SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Occurrence Investigation** Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9033	
Aircraft Registration	**ZS-TVT**	**Date of Accident**	17 April 2012		**Time of Accident**	1300Z
Type of Aircraft	Beech Baron 58		**Type of Operation**		Private	
Pilot-in-command Licence Type	Commercial		**Age**	57	**Licence Valid**	No
Pilot-in-command Flying Experience	Total Flying Hours		736.1		Hours on Type	Unknown
Last point of departure	Port Elizabeth International Airport (FAPE): Eastern Cape province.					
Next point of intended landing	Cape Town International Airport (FACT): Western Cape province.					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Private farm at Draaifontein, Approximately 24km North West of FAPE at GPS co-ordinates determined to be S33°56,554′ E025°20,907 at an elevation of 594 feet above mean sea level (AMSL).						
Meteorological Information	Scattered to broken clouds (stratus and stratocumulus) were observed in the vicinity of the accident site.					
Number of people on board	1 + 0	**No. of people injured**	0	**No. of people killed**	1	

Synopsis

The pilot departed Port Elizabeth International Airport at around 1214Z on the 17th April 2012 on a repositioning flight to Cape Town. Approximately 6 minutes after take-off, FAPE ATC lost contact with pilot of ZS-TVT, and the aircraft disappeared off the ATC radar screens. A few moments later it was reported that the aircraft had crashed on a private farm near the Draaifontein road, approximately 24 kilometres North West of Port Elizabeth International Airport. The examination of the wreckage and the engine could not disclose any evidence of pre impact failure or malfunction. There was no evidence that suggested any failure prior to the accident. The damage observed could only be attributed to the high impact forces caused by the accident. According to the available information from the South African Weather Services and a few witnesses, the weather was overcast with a cloud base of 2000 ft AMSL in the area. There is a possibly that the pilot may have entered Instrument Meteorological Conditions (IMC) and lost visual reference to the ground. After entering IMC conditions the pilot might have suffered spatial disorientation, lost direction and flew into the ground at a very high speed.

Probable Cause

The pilot appeared to have entered instrument meteorological conditions (IMC) and in an attempt to remain VFR, he failed to maintain adequate terrain clearance resulting in the aircraft colliding with it.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Combrink A.J
Manufacturer : Raytheon Aircraft Company
Model : Beech Baron 58
Nationality : South African
Registration Marks : ZS-TVT
Place : Private Farm near Draaifontein
Date : 17 April 2012
Time : 1300Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (1997) this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and ***not to establish legal liability****.*

Disclaimer:

This report is given without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION:

1.1 History of Flight:

1.1.1 On Saturday 28 January 2012, the pilot being the owner of ZS-TVT delivered the aircraft at an approved Aircraft Maintenance Organization (AMO) at Port Elizabeth International Airport (FAPE) for a regular Mandatory Periodic Inspection (MPI) inspection. The AMO commenced with the MPI inspection on the 31 January 2012 and released the aircraft to service on 16 February 2012. The aircraft was parked at the AMO's hangar between the 16th February 2012 and 17th April 2012. On 17th April 2012, the pilot arrived at FAPE to fetch ZS-TVT aircraft. This was to be the first flight after the MPI was completed two months prior.

1.1.2 According to the AMO on 17 April 2012 a normal inspection and ground run were conducted during the presence of the owner/pilot and the aircraft was handed over to him for the flight back to Cape Town. The pilot accepted the aircraft and commenced with the thorough pre-flight inspection before the flight to Cape Town. It appeared that the pilot was happy and he filed a Visual Flight Rules (VFR) flight plan with the FAPE control tower. The flight plan was activated and the aircraft was started and taxied to the runway 26 holding point where after pre departure checks

were carried out.

1.1.3 ZS-TVT pilot was cleared for take-off and requested to keep an altitude of 2000 feet altitude above mean sea level (AMSL) and report at Sea view. According to the air traffic controller who was communicating with the pilot before departure ZS-TVT pilot sounded to be unsure of where Sea view was, but after some explanation he understood and departed. Take off and climb out was uneventful. Once ZS-TVT was airborne the approach controller was advised that ZS-TVT was routing towards the right hand site of the intended track. At 1217Z the approach controller established contact with ZS-TVT and advised him to remain at 2000ft AMSL or below and standby for further climb. There was IFR traffic overhead ZS-TVT and the controller was waiting for the aircraft to be clear before further climb. The controller issued the conflicting IFR descent to 3000 ft.

