AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9687		
Aircraft registration	**ZS-KOM**	**Date of accident**	24 February 2018		**Time of accident**	1047Z	
Type of aircraft	Cessna T210N (Aeroplane)		**Type of operation**		Private (Part 91)		
Pilot-in-command licence type	Student pilot		**Age**	73	**Licence valid**	Yes	
Pilot-in-command flying experience	Total flying hours		Unknown		Hours on type	Unknown	
Last point of departure	Mossel Bay Aerodrome (FAMO), Western Cape Province						
Next point of intended landing	Graaff-Reinet Aerodrome (FAGR), Eastern Cape Province						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Oudtshoorn Military Area (GPS position; 33°30.748' South 022°10.893' East), Elevation 1 922 feet AMSL							
Meteorological information	Surface wind: 060°/5 kts, Temperature: 27°C, overcast with light rain visibility: 4000m						
Number of people on-board	1 + 1	**No. of people injured**	0	**No. of people killed**	2		
Synopsis							

On Saturday, 24 February 2018 at approximately1020Z, a pilot and a passenger took-off on a private flight from Mossel Bay Aerodrome (FAMO) to Graaff-Reinet Aerodrome (FAGR). The aircraft disappeared from the secondary surveillance radar while en route to FAGR.

The aeronautical rescue coordination centre (ARCC) received notification that the aircraft had not arrived at its intended destination. The ARCC activated a search and rescue mission for the missing aircraft at 1435Z. As it became dark, the search was suspended until the following day. All available data was analysed. Using the radar data, an area was identified where the aircraft had most probably gone off the radar. The wreckage of the aircraft was located early in the morning of 25 February 2018 by a helicopter crew that participated in the search and rescue operation. The aircraft was located approximately 8 km (4.3 nm) north of the Outshore aerodrome (FAOH), where it had crashed in a restricted area (FAR47).

The aircraft was found destroyed and in an inverted attitude upon impact with terrain. The on-site investigation team established that the aircraft had an in-flight break-up and that the engine was not operating at the time of impact. Moreover, at the time of the accident, instrument meteorological conditions (IMC) prevailed with overcast conditions and light rain reported. The pilot and the passenger were fatally injured.
The investigation revealed that the aircraft entered IMC and the pilot most likely became spatially disoriented. The aircraft then started to break-up in-flight; the engine stopped running due to fuel starvation when the aircraft was flying inverted. This resulted in the pilot losing control of the aircraft as the aircraft design limitations were exceeded and, therefore, crashing on the terrain.

Probable cause

The aircraft entered IMC conditions; the pilot most likely became spatially disorientated and lost control of the aircraft. Subsequently, the aircraft suffered in flight break-up prior to impacting the ground in an inverted position.

Contributory factor:

The pilot was not qualified nor was he instrument rated to operate the aircraft in instrument meteorological conditions (IMC).

SRP date	11 June 2019	Release date	19 June 2019

Name of Owner	**:** Jangen Air Investments (Pty) Ltd
Name of Operator	**:** Private (Part 91)
Manufacturer	**:** Cessna Aircraft Company
Model	**:** T210N
Nationality	**:** South African
Registration markings	**:** ZS-KOM
Place	**:** Oudtshoorn Military Training Area (FAR47)
Date	**:** 24 February 2018
Time	**:** 1047Z

All times given in this report are Coordinated 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 (2011), 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 apportion blame or liability.

Disclaimer:

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

1. FACTUAL INFORMATION

1.1 History of flight

1.1.1 The pilot, accompanied by a passenger, took-off from FAMO on a private flight to FAGR. (See Figure 1)

Figure 1: Overlay indicating FAMO (take-off aerodrome) and FAGR (intended destination)

1.1.2 According to available information, the pilot and a passenger took-off from FAMO at approximately 1020Z. The pilot did not file a flight plan prior to departure from FAMO and, during radio communication with George Approach at 10:22:05, a visual flight rules (VFR) flight plan was created. At 10:23:10, the air traffic control (ATC) in George Approach requested the pilot to enter the squawk code 3006 on the aircraft transponder. The pilot complied and the aircraft was identified on a secondary surveillance radar (SSR).

1.1.3 The aircraft was observed on radar flying in a north-north-easterly direction after becoming airborne from FAMO. At 1037Z, the aircraft turned left, and at 1040Z it passed to the north of the extended centreline of runway 04 at Oudtshoorn Aerodrome (FAOH) while flying in a westerly direction towards Calitzdorp. The aircraft proceeded to fly in a north-westerly direction, then turned right. At 1041Z, the aircraft entered FAR47, which was a restricted area from ground level up to flight level 195 (19 500 feet AMSL) while flying in a northerly direction. FAR47 is depicted as the green cylinder in Figure 2. At 10:46:59 (radar time) the aircraft was observed flying at an altitude of 8 600 feet AMSL, which was the maximum altitude of the aircraft while it was being tracked on radar.

