Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AVIATION INVESTIGATION REPORT

A98P0303

CONTROLLED FLIGHT INTO TERRAIN

REGENCY EXPRESS AIR OPERATIONS
CESSNA 208B CARAVAN N9352B
MOUNT TUAM, BRITISH COLUMBIA
23 NOVEMBER 1998

Canada

Aviation Investigation Report

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Report Number A98P0303

Synopsis

Regency Express Air Operations Flight 434, a Cessna 208 Caravan (serial number 208B0061), was en route from Vancouver International Airport to Victoria International Airport, British Columbia, on a night visual flight rules (VFR) flight when it collided with trees on Saltspring Island, about five nautical miles (nm) north of the Victoria International Airport. The aircraft broke apart on impact and a post-crash fire occurred. The two pilots, who were the sole occupants of the aircraft, sustained fatal injuries, and the aircraft was destroyed. The accident occurred at 0030 Pacific standard time (PST).

Ce rapport est également disponible en français.

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1.0 *Factual Information*

1.1 *History of the Flight*

Regency Express Air flight 434 (RXX434), a Cessna 208B (N9352B), was on a night cargo flight from Vancouver to Victoria and was operating under VFR. Based on recorded radar and communications data, it was determined that the aircraft departed from Vancouver's runway 08R at 0012 PST and completed a climbing right-hand turn onto a direct track towards Active Pass.[1] The aircraft levelled off at 2000 feet above ground level (agl) and remained at that altitude for all but the last portion of the flight.

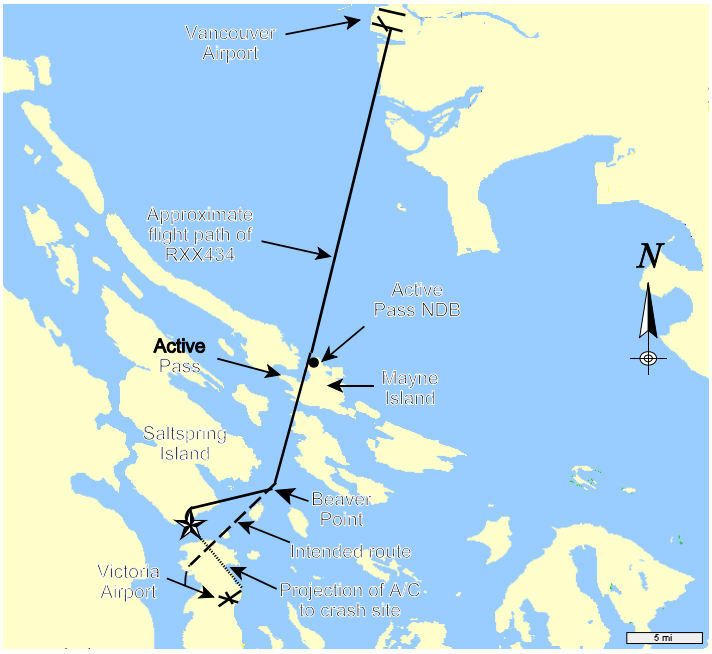

Figure 1 - Aircraft routing and crash site

As the aircraft approached Active Pass, the crew made a radio call to inform any traffic in the Victoria area of their intention to join left-base for a landing on runway 09 at the Victoria airport. Several minutes later, the crew made a second report indicating that they were 10 nm back, for a landing on runway 09. The last position report was made as they approached Beaver Point, at the south-east end of Saltspring Island. Recorded radar data then showed the aircraft made a noticeable turn to the right, in the vicinity of Beaver Point, and began to track towards high ground north of the Victoria airport (solid line depicted on Figure 1).

At 0026, the aircraft began a gradual, descending turn to the left onto a south-easterly heading, before striking trees near the peak of Mount Tuam on the southern end of Saltspring Island. Information gathered at the crash site indicates that the aircraft was in level flight when it first contacted the trees and that its flight path was lined up with the east side of the Victoria airport (dotted line depicted on Figure 1).

