gc.ca](http://www.bst-tsb.gc.ca)) for information about the Transportation Safety Board and its products and services. You will also find the Watchlist, which identifies the transportation safety issues that pose the greatest risk to Canadians. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.*



# Appendix A —Pilot's Cell Phone Use, Peace River to Fort St. John



## Appendix B — C-FXJN Flight Path