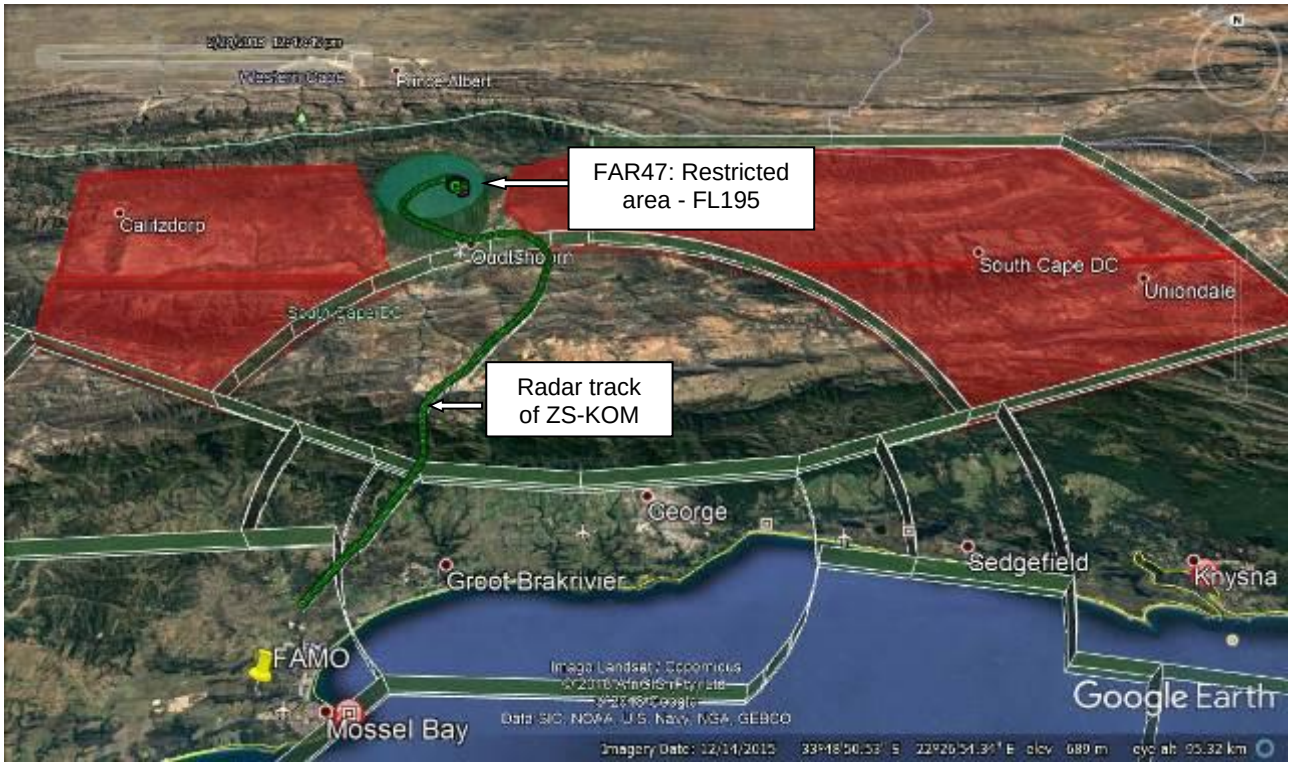

Figure 2: Google Earth overlay indicating the radar track of ZS-KOM (Radar data courtesy of ATNS)

1.1.4 At 10:47:14Z, the aircraft was at 8 600 feet AMSL when it was observed descending past 7 900 feet in approximately 10 seconds. It further descended past 7 100 feet AMSL and disappeared from the radar screen.

1.1.5 The pilot's son was awaiting the aircraft to arrive at FAGR. He then alerted the Cape Town Air Traffic Service Unit (ATSU) when the aircraft did not arrive at approximately 1200Z, which was one hour after the aircraft's estimated time of arrival.

1.1.6 The investigation team obtained information from the ARCC at 1600Z on 24 February 2018, the ATSU received a telephone call from a family member who indicated that the ZS-KOM aircraft did not arrive at FAGR. The ARCC activated the search and rescue (SAR) operation at 1435Z. Following the SAR activation and as it became dark, the SAR operation was suspended until the following day. The radar data of the flight was reviewed for possible location of the aircraft and an area was identified where the search and rescue would commence.

1.1.7 The wreckage of the aircraft was located the following morning at 0435Z by a helicopter crew that participated in the search and rescue operation. The wreckage was located in dense bushes in a restricted area to the north of the town of Oudtshoorn. The two occupants on board the aircraft were found to have succumbed to their injuries. Initial observations indicated that the aircraft broke up in flight, as

pieces of the aircraft were scattered over a large area. This included the entire horizontal tail plane as well as the left wing, the outer section of the right wing and the Stormscope antenna (dome type of antenna), which was attached to the lower outer surface of the right wing. The cockpit/cabin area was destroyed by a post-impact fire. The surrounding veld/vegetation was not set alight. The aircraft was destroyed during the inflight break-up, the impact sequence and by post-impact fire that erupted. The main wreckage was found to have impacted the ground in an inverted attitude within the restricted area (FAR47), which was located approximately 8 km (4.3 nm) to the north of FAOH.

1.1.8 An eyewitness, an employee at FAOH, was off duty at the time when he heard an aircraft flying overhead between 1000Z and 1100Z. He went outside his house to investigate as the weather condition was not favourable for VFR flying. The weather was overcast with light rain; the cloud base was between 2 500 and 3 000 feet above ground level (AGL) with dense stratocumulus and fog. The eyewitness noticed that the aircraft, which appeared to be white/cream in colour, was flying in and out of the clouds for a few seconds in a westerly direction towards Calitzdorp. He then lost sight of the aircraft.

1.1.9 The accident occurred during daylight conditions at geographical position determined to be S33°30.784' E022°10.893' at an elevation of 1 922 feet AMSL.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during the accident sequence and post-impact fire.

Figure 3: The main wreckage as it came to rest in an inverted attitude

1.4 Other Damage

1.4.1 Minor damage was caused to vegetation.

1.5 Personnel Information

1.5.1 Pilot-in-command (PIC)

Nationality	South African	Gender	Male	Age	73
Licence number	0270227465	Licence type	Student pilot		
Licence valid	Yes	Type endorsed	Yes		
Ratings	None				
Medical expiry date	31 August 2018				
Restrictions	Corrective lenses				
Previous accidents	None on record				

According to available information, the pilot was previously the holder of a private pilot licence that lapsed in June 1995. The South Africa Civil Aviation (SACAA) pilot's file indicated that the pilot initially applied for a student pilot licence (SPL) in 2016, which was issued on 12 August 2016 (21 years after his private pilot licence lapsed). He reapplied for his SPL in 2017 and his licence was issued on 14 August 2017, with an expiry date of 13 August 2018. There was no other documentation on the pilot's

file that indicated if the pilot obtained his private pilot licence or if he flew an aircraft after getting his SPL approved the second time.