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[1] All times are PST (Coordinated Universal Time (UTC) minus eight hours).

1.2 Injuries to Persons

	Crew	Passengers	Others	Total
Fatal	2	-	-	2
Serious	-	-	-	-
Minor/None	-	-	-	-
Total	2	-	-	2

1.3 Damage to Aircraft

The aircraft was destroyed by impact forces and by a post-crash fire.

1.4 Other Damage

Trees and vegetation at the crash site were damaged by the aircraft's collision with the terrain and by a subsequent fire.

1.5 Personnel Information

	Captain	First Officer
Age	27	29
Pilot Licence	Commercial	Commercial
Medical Expiry Date	1 August 1999	1 February 1999
Total Flying Hours	1653	120
Hours on Type	400	Nil
Hours Last 90 Days	129	37
Hours on Type Last 90 Days	123	Nil
Hours on Duty Prior to Occurrence	3	3
Hours Off Duty Prior to Work Period	36	72

The aircraft captain was a qualified commercial pilot who held valid instrument and instructor ratings. He was current on the Cessna 208 aircraft type and flew similar routes between Vancouver and Victoria routinely.

The other pilot involved in this accident held a valid commercial pilot licence. He was authorized by the company to be on this aircraft under non-rated pilot provisions of the company operations manual (COM). A non-rated pilot is defined by the company as a pilot who is not trained on the particular aircraft; a non-rated pilot's purpose is to assist the pilot in command when a first officer is either not required or not available. Under these provisions,

non-rated pilots have no designated flight duties but are available to help the pilot in command with loading and flight planning activities. This provision allows non-rated pilots to familiarize themselves with the operating environment, aircraft systems, and company missions.

1.6 Aircraft Information

Manufacturer	Cessna Aircraft Co.
Type and Model	C208B Caravan
Year of Manufacture	1988
Serial Number	208B0061
Certificate of Airworthiness (Flight Permit)	Valid
Total Airframe Time	6717 hours
Engine Type (number of)	Pratt & Whitney PT6-114 (1)
Propeller/Rotor Type (number of)	Hartzell HC-B3MN-3 (1)
Maximum Allowable Take-off Weight	3969 kg
Recommended Fuel Type(s)	Jet A, Jet A-1, Jet B
Fuel Type Used	Jet A-1

1.6.1 Weight and Balance

The aircraft's weight and centre of gravity were calculated to have been within the certificated limits.

1.6.2 Airworthiness

The accident aircraft was owned by Aviation Capital Corporation of La Jolla, California, and registered in the United States. It was being operated by Regency Express Air Operations under a leasing agreement that was authorized by Transport Canada (TC). The aircraft was equipped and authorized for single-pilot operation under either instrument or visual flight conditions. Following the accident, the TC Commercial and Business Aviation and Maintenance and Manufacturing departments conducted a joint special purpose audit of the company.

During that audit, the inspectors identified a number of areas where the company's maintenance procedures and practices were not in accordance with the approved maintenance control manual. They also identified areas of concern involving aircraft technical records and flight crew training records. Notwithstanding the areas of concern that were noted by the TC inspectors, TSB investigators did not find any causal link between the accident of 23 November 1998 and the maintenance of the involved Cessna 208 aircraft.

1.7 Meteorological Information

1.7.1 Minimum Weather Requirements

Canadian Aviation Regulations (CARs) describes the minimum existing weather conditions required for VFR flight in controlled airspace. The requirement is as follows: an aircraft is required to operate with visual reference to the surface; flight visibility is not less than three miles; and the distance of the aircraft from cloud is not less than 500 feet vertically and one mile horizontally.

1.7.2 Forecasts/Hourly Observations

The area forecast for the coast region (FACN32 CWLW 230530), as well as the transcribed weather broadcast (TWB) for the same area, indicated that pilots could expect local stratus ceilings between 500 and 1500 feet, mainly in areas of onshore flow, and visibilities of ½ to 3 statute miles in fog and mist.

