SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9356		
Aircraft registration	**ZS-ION**	**Date of accident**	12 September 2014		**Time of accident**	07:10Z	
Type of aircraft	Cessna Agwagon A188B		**Type of operation**		Agriculture Restricted Part 137		
Pilot-in-command licence type	Commercial (CPL)		**Age**	21	**Licence valid**	Yes	
Pilot-in-command flying experience	Total flying hours		438.9		Hours on type	149.6	
Last point of departure	Private airstrip near the Waterkloof farm in Heidelberg area, Western Cape Province. GPS Coordinates: S34º17.686' E20º 42.319'						
Next point of intended landing	Private airstrip near Waterkloof farm in the Heidelberg area						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Open gravel field at the Waterkloof farm, between Heidelberg and Witsand in the Western Cape Province. GPS coordinates : S34º17.686' E20º 42.319' elevation 1843 feet							
Meteorological Information	Temperature: Hot and sunny weather conditions (CAVOK) prevailed at the time of the accident.						
Number of people on board	1 + 0	**No. of people injured**	0	**No. of people killed**	1		

Synopsis

On 12 September 2014 at 0540Z, the commercial pilot, who was the sole occupant on board the aircraft, took off from a private airstrip near the Waterkloof farm in the Heidelberg area to execute crop spraying on a canola field on the Waterkloof farm between Heidelberg and Witsand in the Western Cape Province.

According to available information, the commercial pilot, who had not yet been issued with the required agricultural crop spraying rating, performed the crop spraying on the canola under agricultural supervision training. The pilot subsequently landed and took off several times at the private airstrip to replenish the load of pesticide and to refuel the aircraft during the spray runs.

Evidence on the aircraft indicated that the left hand wing tip collided with the lower electrical wires in the area before the aircraft impacted the ground in a nose-down attitude. The aircraft came to rest in an inverted position. It appears that the pilot was aware of the high-tension wires in the area where the crop spraying operation was being performed, but at the time failed to notice the electrical wires that blended in with the background.

Probable cause

The aircraft collided with electrical wires during the agriculture crop spraying operation.

SRP date	08 August 2017	Release date	

AIRCRAFT ACCIDENT REPORT

Name of Owner	**:** Trio Lugbespuiting CC
Name of Operator	**:** Trio-Lugbespuiting CC / J S Lugbespuiting
Manufacturer	**:** Cessna Aircraft Company
Model	**:** C188B
Nationality	**:** South African
Registration Marks	**:** ZS-ION
Place	**:** Waterkloof Farm, Witsand/Heidelberg, Western Cape
Date	**:** 12 September 2014
Time	**:** 0710Z

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 (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 establish blame and 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 On 12 September 2014 at 0540Z, the commercial pilot, who was the sole occupant on board the aircraft, took off from a private airstrip near the Waterkloof farm in the Heidelberg area to execute agricultural pesticide crop spraying on a canola field on the Waterkloof farm between Heidelberg and Witsand in the Western Cape Province.

1.1.2 According to available information, the pilot, who was rated as a commercial pilot, had not yet been issued with the required agricultural crop spraying rating, performed the crop spraying operation on the canola farm under agricultural supervision training.

1.1.3 The pilot performed several agricultural pesticide spray runs on the canola field at Waterkloof Farm and landed and took off several times back at the airstrip in order to uplift pesticide and to uplift fuel in the aircraft.

1.1.4 Evidence on the aircraft indicated that the left-hand wing tip struck the lower electrical wires in the area before the aircraft impacted the ground in a nose-down attitude. The aircraft finally came to rest in an inverted position. It appears that although the pilot was aware of the high-tension wires in the area where the crop spraying operation was being performed, he subsequently failed to notice the high-tension wires that blended in with the background.

1.1.5 According to the weather information, the weather conditions were fine at the Waterkloof Farm during the crop spraying operation.

1.1.6 According to pilot's flying logbook, the pilot had flown the C188B aircraft in September 2014 during agricultural operations as follows: 03 September 2014 - 6.3 hours, 10 landings; 04 September 2014 - 4.1 hours, 06 landings and 11 September 2014 - 5.8 hours, 11 landings.