The investigator met with the pilot's family on Wednesday, 28 February 2018 in Oudtshoorn where they requested the family to look for the pilot flying's logbook(s) and make it available to the investigating team in order to obtain a record of his flying experience. By the time this report was concluded and after numerous follow-ups, no response had been received from the family. The aviation training organisation (ATO) where he conducted his flying training was also contacted via email and telephone to assist with any possible information, but no feedback had been received by the time this report was concluded. Therefore, it cannot be determined if his pilot logbook was with him in the aircraft during the flight; and no evidence of the logbook was found.

Flying experience:

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

1.6 Aircraft Information

1.6.1 Aircraft information

Figure 4: The aircraft ZS-KOM (photograph courtesy of a family member)

1.6.2 The Cessna T210N Turbo Centurion II is a six-seater, high-performance, retractable-gear fitted with a single air-cooled turbocharged flat six-cylinder engine, 310 hp (231kW), high-wing general aviation aircraft.

Aircraft Structural Strength Consideration

A certified aircraft is required to satisfy structural design standards. A normal category aircraft, such as the Cessna T210N, was designed for maximum in-service loads (limit loads) of +3.8g and -1.52g with an additional safety factor of 1.5 (ultimate loads).

Cessna T210N, Turbo Centurion - Performance Data

Horsepower: 310	Gross Weight: 4 000lbs
Top Speed: 204kts	Empty Weight: 2 303lbs
Cruise Speed: 192kts	Fuel Capacity: 90 US Gal
Stall Speed (dirty): 58kts	Range: 715nm

Airframe:

Type	Cessna T210N	
Serial number	210-64526	
Manufacturer	Cessna Aircraft Company	
Year of manufacture	1981	
Total airframe hours (at time of accident)	Unknown	
Last MPI (hours & date)	6 546.9	8 September 2017
Hours since last MPI	Unknown	
C of A (Issue date)	28 January 2009	
C of A (Expiry date)	31 January 2019	
C of R (Issue date) (Present Owner)	8 September 2017	
Operating Category	Standard Normal (Aeroplane)	

Major defects and damage record (Source; Airframe logbook p. 5)	1. Aircraft veered off the runway during landing at Springs Aerodrome on 4 August 1983, resulting in damage to the right wing, horizontal stabiliser, elevator and the lower fuselage. Airframe hours 701.6. 2. The aircraft overturned during landing at Krugersdorp Aerodrome on 20 April 1992. The aircraft sustained damage to the wings, right elevator, stabiliser and fin. Airframe hours 4833.0. 3. The aircraft was involved in a wheels-up landing on 2 March 1998. Airframe hours 5180.0.

NOTE: The airframe, engine and propeller hours entered in the three tables were obtained from the aircraft, engine and propeller logbooks. The flight folio was required to be carried on board the aircraft and was not located.

Engine:

Type	Continental TSIO-520-R
Serial number	294059-R
Hours since new	1 043.9
Hours since overhaul	TBO not yet reached

Propeller:

Type	McCauley D3A34C402
Serial number	813999
Hours since new	Not known
Hours since overhaul	246.9

1.7 Meteorological Information

1.7.1 An official weather report was obtained from the South African Weather Service (SAWS). The information in the table below was extracted from the report.

Wind direction	060º	Wind speed	05kts	Visibility	Reduced to 4000m
Temperature	27ºC	Cloud cover	N/A	Cloud base	N/A
Dew point	N/A				

The satellite image in Figure 5 shows significant weather, as well as low-level clouds overhead Oudtshoorn area at the time of the accident. The satellite image was taken on 24 February 2018 at 1100Z, which was approximately 13 minutes after the aircraft disappeared from radar.

Warnings Issued

Considering the Cape Town Flight Information Region (FACA FIR), several AIRMETs for moderate turbulence, moderate mountain waves and strong winds were issued near the time of the accident.

Significant Weather Chart (SIGWX Chart)

The 1200Z SIGWX is made available at 0800Z daily for flight planning purposes. When studying the forecast chart, it could be seen that there was moderate turbulence indicated on the low-level chart, as well as on the additional low-level chart. The additional low-level chart forecasted moderate turbulence between 3 000ft and 10 000ft over Mossel Bay area and severe turbulence was forecasted between 6 500ft and 10 000ft over Oudtshoorn area. Surface visibility was forecasted to be reduced to 4 000m in misty patches if it should precipitate in the area.

Vertical cross-section of wind direction and speed near coordinates of the accident

The cross-section shows south-westerly winds of 10 knots from 0900Z onwards into the afternoon, steadily increasing with height. At 1300Z, there was a marked increase in wind speed from 8 knots to 15 knots in the lower levels. Where westerly to north-westerly winds were observed on the cross-section with speeds greater than 10 knots, mountain waves had to be considered as the winds would start to become perpendicular to the escarpment.