1.1.4 The controller observed TVT climbing to 2200ft and then 2600ft, still routing towards the right hand site of the intended track. ZS-TVT was advised to remain at 2000ft AMSL. ZS-TVT pilot apologised and slowly descended to 2400ft. ZS-TVT pilot further requested to descend to 1000ft without indicating why. His request was granted. At 1221Z the controller observed ZS-TVT making a sharp turn to the right and disappeared OFF the radar. The controller attempted to establish contact with ZS-TVT, but there was no response. According to the controller due to the nature of ZS-TVT flight path he assumed that the aircraft may have experienced some technical problems and landed at Progress airfield. The controller contacted Progress flight school asking whether ZS-TVT has not landed at their airfield and the answer was Negative.

1.1.5 The controller informed the airport pool manager and they started the initial phase of Search and Rescue. At this time, Progress flight school aircraft, call sign, ZS-KHO was in the air on a training flight and its pilot was requested to overfly the surrounding area to see if they could see anything. They saw aircraft debris scattered all over the area and was confirmed to be ZS-TVT aircraft. There was no distress call made by ZS-TVT pilot and the aircraft crashed on a private farm near the Draaifontein road, approximately 24 kilometres North West of Port Elizabeth International Airport. The South African Police Services (SAPS) and the local Emergency Medical Services (EMS) were notified and immediately drove to the accident site. The aircraft was found to have been destroyed by impact during the accident sequence and the pilot was fatally injured.

1.1.6 A witness, who is also a pilot, saw the aircraft flying overhead Progress airfield routing in the Westerly direction at an altitude of approximately 2000ft AMSL. He stated that he observed the aircraft taking a gradual bank to the left into a cloud. According to the witness, the cloud base was at approximately 2000ft AMSL. Immediately after the aircraft entered the cloud, the witness heard a high pitch noise as if the engines were accelerating. A few moments later the witness heard an impact sound as the aircraft impacted the ground. The flight was conducted under the provisions of Part 135 of the Civil Aviation Regulations.

1.1.7 The accident happened at approximately 1221Z, on a private farm near Draaifontein road, about 24 km North West of FAPE, at GPS co-ordinates determined to be S33°56.562′ E025°20,904′ at an elevation of 594 feet above mean sea level (AMSL).

1.2 Injuries to Persons:

Injuries	Pilot	Crew	Pass.	Other
Fatal	1	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3 Damage to Aircraft:

1.3.1 The aircraft was completely destroyed on impact.

Figure 1: View of the aircraft as found at the accident site.

1.4 Other Damage:

1.4.1 Damage was limited to the cattle grazing area on a farm.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	57
Licence Number	0271026155	Licence Type	Commercial		
Licence valid	No	Type Endorsed	Yes		
Ratings	Night Rating, Instrument Rating				
Medical Expiry Date	31 December 2011				
Restrictions	Corrective lenses				
Previous Accidents	Nil				

Flying Experience:

Total Hours	736.1
Total Past 90 Days	Unknown
Total on Type Past 90 Days	Unknown
Total on Type	736.1

*NOTE: The pilot's hours were extracted from the SA CAA pilot's file which was last updated on the 13 January 2010, thus the pilot's flying experience for the past 90 days could not be determined.

1.6 Aircraft Information:

Aircraft description.

The Beechcraft Baron 58 is a light, twin-engined piston aircraft originally developed by Beech Aircraft Corporation and currently manufactured by the Hawker Beechcraft Corporation.

Figure 2: Similar view of the aircraft involved in an accident.

Airframe:

Type	Beech 58	
Serial Number	TH-1962	
Manufacturer	Raytheon Aircraft Company	
Date of Manufacture	2000	
Total Airframe Hours (At time of Accident)	1664.5	
Last MPI (Date & Hours)	16 February 2012	1664.5
Hours since Last Annual Inspection	0 .1 hours	
Certificate of Airworthiness (Issue Date)	06 November 2003	
Certificate of Airworthiness (Expiry Date)	05 November 2012	
C of R (Issue Date) (Present owner)	01 June 2007	
Recommended fuel used	Avgas LL 100	
Fuel used	Avgas LL 100	
Operating Categories	Part 135	

*NOTE: This was the first flight after the MPI was carried out.