The terminal forecast for Victoria that was valid at the time the accident crew was flight planning indicated a worst-case temporary condition of 4000 feet broken and did not include any mention of the low cloud or visibility levels noted in the area forecast. The 2300 weather observation was consistent with this forecast and reported wind from 90 degrees True at 5 nm per hour (knots), 15 statute miles visibility, a scattered layer of cloud at 1600 feet agl, and a broken ceiling at 4000 feet agl.

A deepening pressure gradient was causing strong low-level winds from the south. Other pilots who were flying on the night of the accident confirmed this condition. In one instance, a pilot indicated that he needed 25 degrees of drift correction to maintain his track. First responders to the accident site estimated the wind to be between 25 and 30 knots at the crash elevation of about 1850 feet above sea level (asl).

An amended terminal forecast was issued for Victoria at 0016, after the accident flight was airborne. This forecast indicated that a temporary condition could be expected between midnight and 0200, giving a broken ceiling at 2000 feet agl. The 0000 weather observation indicated that weather conditions were worse than forecast and reported that the previously scattered layer of cloud at 1600 feet had thickened to produce a broken ceiling. This information was issued after the crew had completed their preflight planning activities.

Weather updates are available by radio from either the Vancouver Flight Service Station (FSS) specialists or from the Victoria Terminal controllers. There is no communication record showing that the pilots had requested weather updates from either of these agencies. There is no mandated requirement to obtain the latest weather information when flying to Victoria airport when the tower is not in operation.

1.7.3 Pilot Report

A pilot report (PIREP) from a regional air carrier that landed about 15 minutes before this accident indicated that visual meteorological conditions existed at Victoria, with a broken layer of cloud reported at 1400 feet asl. Visibility below the cloud was reported to be 15 statute miles.

1.8 Aids to Navigation

The Vancouver very high frequency omni-directional range (VOR), the Active Pass non-directional beacon (NDB), the Victoria VOR, the Victoria and Mill Bay NDBs, and the instrument landing system for runway 09 were all serviceable at the time of the accident. The aircraft was equipped to receive information from all of these navigation aids. In VFR flight, pilots often use such information to augment their visual navigation procedures. Information about the selection or tuning of the navigation equipment on board the aircraft is not available, as that equipment was destroyed by a post-crash fire.

1.9 Communications

NAV CANADA's audio tapes from Vancouver Tower, Victoria Tower, and Victoria Terminal were reviewed following the occurrence. There is no indication on these tapes that the crew may have been experiencing an in-flight emergency.

1.10 Aerodrome Information

NAV CANADA operates a control tower at the Victoria airport between 0600 and 2400; at other times the tower is closed. When open, the tower controllers provide air traffic service within an irregularly shaped Class C control zone up to an altitude of 2500 feet asl. As part of their function, the Victoria tower controllers provide aircraft operators with a level of radar service that can include radar advisory, radar control, radar monitoring, radar navigational assistance, and radar separation. When the tower is closed, the airspace reverts to a Class E airspace, the radar services are unavailable, and the airport remains open as an uncontrolled airport. The tower was closed at the time of this accident.

The *Canada Flight Supplement* (CFS) directs all aircraft to use runway 09/27 between 2000 and 0700, consistent with certain limiting factors. At the time this accident occurred, runway 09 was the preferred runway, based on the direction of the wind.

1.11 Flight Recorders

Flight recorders were not installed in the aircraft and were not required by regulation.

1.12 Wreckage and Impact Information

The accident site is located about 500 feet north-northeast of the VOR facility on Mount Tuam. The site location was measured by global positioning system (GPS) as latitude 48˚43.83' north,

longitude 123˚29.05' west, and is about 100 feet below the peak of the mountain, at an estimated elevation of about 1850 feet asl. The debris trail was 400 to 500 feet in length, orientated on a magnetic bearing of 123 degrees, and was in line with the east side of the Victoria airport. (See dotted line on Figure 1.)