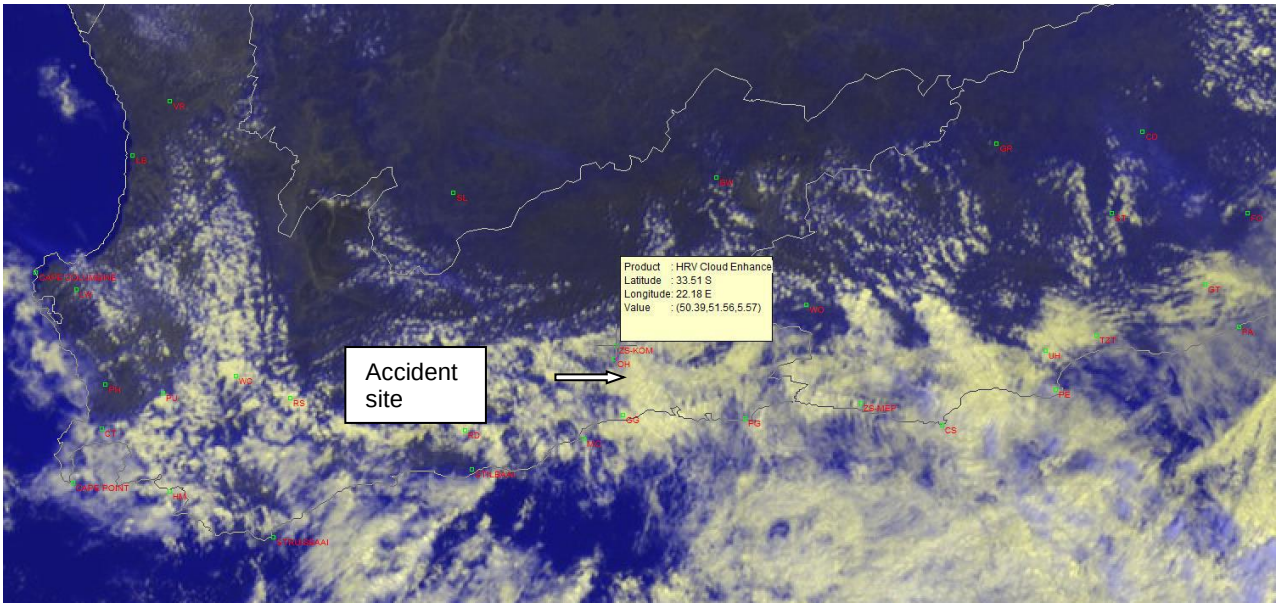

Figure 5: Satellite image taken on 24 February 2018 at 1100Z

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with the following equipment: a magnetic compass as well as a panel-mounted Garmin 430 GPS unit, which was destroyed during the post-impact fire. There were no recorded defects to the navigation equipment prior to the accident.

Figure 6: The instrument panel of the aircraft ZS-KOM

1.9 Communication

1.9.1 The aircraft was equipped with standard communication equipment. There were no recorded defects to the communication equipment prior to the accident.

1.9.2 The pilot communicated with George Approach on the radio frequency 128.20 MHz and was requested to route below the terminal control area (TMA). The controller then instructed the pilot to broadcast his intention on the traffic information by airmen (TIBA) frequency 124.80 MHz and to contact Cape Town Flight Information, thereafter. He was also requested to enter the squawk code 3006 into the transponder, after which the aircraft was identified on SSR radar. A transcript of the communication can be found attached to this report as Annexure A.

1.9.3 According to information that was obtained from the FAOH tower, the pilot of ZS-KOM did not broadcast any message on the aerodrome frequency 131.10 MHz when he passed the extended centreline of Runway 04 prior to entering FAR47. The main wreckage was located 8km (4.3nm) to the north of FAOH.

1.10 Aerodrome Information

1.10.1 The aircraft crashed on a military training area/bombing range within or near an airport, but in a restricted area (FAR47), which was approximately 8km to the north of Oudtshoorn Aerodrome (FAOH):

Aerodrome	Oudtshoorn Aerodrome (FAOH)	
Aerodrome coordinates	S33˚36'03.73" E022˚11'26.94"	
Aerodrome elevation	1 069 feet above mean sea level	
Runway designations	04/22	
Runway dimensions	1 700 x 30 m	
Runway used	Not applicable	
Runway surface	Asphalt	
Runway slope	+0.71% uphill slope	
Approach facilities	Runway lights, PAPI V3 degrees	
Aerodrome status	Licensed	
Aerodrome rescue & fire fighting	There was no ARFF services at the aerodrome	

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a cockpit voice recorder (CVR) or a flight data recorder (FDR), nor was it a regulatory requirement to be installed on this aircraft type.

1.12 Wreckage and Impact Information

1.12.1 The main wreckage of the aircraft was found in an inverted attitude, with the nose of the aircraft facing a south-westerly direction. The propeller was found to have fractured at the crankshaft flange and was located approximately 3m in front of the engine, which was still secured inside the airframe. The three propeller blades were still attached to the hub assembly and did not display any rotational evidence. The spinner was still attached to the propeller hub assembly and did not display any evidence of rotation that could be associated with normal engine operation.

Figure 7: Google Earth overlay indicating the flight profile over Oudtshoorn until the aircraft disappeared from radar

1.12.2 The left wing and the outer section of the right wing failed in flight. The left wing structure (illustration in Figure 8) was found 57m from the main wreckage. The weather radar dome, which was mounted underneath the right wing of the accident aircraft, was located several hundred metres from the main wreckage in a northerly direction. The entire horizontal tail plane failed in flight, and several pieces were found scattered over a large area to the north of the main wreckage, which included an

adjacent farm to the north of the military shooting range (FAR47). The three pieces of the horizontal tail plane (depicted in Figure 10) were found approximately 258m from the main wreckage. (It should be noted that this is a straight line measurement as the terrain is mountainous). The landing gear as well as the flaps were in the retracted (up) position. Although the left wing had separated from the aircraft in flight, the flap surface remained attached to the wing structure. The vertical fin and rudder assembly remained attached to the fuselage structure, but displayed evidence of deformation associated with impact as the aircraft came to rest in an inverted position.