L/H Engine:

Type	Continental IO-550C-31
Serial Number	684414
Hours since New	1664.6
Hours since Overhaul	TBO not yet reached

R/H Engine:

Type	Continental IO-550C-31
Serial Number	684423
Hours since New	1664.5
Hours since Overhaul	TBO not yet reached

L/H Propeller:

Type	Hartzell PHC-J3YF-2UF
Serial Number	ED 4270B
Hours since New	1664.5
Hours since Overhaul	529.6

R/H Propeller:

Type	Hartzell PHC-J3YF-2UF
Serial Number	ED 4268B
Hours since New	1664.5
Hours since Overhaul	529.6

*NOTE: Both propellers were last overhauled on the 22 February 2006. The overhaul cycle for these propellers is six years.

1.7 Meteorological Information:

1.7.1 Weather information as obtained from the SA Weather Services.

SATELLITE IMAGE AT THE TIME OF THE ACCIDENT:

Scattered to broken clouds (stratus and stratocumulus) were observed along the South coast and adjacent interior including the vicinity of the aircraft accident on that day. Convective cloud development in line with the upper air trough was confined to the central and Northern interior of the Eastern Cape.

OBSERVED WEATHER CONDITIONS IN THE VICINITY OF THE AIRCRAFT ACCIDENT:

A meteorological routine report (METAR) from Port Elizabeth weather office is used to estimate the surface conditions in the vicinity of Draaifontein road closer to the time of the aircraft accident. It can be deduced from the available data (Port Elizabeth METAR and the Satellite image) that the lowest cloud base was about 1300ft above ground level (AGL). Below is the weather chart as per S A weather bureau.