An examination of the site revealed that the aircraft first contacted trees in a near-level-flight condition. It began breaking apart after first impact, but the majority of the deceleration occurred near the end of the wreckage trail, where the engine, right wing, and cockpit sections contacted the base of a heavy stand of trees. These aircraft components, as well as the aircraft radios and instruments were burned beyond usefulness in a post-crash fire. Damage to the engine and propellor components was consistent with the engine being powered at the time of impact. The level of engine power was not determined.

The orientation of the aircraft at initial impact, the length of the debris trail, and the extensive damage to the aircraft structure and components are consistent with a high-speed, controlled flight collision with the terrain.

1.13 Medical Information

The pilot in command held a valid medical certificate. A review of available records shows no pre-existing medical problems that would have affected his performance on this flight.

1.14 Fire

The engine, right wing, and cockpit sections were extensively burned by a post-crash fire. Because the trees and ground in the area had been saturated by days of rain, the fire was limited to a relatively small area of approximately 10 feet by 15 feet.

1.15 Survival Aspects

The accident was not survivable due to rapid deceleration forces that were beyond human tolerance and a post-crash fire.

1.16 Tests and Research

Not applicable.

1.17 Organizational and Management Information

International Express Aircharter Ltd., conducting business as Regency Express Air Operations, is a domestic, non-scheduled international air operator. The company operates under the authority of a Canadian Air Operator Certificate. A general condition of the air operator certificate is that the air operator shall conduct flight operations in accordance with its COM; in this instance, the flight was conducted in accordance with its COM.

Regency Express Air Operations also published an unofficial crew manual (i.e., one not approved by TC) as an information source for the company's flight crews. That manual detailed the general routing, weather limits, fuel requirements, standard procedures, and contacts to be used in support of the company's air taxi flights. Company pilots indicated that they would rarely obtain weather updates during the Vancouver to Victoria flight because of the short duration of the flight; normally, they can also see their destination shortly after take-off from Vancouver.

1.18 Additional Information

1.18.1 Obstacle Clearance Requirements

VFR flight obstacle clearance requirements for air taxi operations are as follows: "Except when conducting a take-off or landing, no person shall operate an aircraft in VFR flight … at night, at less than 1,000 feet above the highest obstacle located within a horizontal distance of three miles from the route to be flown." These obstacle clearance requirements are independent of the minimum weather requirements for flight under VFR and are applicable in both controlled and uncontrolled airspace. Although the COM did refer to this regulation, it linked the obstacle clearance requirement to night VFR flight in uncontrolled airspace only; the flight from Vancouver to Victoria was conducted in controlled airspace.

With the introduction of the CARs in the mid-1990s, TC had promulgated a generic COM to the air carriers in the Pacific Region. This generic manual was issued to aid the air carriers in their development of new COMs that would be compliant with the revised regulations. The Regency Express Air Operations COM is consistent with TC's generic operations manual. On review of the TC manual, it became apparent that the generic COM did not include references to minimum obstacle clearance requirements for night VFR operations in controlled airspace, but only referenced these requirements for operations in uncontrolled airspace. TC subsequently issued a Commercial and Business Aviation Advisory Circular (No. 0153, dated 12 March 1999) reiterating CAR requirements for night VFR operations. In addition, TC provided advance notice that the generic operations manual would be amended on the next cycle to include all relevant regulations related to night VFR flight by commercial operators.

The company's crew manual indicated that the standard VFR route to be used for this particular flight to Victoria should be from Vancouver, direct to Active Pass, then direct to Victoria at 1500 feet. At 1500 feet asl, this entire route of flight remains within controlled airspace. However, in order to meet the obstacle clearance requirements, the route would have to be completed at about 2000 feet through Active Pass and at about 3000 feet in the vicinity of Mount Tuam.