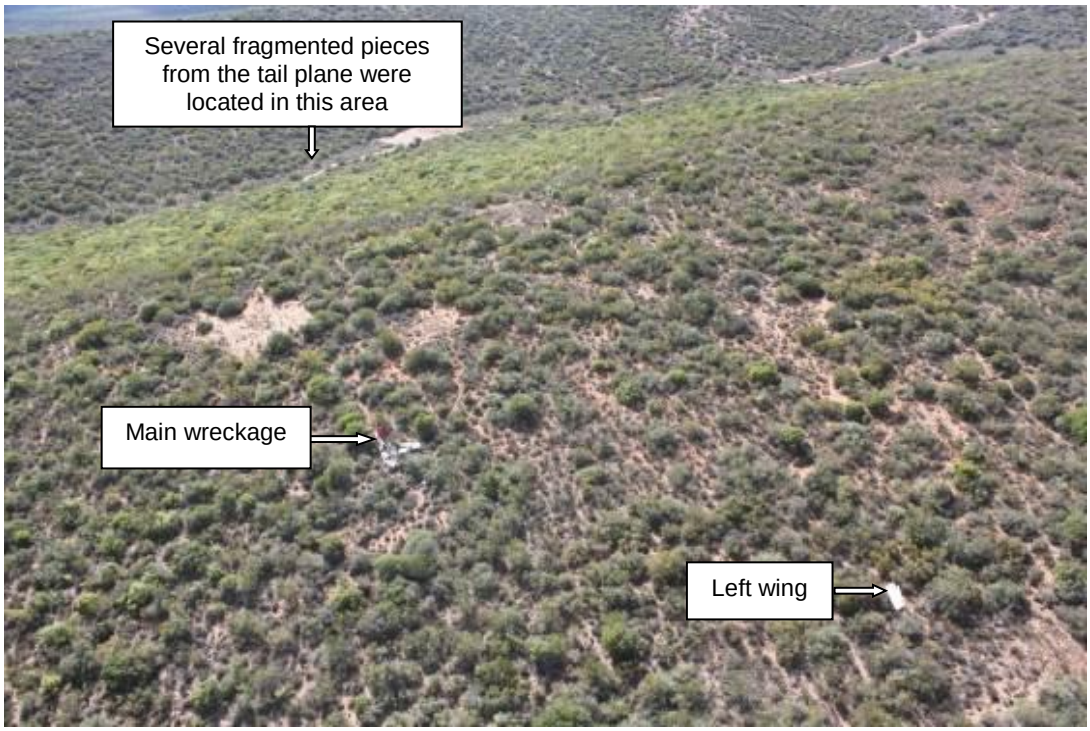

Figure 8: An aerial view of the wreckage field. The left wing was located 57 m to the south of the main wreckage (Picture: SA Police Services)

1.12.3 Due to post-impact fire that consumed the cockpit/cabin area, all instrumentation was destroyed. It could be established from the debris that the aircraft was structurally intact before the in-flight break-up occurred, as all flight controls were accounted for, even though they were scattered over a large area. The four points of the aircraft were accounted for, as well as both wing tips. The most forward point (the propeller) and the tail/empennage were located with the main wreckage.

Figure 9: Aerial view of the main wreckage (Picture: SA Police Services)

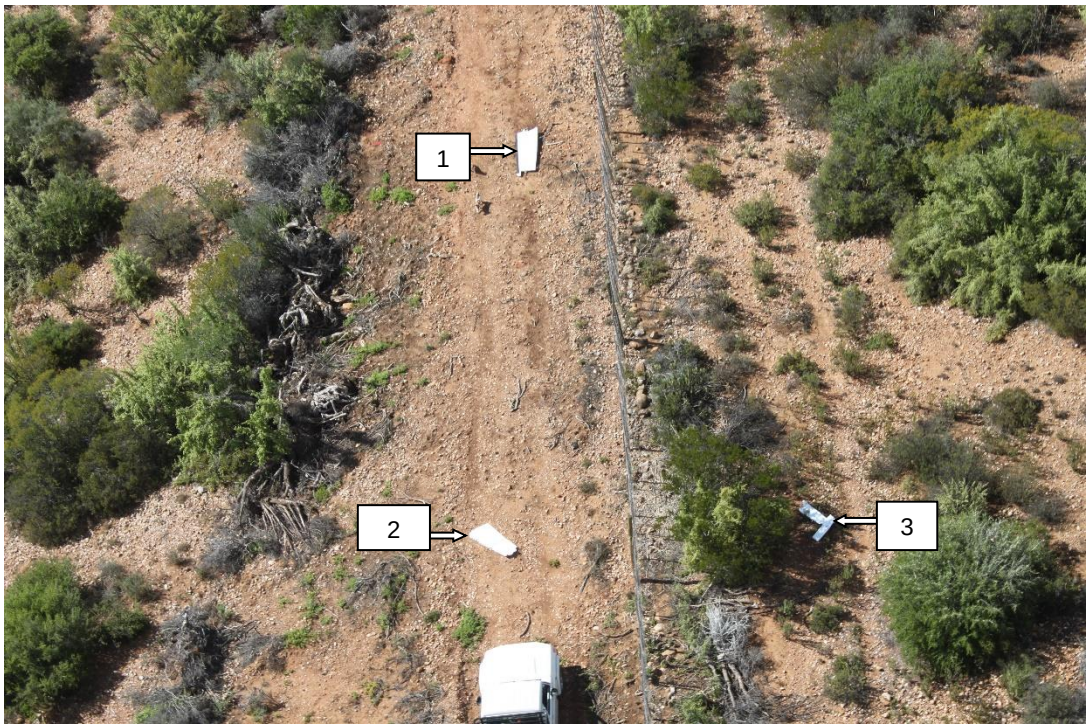

Figure 10: Three pieces from the horizontal tail plane (Picture: SA Police Services)

Figure 11: A view of the empennage (left-hand side) with the horizontal stabiliser and elevator missing

Figure 12: A major part of the left wing with the flap attached and in the up position

Figure 13: The right wing that was still attached to the fuselage

Figure 14: The outer section of the left horizontal stabiliser

Figure 15: The Stormscope antenna that was mounted underneath the right wing

Figure 16: The propeller with the spinner still attached, displaying minor damage

Figure 17: The cockpit/cabin area was consumed by post-impact fire

Figure 18: Deformation visible to the right aft fuselage where the horizontal tail plane was fitted

Figure 19: Some parts from the right horizontal tail plane that were recovered from the scene

1.13 Medical and Pathological Information

1.13.1 The medico-legal post-mortem examination, report No. WC/08/0026/18, on the pilot was received from the Department of Health: Province of the Western Cape. The report concluded that the cause of death was due to *"multiple injuries secondary to an aircraft accident."*

1.14 Fire

1.14.1 A post-impact fire erupted and consumed the cockpit/cabin area of the aircraft. The fire was contained to this area and the surrounding vegetation was not set alight by the post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was not survivable as it was associated with a high rate of descent and the aircraft impacting with terrain in an inverted attitude, catching fire and destroying the cockpit/cabin area.

1.16 Tests and Research

1.16.1 None considered necessary.

1.17 Organisational and Management Information

1.17.1 This was a private VFR flight with the pilot also being the owner of the aircraft. It was not a training flight as the pilot had a passenger on-board and was conducting the flight in his private capacity.