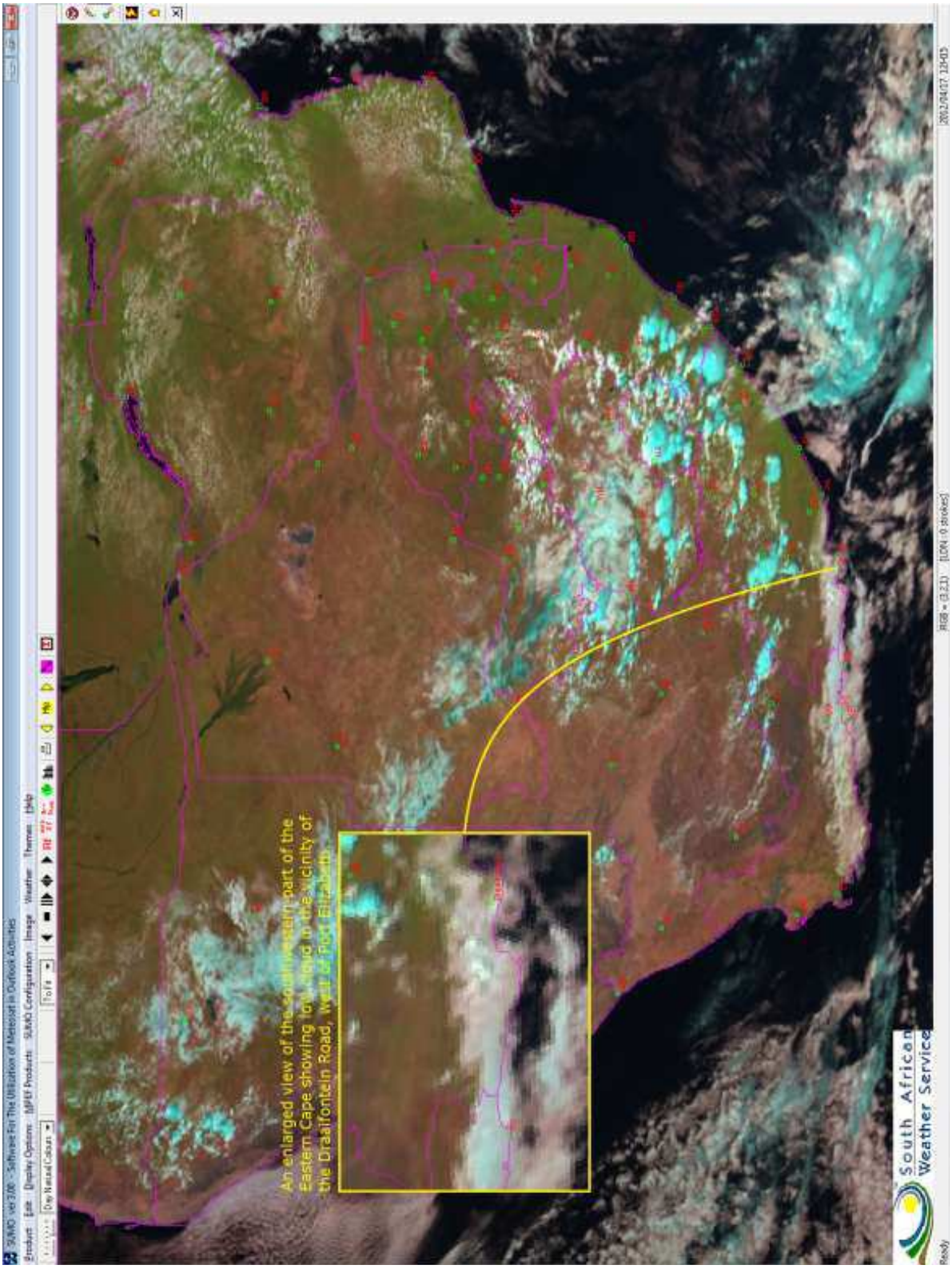

Figure 3: View of the weather chart.

1.8 Aids to Navigation:

1.8.1 The aircraft was equipped with standard navigation equipment. All the navigation equipment was serviceable prior to the accident.

1.9 Communications:

1.9.1 The communication equipment that was installed in the aircraft was found to be in accordance with the approved equipment list. There were no defects reported with the communication equipment prior to the accident and no distress call made by the pilot.

1.10 Aerodrome Information:

1.10.1 The accident occurred in a private farm near the Draaifontein road, approximately 24 kilometres North West of Port Elizabeth International Airport at GPS coordinates determined to be S33°56.562′ E025°20,904′ at an elevation of 594 feet AMSL.

1.11 Flight Recorders:

1.11.1 The aircraft was not fitted with a Flight Data Recorder (FDR) or a Cockpit Voice Recorder (CVR), nor was it required by regulation.

1.12 Wreckage and Impact Information:

1.12.1 The accident site was a livestock graze field on a private farm near the Draaifontein road in Port Elizabeth. The aircraft impacted blue gum trees before it impacted the ground. It would seem like the aircraft impacted the ground at a very high speed and steep attitude. The is evidenced by the fact the initial impact with the ground is where one engine was found one metre underground, and the second one was found on top of the other one. The rest of the wreckage was scattered on an area that is equivalent to a football soccer field size.

1.12.2 The wreckage distribution was a straight line trail that extended to approximately 100 metres from the initial impact point. All control surfaces were accounted for at the accident site. The cockpit/cabin area was destroyed and all instruments were destroyed. All flight controls were destroyed by the impact forces and flight control cable continuity and pre-impact control integrity could not be established. Both fuel tanks raptured during the accident sequence and there was no fuel available for analysis however there was a strong smell of fuel at the accident site. The undercarriage broke after impact with the ground.

1.12.3 The extent of the damage to the aircraft and wreckage distribution revealed that the aircraft had struck the ground at high speed in a nose down attitude. The wreckage pieces were scattered in an area equal to a soccer field. The aircraft was on an easterly heading on impact. Below is the evidence of a tree cut prior impact.

Figure 4: Evidence of tree cut by the aircraft prior impact with the ground.

Figure 5: View off the engines as found at the accident site and first point of impact:

Figurer 6: Showing the aerial view of the accident site with aircraft debris all over the area.

1.13 Medical and Pathological Information

1.13.1 Post mortem results revealed that the pilot died as a result of multiple injuries associated with the accident. The results of toxicology tests were not available at the time that this report was compiled. If any results are received later indicating that medical aspects may have affected the performance of the pilot, this will be considered as new evidence and the investigation will be re-opened.

1.13.2 The pilot's medical expired.

1.14 Fire:

1.14.1 There was no evidence of a pre or post impact fire.

1.15 Survival Aspects:

1.15.1 The accident was regarded to be a non-survivable accident due to impact forces associated with it, which resulted in the complete destruction of the cockpit/cabin area.

1.16 Tests and Research:

1.16.1 On-site Examination of the wreckage:

On-site inspection of the wreckage revealed that all of the structural damages were consistent with the impact at high speed in a nose down attitude and nothing was found to suggest that there had been any pre-impact failure of the primary structure. The fuel tanks were ruptured, and damage to the vegetation at the impact site indicated a significant amount of fuel spillage.