1.18.2 Victoria's VFR Arrival Routes

There are no specific regulations to be used to transition from a safe en route altitude to the runway environment. Circuit procedures outlined in the *Aeronautical Information Publication* (A.I.P. Canada) do not take local obstacles into account. Under night conditions, especially in remote areas or mountainous regions with few ground lights, the procedures outlined in the A.I.P. Canada may not ensure safety during a descent from a safe en route altitude to the

runway environment. In addition to the procedures outlined in the A.I.P. Canada, the CFS depicts a number of VFR arrival and departure routes into and out of the airport. The Beaver Point arrival route is used when runway 09 is in use. That arrival procedure depicts a routing direct from Active Pass to Beaver Point, near the south end of Fulford Harbour, followed by a right turn to follow Satellite Channel westward until a left turn can be completed in the vicinity of Patricia Bay to establish a final approach to runway 09. A note on this procedure in the CFS indicates that pilots are to "MAINTAIN 2000' UNTIL TURNING FINAL OR CLEARED LOWER." The Beaver Point arrival route passes within three miles of Mount Tuam on the south end of Saltspring Island. For commercial operators to meet the night VFR obstacle clearance requirements, they would have to complete that route at a minimum altitude of 3000 feet asl in the vicinity of Mount Tuam. NAV CANADA was initially unaware that the published VFR arrival routes were inconsistent with CARs and subsequently issued two NOTAMs to restrict the use of the arrival and departure routes at night. These VFR routes have now been amended in the CFS with a note to pilots that they are "NOT AUTHORIZED OUTSIDE TWR HRS OF OPS."

One flashing red obstruction light identifies rising terrain on the south side of Satellite Channel. Two additional flashing red obstruction lights identify rising terrain on the north side of the channel on Saltspring Island. Some pilots have reported that they use these obstruction lights at night to identify the channel and that, when making a right turn at Beaver Point, they fly between these obstruction lights until they can visually acquire the approach environment for runway 09. An additional obstruction light is located at the top of Mount Tuam, near the Victoria VOR installation, at an elevation of about 2000 feet asl.

1.18.3 Ground Proximity Warning System

The accident aircraft was not equipped with a ground proximity warning system (GPWS), nor was one required by regulation. Regulation requires that GPWS equipment be installed in all turbo-jet–powered aircraft that have a maximum certified take-off weight greater than 33 069 pounds and a type certificate authorizing the carriage of 10 or more passengers. This regulation does not generally apply to air taxi operations because aircraft involved in these operations do not meet weight or propulsion criteria.

2.0 Analysis

2.1 Introduction

Based on a review of the aircraft's maintenance records and an examination of other available data, it is unlikely that a mechanical malfunction caused this accident. This conclusion is supported by recorded radar data regarding aircraft's speed, heading, and altitude, and by physical information from the accident site. The analysis of this accident will concentrate on safety issues related to deteriorating weather, an in-flight navigation error, flight below the minimum obstacle clearance altitudes, and a lack of terrain proximity warning equipment.

2.2 Environmental Conditions

At the time the crew of RXX434 was completing their preflight planning, the ceiling and visibility at the departure airport of Vancouver, and the arrival airport of Victoria, met the VFR weather requirements although the overcast layer at 4000 feet agl would have obscured any available celestial illumination and reduced ambient lighting.

The 0000 weather sequence and an amended terminal forecast for Victoria both indicated a lowering ceiling at the Victoria airport. However, because this information was issued after the crew's flight planning had been completed, it is unlikely that the crew were aware of these changes or would expect a ceiling to develop below their planned flight altitude of 2000 feet.

Although updated weather and a PIREP were available by radio through the Vancouver FSS and the Area Control Centre, the crew of RXX434 did not contact these units to request the latest information. Other pilots, interviewed after the accident, indicated that they would rarely obtain these updates given the short duration of the trip and since they could normally see their destination shortly after take-off from Vancouver.