1.17.2 The last mandatory period inspection (MPI) was carried out on 8 September 2017 at 6 546.9 airframe hours. The aircraft maintenance organisation (AMO) that carried out the maintenance inspection was in possession of a valid AMO approval certificate.

1.18 Additional Information

1.18.1 Privileges and limitations of a student pilot licence (SPL)

(i) The pilot did not adhere to the requirements as set out in Part 61.02.5(1)(b) of the CAR 2011, as he conducted the flight in question without being duly authorised by a flight instructor within the relevant curriculum for the intended flight.

(ii) The pilot was found to have contravened Part 61.02.5(1)(c) of the CAR 2011, as he had a passenger with him on-board the aircraft. The regulation is attached to this report in Annexure B.

1.18.2 Restricted Areas

The pilot was found to have contravened Part 91.06.20 of the CAR 2011, as he entered a restricted area (FAR47) without obtaining prior authorisation. The regulation is attached to this report in Annexure B.

Definition

Restricted areas are airspaces that civil aircraft may only enter with specific permission from the appropriate authority. In other words, movement of aircraft in these areas is restricted. They have certain lateral, as well as lower and upper limits. Restricted areas are named FA (South Africa), followed by an R (Restricted) and two- or three-digit numbers.

1.18.3 Visual flight rules - Visibility and distance from cloud

The pilot was found to have contravened Part 91.06.21 of the CARs of 2011 by not adhering to the requirements in this Part, which refers to VFR. The regulation is attached to this report in Annexure B.

1.18.4 Fuel uplift

The service provider at Mossel Bay Aerodrome was contacted in order to ascertain whether the aircraft uplifted any fuel (Avgas) at any period prior to the accident flight from their facility. According to their records, no fuel was uplifted. The only information they had on the aircraft was that it landed at FAMO on 1 February 2018 and again on 16 February 2018, as landing fees were paid by the pilot.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 Man (Pilot)

According to available information, the pilot was previously the holder of a private pilot licence, which lapsed in June 1995. Twenty-one (21) years later, on 12 August 2016, the Regulating Authority received an application from the pilot applying for a pilot licence. No further information was available on the CAA pilot file. Available information indicated that the pilot did not progress to a private pilot licence since his application on 12 August 2016 and, therefore, had to reapply for a pilot licence on 14 August 2017. At the time of the accident, he was still the holder of a student pilot

licence. The aircraft type (Cessna T210) was endorsed in his student pilot licence.

The intention of the pilot was to fly from FAMO to FAGR. However, he had a passenger on-board and the flight was not duly authorised by the ATO and a flight instructor, which was in contravention of the CAR.

From the communication with George Approach, it was evident that he had not filed a flight plan prior to the flight. He was accommodated by the George Approach controller to comply in this regard and was requested to remain below the George TMA, which was 6 500ft AMSL. The aircraft was observed on radar to have ascended to a height of 8 600ft AMSL during the intended flight to FAGR and also entered into FAR47, which was a restricted area – military shooting range. Prior permission was required from the South African Air Force (SAAF) for a civilian aircraft to enter FAR47 unless the aircraft was flying higher than FL195 (19 500ft AMSL). The pilot did not obtain such permission prior to the intended flight from the SAAF. He most probably entered FAR47 unintentionally while he was attempting to avoid the inclement weather conditions that prevailed in the area at the time. At a certain stage of the flight, the aircraft was observed flying in a westerly direction, which was, basically, in the opposite direction to his intended destination.

The flight profile as captured on radar displayed an erratic flight path, which indicated that the prevailing weather conditions in the area were such that the pilot most probably attempted to avoid the weather. However, at no stage during the flight did the pilot establish radio contact with ATC and request their assistance to vector him back to his departure aerodrome (FAMO) or any other aerodrome in the area where VFR flight rules prevailed. Neither did he take any evasive action by turning back to FAMO before entering inclement weather conditions.

2.2 Machine (Aircraft)

Several parts of the aircraft were found scattered over a large area, including several fragmented pieces of the tail-plane, the Stormscope antenna (which was installed on the lower outboard surface of the right wing) and a large section of the left wing (See 1.12 of the report). The aircraft was maintained in accordance with the regulatory requirements. At no stage during the flight did the pilot broadcast a distress or a Mayday call. The pilot communicated with George Approach for the last time approximately 18 minutes prior to the accident. All the flight control surfaces were accounted for, as well as all “four corners” of the aircraft (i.e. both wing tips and the front and aft points of the aircraft). The propeller, which was located a few metres in

front of the main wreckage, did not display any evidence of rotation, as the engine most probably stopped during the high ROD or when the aircraft became inverted as the fuel and lubrication systems of the engine were not accordingly designed. It was evident from the post-impact fire that an undetermined amount of fuel was still on board the aircraft at the time of the impact.

2.3 Environment

The weather conditions that prevailed on the day of the accident were not favourable for VFR flights along the pilot's intended route. However, once airborne from FAMO, the pilot had made a conscious decision to proceed with the flight, knowing that he was not appropriately rated to enter IMC conditions and to remain clear of clouds. From the SSR radar data, it was evident that the pilot attempted to deviate from a direct route to his intended destination and ended up flying directly north of his departure aerodrome (FAMO). The weather data as contained in sub-paragraph 7.1 on page 12 of this report state that: s*urface visibility was forecast to be reduced to 4 000m in misty patches if it should precipitate in the area."*

2.4 Mission

This was a private VFR flight with the pilot's intention to fly from FAMO to FAGR. The flight was not authorised by an ATO and a passenger accompanied the pilot, which was in contravention with the CAR 2011 as amended. No flight plan was filed prior to the intended flight; however, the pilot established radio contact with George Approach a few minutes after becoming airborne from FAMO and was given a squawk code that he needed to enter into the transponder, thereafter, the aircraft was identified on radar.

2.5 Conclusion

The pilot, accompanied by a passenger, departed from FAMO on a private VFR flight to FAGR. The aircraft was identified on SSR radar after the pilot had communicated with George Approach, and was given a squawk code. It was evident from the radar data that the aircraft was flying in a northerly direction.