1.16.2 Engines Examination:

Aircraft engines, serial numbers, 684414 and 684423 were recovered and taken to an approved engine overhaul facility based at Wonderboom (FAWB) aerodrome, Pretoria for further examination and analysis. Before that all relevant aircraft documentation e.g. {Certificate of Registration (C of R), Certificate of Airworthiness (C of A), Radio Station Licence, Mass and Balance Certificate} were inspected and were found to be valid in accordance with requirements of applicable regulation.

The aircraft maintenance documentation such as Airframe logbooks, Engines logbooks, and Work Packages were obtained from the aircraft maintenance organisation (AMO) and inspected and all maintenance entries made in the logbooks were appropriately certified in terms of applicable regulations. A complete engine teardown inspection was conducted in the presence of a SA CAA accident investigating team. It was found that all noted damage on both engines was consistent with that of accident damage. Disassembly and examination of both engines revealed no evidence of any internal mechanical malfunction or catastrophic failure. There was no evidence of detonation, piston/combustion chamber melting or oil starvation. Both engines' ignition system components, including the magnetos, the spark plugs and the ignition harnesses were severely

damaged and could not be tested.

1.16.3 Propellers examination:

Examination of the propellers did not reveal any pre-impact mechanical anomalies. In addition, the observed marks and damage confirmed that the propellers were in a positive angle and receiving power from the engines at impact. Examination of both propellers governors was impossible due to damage caused by impact.

1.16.4 Cockpit instruments and switches.

All the instruments and switches were severely damaged by the impact and nothing could be analysed.

1.17 Organizational and Management Information:

1.17.1 This was a private flight, with the pilot also being the owner of the aircraft.

1.17.2 The last Inspection that was carried out on the aircraft prior to the accident was certified on 16 February 2012 by Aircraft Maintenance Organization (AMO) No 05 at 166.5 airframe hours. The person that certified the task held a valid Aircraft Maintenance Engineer (AME) licence that was accredited by the SACAA.

1.18 Additional Information:

1.18.1 None.

1.19 Useful or Effective Investigation Techniques:

1.19.1 None.

2. ANALYSIS:

2.1 The pilot departed Port Elizabeth International Airport at around 1214Z on the 17th April 2012 on a repositioning flight to Cape Town. Approximately 0.1 hours after take-off, FAPE ATC lost contact with pilot of ZS-TVT, and the aircraft disappeared off the ATC radar screens. A few moments later it was reported that the aircraft had crashed on a private farm near the Draaifontein road, approximately 24 kilometres North West of Port Elizabeth International Airport. The examination of the wreckage and the engine could not disclose any evidence of pre impact failure or malfunction.

There was no evidence that suggested any failure prior to the aircraft colliding with the ground. The damage observed on the aircraft at the accident site could only be attributed to the high impact forces caused by the crash.

2.2 According to the available information from the South African Weather Services and a few witnesses, the weather was overcast with a cloud base of 2000 feet AMSL in the area. Taking into account the overcast weather condition there is a possibility that the pilot entered into IMC (Instrument Meteorological Conditions) and lost visual reference to the ground. After entering IMC conditions the pilot might have suffered spatial disorientation, lost attitude of the aircraft and flew into the ground at a very high speed. Although the aircraft was IMC equipped it is possible that the pilot may have entered instrument meteorological conditions (IMC) and in an attempt to remain VFR, failed to maintain adequate terrain clearance resulting in the aircraft colliding with it.

3. CONCLUSION:

3.1 Findings:

3.1.1 The pilot held commercial pilot license which was invalid because his medical has expired.

3.1.2 The aircraft had a valid Airworthiness certificate at the time of the accident.

3.1.3 The accident occurred in daylight conditions.

3.1.4 Weather conditions were reported overcast.

3.1.5 The aircraft was loaded within its limits for weight and balance.

3.1.6 The MPI was certified by an AMO on February 2012 at 1664.5 airframe hours.

3.1.7 There was no evidence of pre-impact failure or malfunction of the aircraft's structure, power plant, flight controls or other systems.

3.1.9 The pilot flew into IMC conditions.

3.2 Probable Cause/s:

3.2.1 The pilot appeared to have entered instrument meteorological conditions (IMC) and in an attempt to remain VFR, he failed to maintain adequate terrain clearance resulting in the aircraft colliding with it.