The crew of RXX434 would have encountered the lower ceiling in the vicinity of Beaver Point. This lower layer of cloud would have restricted the pilot's view of the ground lighting and reduced the ambient lighting available to navigate by visual means.

2.3 Night Visual Navigation

The crew of RXX434 had transmitted their intention to join left-base for runway 09. That transmission infers an intent to follow a route similar to the published Beaver Point arrival. As RXX434 passed Beaver Point, the aircraft track altered right toward high ground on the south-west end of Saltspring Island; a strong, low-level crosswind from the left might account for some of this divergence away from the intended track.

Under normal conditions, a pilot will use ground lighting as a means of positional reference when operating at night. In this occurrence, the unexpected undercast layer at 1400 feet agl would have obscured the normal lighting references that delineate Satellite Channel. With these lighting references obscured, the only obstruction light the crew would be able to see would be

the light mounted on top of Mount Tuam. Because of the effect of the low-level winds, that light would have been slightly to the left of the aircraft's track line and at a distance that was similar to the low-level light reference normally used. Under these conditions, it is likely that the lights seen by the crew would have appeared similar to those normally seen during a night visual approach into Victoria. The crew would have been unable to perceive the divergence of their aircraft's flight path away from the intended track by visual means.

2.4 Obstacle Clearance

At night, VFR commercial operations must be conducted above a minimum obstacle clearance altitude. Although the COM did cite the applicable obstacle clearance requirements, it linked those requirements to night VFR flight in uncontrolled airspace. Given the way that the COM was written, it was possible to draw an incorrect inference that the minimum altitudes did not apply in controlled airspace.

Two other recent TSB investigations (A97C0215 and A99P0006) identified similar issues in other COMs, as well as a lack of awareness by other companies and their flight crews of the night VFR obstacle clearance requirements. In addition, given that the company's crew manual suggested an en route altitude of 1500 feet for this particular flight, it is apparent that neither the company nor the crew involved was aware of the obstacle clearance requirements.

The night VFR obstacle clearance requirements mitigate risk during the en route phase of flight. Had the crew been aware of the minimum altitudes, and had they respected them, the chance of a collision with terrain would have been eliminated. The night VFR obstacle clearance minimum altitudes do not provide protection during the approach or departure phases of night VFR flights.

2.5 Equipment Issues

2.5.1 Positive Navigation Guidance

In this occurrence, the aircraft was not equipped with a GPS or other equivalent area navigation system that could provide positive tracking guidance to the pilot for the portion of the flight along the published VFR arrival route. Availability of a GPS system may have provided early indications to the crew of their deviation from the required track. However, conventional ground-based navigational aids were available to the pilot, but it could not be determined if the pilots were using these aids at the time of the occurrence.

2.5.2 Terrain Warning Equipment

RXX434 was not equipped with a GPWS, which is designed specifically to warn of approach to terrain. Although such equipment is required on larger, passenger-carrying jet aircraft, that requirement does not extend to air taxi operations even though their operations are being conducted visually, at night, in high-risk mountainous areas, and often without the radar monitoring and support that is normally provided to larger, passenger-carrying jet aircraft.

GPWS equipment is a recognized defence against controlled flight into terrain accidents and could be used to enhance safety in high-risk operational environments. With this type of equipment installed on the aircraft, the likelihood of this accident occurring would have been reduced.

3.0 Conclusions

3.1 Findings as to Causes and Contributing Factors

1. Although weather information was available by radio from the Vancouver FSS specialists or from the Victoria Terminal controllers, there is no indication that the pilots requested weather updates from either of these units.

2. The crew of RXX434 would have encountered the lower ceiling in the vicinity of Beaver Point. This lower layer of cloud would have restricted the crew's view of the ground lighting and reduced the ambient lighting available to navigate by visual means.