Approximately 22 minutes after take-off from FAMO, the aircraft was observed to have entered FAR47, which was to the north of FAOH. Available data indicated that the pilot did not comply with VFR flight rules and entered IMC conditions. The aircraft was observed on radar to ascend while in a right-hand turn to a height of 8 600ft AMSL. At this point, the pilot lost control of the aircraft, as it was observed 10 seconds

later descending to 7 100ft, when the aircraft disappeared from radar. During this 10-second period, the aircraft descended to 1 500 feet, which amounted to a rate of descent (ROD) of 9 000 feet per minute (ft/min); but the ROD could have increased far beyond this value. The elevation where the main wreckage came to rest was 1 922ft AMSL.

The altitude between the maximum height during the flight according to the radar data, which was captured at 8 600ft and the elevation at impact was, therefore, approximately 6 700ft. The ROD was such that it caused several parts/components of the aircraft to fail in-flight, and this would have adversely affected the structural strength, performance and flight characteristics of the aircraft and rendered ground impact inevitable. The accident was not survivable.

3. CONCLUSION

3.1 Findings

3.1.1 According to available records, the pilot previously was the holder of a private pilot licence (aeroplane), which had lapsed in June 1995.

3.1.2 According to available records, he applied for a pilot licence and submitted the required forms (CA 61-02.2) to the Civil Aviation Authority (CAA) on 12 August 2016. However, he did not continue flying after applying for the pilot licence.

3.1.3 Approximately one year later, on 14 August 2017, he again applied for a student pilot licence and submitted the required forms (CA 61-02.2) to the CAA. He was issued with a pilot licence, and the Cessna T210 type aircraft was endorsed on it.

3.1.4 At the time of the accident, the student pilot was the holder of a valid student pilot licence.

3.1.5 The student pilot held a valid aviation medical certificate that was issued by a designated medical examiner with the restriction to fly with suitable corrective lenses.

3.1.6 The pilot did not comply with Part 61.02.5(1)(c) of the CAR 2011 as amended in that as the holder of a pilot licence, a passenger accompanied him on this flight.

3.1.7 The pilot did not comply with Part 61.02.5(1)(e) of the CAR 2011 as amended, as he did not comply with visual meteorological flying conditions (VMC) during this flight.

3.1.8 The pilot unlawfully entered FAR47, which was a restricted area/airspace. ENR 5.1 dated 15 April 2016 required prior approval from the SAAF before any aircraft was allowed to enter this airspace.

3.1.9 According to available information, no flight plan was filed for this flight prior to the intended flight. However, the pilot communicated with the ATC after he took off, after which a flight plan was filed with the assistance of the George Approach controller.

3.1.10 The aircraft had a valid certificate of release to service, which was issued on 8 September 2017.

3.1.11 The aircraft had a valid certificate of airworthiness that was issued on 27 January 2018 and expiring on 31 January 2019.

3.1.12 The last mandatory periodic inspection (MPI) that was carried out on the aircraft prior to the accident flight was certified on 8 September 2017 at 6 546.9 airframe hours by an approved aircraft maintenance organisation (AMO).

3.1.13 According to available records obtained from the fuel service provider at FAMO, no documented evidence could be obtained that the aircraft uplifted any fuel at their facility prior to the accident flight.

3.1.14 Both the landing gears and the flaps were found in the retracted position.

3.1.15 The cockpit/cabin area was destroyed by the post-impact fire; therefore, no information could be gathered from any of the instruments.

3.1.16 The entire horizontal tail-plane and the left wing were found to have separated from the aircraft and debris was found scattered over a large area.

3.1.17 According to available radar data, the aircraft entered into a right-hand spiral before ground impact. The fuselage was found to have impacted the ground in an inverted attitude.

3.1.18 Overcast conditions with rain were reported overhead the Oudtshoorn area at the time of the accident.

3.1.19 There were no eyewitnesses to the accident as it crashed in a restricted area, which was not active at the time.

3.1.20 The wreckage of the aircraft was located early the following morning by a helicopter crew that participated in the official search and rescue operation.

3.1.21 Both occupants had succumbed to their injuries. A forensic pathologist visited the accident site prior to the bodies being recovered.

3.2 Probable cause

3.2.1 The aircraft entered IMC conditions; the pilot most likely became spatially disorientated and lost control of the aircraft. Subsequently, the aircraft suffered in-flight break-up prior to impacting the ground in an inverted position.

3.3 Contributory factors

3.3.1 The pilot was not qualified nor was he instrument rated to operate the aircraft in instrument meteorological conditions (IMC).

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

5.1 Annexure A (Transcript of communication with ATC George Approach)

5.2 Annexure B (Part 61.02.5, 91.06.20 and 91.06.21 of the CARs of 2011)

ANNEXURE A

This is a transcript of communication between the ATC at George Approach and the pilot of the aircraft ZS-KOM. The VHF frequency in use was 128.20 MHz.