4. SAFETY RECOMMENDATIONS:

4.1 None.

5. APPENDICES:

SECTION 4 **APPENDIX G**

ATS AUDIO TRANSCRIPT FORMAT

Transcript of (*ATC frequency*) voice recordings on Approach, *on 17/04/2012* regarding Safety Event involving ZSTVT

- The transcript was made by Mark Cooper from the ATS recording. The recording is of operational frequency (*position*);
- Times in HH:MM:ss UTC;
- Source may be either of the following: RTF, Intercom, ATS DS, composite;
- Station refers to any aircraft, ATC position or vehicle making the transmission;
- Text of transmission is the contents of the transmission for that specific time;
- For easy reading letters in the phonetic alphabet should be transcribed as uppercase italic letters only, even though the full word is used on the RT;
- Comments are for the investigator when analysing the context of the transmissions.

Time	Source	Station	Text of transmission	Comments
12:05z		ZSTVT	Tango Victor Tango, Good afternoon.	
		TOWER	Tango Victor Tango, Good afternoon. Taxi delta cross one seven holding point two six.	
		ZSTVT	Left and uh.... holding point two six Tango Victor Tango.	
12:12z		ZSTVT	Tower, Tango Victor Tango holding on "E" on "D" two six.	
		TOWER	Tango Victor Tango confirm ready.	
		ZSTVT	Affirm Sir.	
		TOWER	Tango Victor Tango behind the Cessna one fifty, short final landing line up and wait runway two six behind.	
		ZSTVT	After the landing Cessna line up and wait, Tango Victor Tango.	
12:14z		TOWER	Tango Victor Tango runway two six wind two four zero degrees, one four knots, cleared take-off right turn out not above one thousand five hundred foot report at Seaview.	
		ZSTVT	Uh.... cleared take-off right hand turn out and sorry what was the next thing?	
		TOWER	Report at Seaview.	

Time	Source	Station	Text of transmission	Comments
		ZSTVT	Report at Seaview uh.... how many miles out is that? Tango Victor Tango.	
		TOWER	Tango Victor Tango its uh.... twelve miles.	
12:14z		ZSTVT	Thanks right hand out twelve miles out uh.... below one thousand five hundred foot or below, Tango Victor Tango cleared take-off.	
12:15z		TOWER	Tango Victor Tango route direct to Seaview.	
		ZSTVT	Direct to?	
		TOWER	Tango Victor Tango route direct to Seaview.	
		ZSTVT	Seaview uh.... sorry where is Seaview?	
		TOWER	Tango Victor Tango standby.	
		TOWER	Tango Victor Tango route direct to Golf Romeo Victor.	
		ZSTVT	Golft Romeo Victor thank you, Tango Victor Tango.	Short while after 1216z
		ZSTVT	Tower to avoid cloud I'd like to route right off track please.	
		TOWER	Sorry say again?	Instructor on Tower
		ZSTVT	Uh.... to avoid the cloud I'd like to route right off track inland.	
		TOWR	Tango Victor Tango thank you remain VFR at all times avoid cloud as required.	Instructor on Tower
		ZSTVT	Thanks and permission to climb to eight five?	
		TOWER	Um.... we can't yet we got traffic above I can accommodate you at two thousand.	
		ZSTVT	Thanks I'll take two thousand.	
12:17z		TOWER	Tango Victor Tango contact approach one two zero decimal four.	
		ZSTVT	One two zero decimal four, cheers thanks,	
12:17z		ZSTVT	Approach Tango Victor Tango, Good afternoon.	
		APPROACH	Tango Victor Tango, Good afternoon to you climb initially two thousand feet, standby further climb the QNH One zero one nine.	
		ZSTVT	Two thousand feet, one zero one nine, Tango Victor Tango.	

Time	Source	Station	Text of transmission	Comments
		APPROACH	Tango Victor Tango thanks uh.... two thousand feet and below please.	
		ZSTVT	Sorry about that.	
		ZSTVT	Can I descend to one thousand?	
		APPROACH	Affirm if you would prefer, just confirm you would like to descend to one thousand feet?	
		ZSTVT	Affirm.	
		APPROACH	Affirm that's approved.	
		ZS TVT	Thanks one thousand feet, Tango Victor Tango.	
		APPROACH	Tango Victor Tango just waiting for some traffic above and then I will uh.... give you some climb.	
		ZSTVT		Just clicks once as a suspected acknowledgement with engine noise.
12:20:52z				One last click heard with same engine noise.
		APPROACH	Tango Victor Tango, report abeam the Gamtoos river mouth.	
				No response from ZSTVT.
		APPROACH	Tango Victor Tango, Approach.	

..... Date: ……..

For: Director of Civil Aviation

Investigator-in-charge: ……. Date: ……..

Co-Investigator: ……..……. Date: ……