3. With the loss of ground references, it is unlikely that the crew would have been able to perceive the divergence of the aircraft's flight path away from its intended track by visual means.

4. The crew was unable to maintain separation between the aircraft and the terrain by visual means.

5. The published VFR arrival and departure routes for Victoria were not consistent with obstacle clearance requirements for commercial operators.

6. Regency Express Air Operations' crew manual suggested an en route altitude of 1 500 feet for this particular flight. That route and altitude combination is not consistent with published obstacle clearance requirements.

3.2 Other Findings

1. At the time the crew completed their flight planning, the weather at the departure airport of Vancouver and the arrival airport of Victoria was suitable for a night VFR flight.

2. An amended terminal forecast for Victoria indicating the presence of a temporary ceiling at 2000 feet asl was issued after the crew had completed their preflight planning activities.

3. The regulation requiring GPWS equipment does not apply to air taxi operations because the aircraft used in those operations do not meet weight or propulsion criteria.

4.0 Safety Action

4.1 Action Taken

4.1.1 Notices to Airmen (NOTAMs)

The TSB issued an occurrence bulletin to TC, NAV CANADA, and the management of Regency Express Air Operations which explained that the VFR arrival and departure procedures for Victoria may not be consistent with the obstacle clearance requirements.

NAV CANADA subsequently issued a NOTAM (No. 990012) restricting the use of the published VFR arrivals into the Victoria airport during times when the tower was closed. This restriction has since been incorporated into the CFS.

NAV CANADA issued a second NOTAM (No. 990013) restricting CARs Part VII operators from using the published arrival/departure procedures for Victoria at night.

4.1.2 TC Audit

Following this accident, TC conducted a special purpose audit of Regency Express Air Operations. Areas of concern noted during that audit have been addressed and corrected by the company.

4.1.3 Commercial Air Service Standard—Night VFR Operations

TC issued a Commercial and Business Aviation Advisory Circular (CBAAC No. 0153) on 12 March 1999 to draw air taxi operators' attention to the civil aviation regulation requiring increased obstacle clearance during night VFR operations. That advisory also highlighted the requirement for night VFR to be conducted along air routes or routes that had been specifically established by the air operator and designated in accordance with *Commercial Air Service Standard* (CASS) 723.34. CASS 723.105(1)(j) now requires COMs to include information and direction pertaining to night VFR operations.

4.1.4 Training Programs

TC issued CBAAC Number 0161, dated 31 August 1999, detailing a new requirement for all CARs subpart-703 (Air Taxi), -704 (Commuter), and -705 (Airline) operators to undergo mandatory training for the avoidance of controlled flight into terrain accidents.

4.1.5 Company Crew Manual

Regency Express Air Operations has removed any reference to recommended routes or altitudes from its crew manual. The company pilots have been briefed on the obstacle clearance requirements for night VFR flight in designated mountainous regions and have been informed that it is now the company's preferred practice to conduct these flights under instrument flight rules.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 28 November 2000.

Appendix A – Glossary

agl	above ground level
A.I.P. Canada	*Aeronautical Information Publication*
asl	above sea level
CBAAC	Commercial and Business Aviation Advisory Circular
CARs	*Canadian Aviation Regulations*
CASS	*Commercial Air Service Standard*
CFS	*Canada Flight Supplement*
COM	company operations manual
FSS	Flight Service Station
GPS	global positioning system
GPWS	ground proximity warning system
HRS	hours
knot	nautical mile(s) per hour
NDB	non-directional beacon
nm	nautical mile(s)
NOTAM	Notice to Airmen
OPS	operations
PIREP	pilot report of weather conditions in flight
PST	Pacific standard time
TC	Transport Canada
TSB	Transportation Safety Board of Canada
TWR	tower
UTC	Coordinated Universal Time
VFR	visual flight rules
VOR	very high frequency omni-directional range
°	degree(s)
'	minute(s), feet