Time	From	To	Message
10:22:05	ZS-KOM	George App	Hello George Kilo Oscar Mike (KOM)
10:22:09	George App	ZS-KOM	Kilo Oscar Mike George Approach Good day
10:22:13	ZS-KOM	George App	Good morning, we are just airborne at Mossel Bay at the moment request flight to Golf Romeo (Graaff-Reinet) we were planning to sneak over the mountain hopefully free of your TMA but never the less we would like to climb to 55 perhaps 75 can we request 75 we tried to phone you unfortunately we apologize for… (break in transmission)
10:22:59	George App	ZS-KOM	Kilo Oscar Mike George Approach how do you read?
10:23:01	ZS-KOM	George App	I read you five
10:23:03	George App	ZS-KOM	Kilo Oscar Mike I lost you there, just confirm you airborne Mossel Bay on your destination, confirm you haven't filed a flight plan?
10:23:09	ZS-KOM	George App	Mossel Bay to Graaff-Reinet we will be passing through the east side of Oudtshoorn, we will be flying first on a heading of due east as we are at the moment, we would like to have the QNH from you, Kilo Oscar Mike
10:23:40	George App	ZS-KOM	Kilo Oscar Mike the QNH is 1011, report your position? Please squawk 3006
10:23:46	ZS-KOM	George App	Squawking 3006 and our position is just still over the Brandwag Road at Mossel Bay, we are at 1 300 feet, Kilo Oscar Mike
10:24:14	George App	ZS-KOM	Kilo Oscar Mike standby radar identification and confirm flight level request to Graaff-Reinet
10:24:20	ZS-KOM	George App	We are going to try for 55, Kilo Oscar Mike
10:24:56	George App	ZS-KOM	Kilo Oscar Mike just confirm your routing please
10:24:58	ZS-KOM	George App	We routing due east from Mossel Bay which is going to take us more or less to the right of Oudtshoorn we are flying …. Zero at present we are 1 300 feet still above ground
10:25:26	George App	ZS-KOM	Kilo Oscar Mike is now identified on squawk 3006 climb to 5500 ft
10:25:33	ZS-KOM	George App	Climb to 55 identified on squawk thank you, Kilo Oscar Mike
10:29:01	George App	ZS-KOM	Sierra (Kilo) Oscar Mike just confirm flight level 55 your final level on request?
10:29:05	ZS-KOM	George App	Flight Level 55 on request please, thank you
10:29:12	George App	ZS-KOM	Kilo Oscar Mike in that case you will be remaining below the TMA broadcast on TIBA below the TMA. Cheers now bye bye
10:29:19	ZS-KOM	George App	We will remain on TIBA, Kilo Oscar Mike
			There was no further communication between ATC and the pilot

ANNEXURE B

Source: The Civil Aviation Regulations of 2011 as amended.

Privileges and limitations of a Student Pilot Licence (SPL)

Part 61.02.5 *(1) The holder of a valid SPL may only fly solo as prescribed in Document SA-CATS 61, at the age of 16 or more, for the purpose of training for the applicable pilot licence-*

(a) in the type of aircraft in which he or she is undergoing training as endorsed in his or her logbook;

(b) after a prior written authorisation thereto for a flight, or a sequence of flights, as prescribed in the relevant curriculum and all such flights are under the supervision of the holder of an appropriate and valid flight instructor rating, or a person appointed by the Chief Flying Instructor, provided that such person is the holder of at least a PPL;

(c) without carrying any passengers;

(d) on a flight other than an international flight; and

(e) in VMC by day.

(2) Notwithstanding the provision of paragraph (1) (e), a student undergoing the integrated training may exercise the privileges of his or her SPL also—

(a) in VMC by night, if he or she is the holder of a valid night rating; and

(b) under IFR, if he or she is the holder of a valid instrument rating.

(3) Except in an emergency, a student pilot may not land or take-off in an aeroplane from an area other than an aerodrome.

(4) If a student pilot has executed an emergency landing with an aeroplane in an area other than an aerodrome, only the holder of a CPL or ATPL, or another pilot approved for the purpose in writing by the Director, may fly that aeroplane out of that area.

Restricted areas

Part 91.06.20 *(1) The Director may by notice in the IAIP declare any area to be a restricted area and shall, when so declaring an area to be a restricted area, specify in the notice in question—*

(a) the nature and extent of the restriction applicable in respect of the area in question; and

(b) the authorisation under which flights in such restricted area shall be permitted.

(2) No person shall, in contravention of a restriction contemplated in subregulation (1) (a), fly any aircraft to which the said restriction applies, in any restricted area, unless the flight in question has been permitted by virtue of an authorisation contemplated in subregulation (1) (b).

*[**Editorial note:** Restrictions to airspace may also be imposed by other persons than the Director. Such restrictions may be found in Volume 1 of "Aviation Law in South Africa" in the section Miscellaneous Legislation and in the AICs.]*

Visibility and distance from clouds

Part 91.06.21 *(1) Every VFR flight shall be so conducted that the aircraft is flown with visual reference to the surface by day and to identifiable objects by night and at no time above more than three eighths of cloud within a radius of 5 NM of such aircraft and—*

(a) in the case of aircraft excluding helicopters operating under conditions of visibility and distance from cloud equal to, or greater than, the conditions specified in tables 1 and 2—

Table 1

Airspace	***Forward Flight visibility***	***Distance from clouds***	***Ground visibility and ceiling***
Control zones	*Five km*	*Horizontally: 600 metres Vertically: 500 ft*	*No aircraft shall take-off from, land at, or approach to land at an aerodrome or fly within the control zone when the ground visibility at the aerodrome concerned is less than 5 km and the ceiling is less than 1 500 ft.*
Within an aerodrome traffic zone (which does	*Five km*	*Horizontally: 600 metres*	*No aircraft shall take-off from, land at or approach to land at an aerodrome or fly*

not also comprise a control zone or part of a control zone)		*Vertically: 500 ft*	*within the aerodrome traffic zone when the ground visibility within such aerodrome traffic zone is less than 5 km and the ceiling is less than 1 500 ft.*

Table 2

In Airspaces other than those specified in Table 1

Airspace class	***Altitude band***	***Forward Flight visibility***	***Distance from cloud***
C F G	*At and above 10 000 ft above MSL*	*8 km*	*1 500 m horizontally 1 000 ft vertically*
C F G	*Below 10 000 ft AMSL and above 3 000 ft above MSL, or above 1 000 ft above terrain, whichever is the higher*	*5 km*	*1 500 m horizontally 1 000 ft vertically*
C	*At and below 3 000 ft above MSL, or*	*5 km*	*1 500 m horizontally 1 000 ft vertically*
F G	*1 000 ft above terrain, whichever is the higher*	*5 km*	*Clear of cloud and with the surface in sight*

Provided that the minimal specified in Table 1 are not applicable when—

(i) entering or leaving a CTR and the flight has received clearance from an ATSU to operate under Special VFR minima as prescribed in regulation 91.06.22; or

(ii) entering or leaving an ATZ on a cross-country flight; and

(iii) a pilot in the aircraft maintains two-way radio communication with the aerodrome control tower or aerodrome flight information service unit, in which case the pilot may leave or enter the aerodrome traffic zone when the ground visibility is equal to or greater than 5 km and the ceiling is equal to or higher than 500 ft.