1.1.7 According to witnesses, they heard the aircraft flying in the area busy with the agriculture operation. The pilot, who sustained fatal injuries, was air lifted to a hospital, where he succumbed to his injuries some hours after the accident. The aircraft was destroyed during the ground impact sequence.

1.1.8 Just before the accident occurred, the witnesses heard and noticed the aircraft approaching the smaller section of canola field on the farm. The aircraft was flying very low above the canola field and suddenly collided with the high-tension wires. The aircraft immediately lost height, impacted the ground in a nose-down attitude and nosed over. The accident occurred at the GPS coordinates S34º17.686' E20º42.319'.

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 destroyed during the impact sequence.

Photo 1: Aircraft substantially damaged in an inverted position

1.4 Other Damage

1.4.1 The electrical wires were damaged during the impact sequence.

1.5 Personnel Information

1.5.1 Commercial Pilot:

Nationality	South African	Gender	Male	Age	21
Licence Number	0272358557	Licence Type	Commercial Pilot		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, Night, Flight Test – Single Engine Piston and Instructor Ratings				
Medical Expiry Date	31 October 2014				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	438,9
Total Past 90 Days	70,2
Total on Type Past 90 Days	70,2
Total on Type	149,6

1.5.2 The pilot was issued with a student pilot's licence (SPL) on 21 June 2010. He then received flight training on the Piper PA-28 and SAMBA XL series aircraft at Paramount Aviation Academy (ATO/CAA 0143). The pilot successfully completed his training and obtained his private pilot's licence (PPL) on 04 April 2011. The PA 28 and the SAMBA XL aircraft type ratings were endorsed on his licence. According to the pilot's flight logbook, he had accumulated 62,6 flying hours when he received his private pilot's licence.

1.5.3 The pilot commenced with crew online technical examinations in April 2012 in

order to obtain his commercial pilot's licence (CPL) and in August 2012 he completed all the technical examinations successfully. He completed 204,8 flying hours in order to qualify for his commercial pilot's licence and received his CPL on 17 April 2013.

1.5.4 The pilot also completed the aircraft type differences and familiarisation training, in accordance with Form CA61-109.7 dated 15 March 2014 on the C188 aircraft ZS-ION. The differences training was carried out by Fantini Air Flight Academy ATO/CAA 0086 at Kroonstad Municipal Airport (FAKS). The differences training flight time was 1,5 hours. According to the pilot's flight logbook, his total flying hours were 297,5 hours (dual – 127,3 hours and PIC – 152,1 hours) on single-engine aircraft.

Note: Based on the logbook, after the differences training had been completed, the pilot continued to fly the aircraft C188B ZS-ION only.

1.5.5 On 22 May 2013, the pilot completed the Aerial Applications – Certificate No: PMA0024/13AA. The certificate was issued under the jurisdiction of AgriSETA by the Pest Management Academy. He completed the Crew Resource Management Course for Agriculture Pilots and Operators and issued with a certificate dated May 2014 provided by Fantini Aviation Flight Training School ATO/CAA0086.

1.5.6 According to the operator, the pilot's flight and duty times for the last 48 hours were as follows:

(i) The pilot reported for flight duty on 11 September 2014. According to the flight folio, he then flew the aircraft for 5,8 hours. The following day (12 September 2014) the pilot flew the aircraft, but did not make entries in the flight folio or in his logbook. It was therefore not possible to establish whether the pilot had complied with the flight and duty time requirements.

1.5.7 The pilot's logbook dated 5 December 2013 reads as follows:

Aircraft	Date Last Flown	Cross Country				Taildragger		IF		FSTD	Single Engine A/C	
		DAY		NIGHT							Total	
Type	dd.mm.yyyy	Dual	PIC	Dual	PIC	Dual	PIC	Act	FSTD		Dual	PIC
X182	12/12/2011	5.6	10.2					4.2			44.6	22.5
PA28-140	17/06/2011										1.9	
PA28-180	15/10/2013										2.3	20.5
C172	05/12/2013	5.1	82.5	1.9	3.8			33.1			50.6	106.3
C182	01/06/2012										1.2	
C210	29/11/2012		28.0					17			5.3	2.8
Z010	13/02/2013					4.8					4.8	
PA25-235	15/05/2013					23.0	8.5				23.0	8.5
ELITE	18/01/2012								3.3	3.3		
	Totals	10.7	96.0	1.9	3.8	**27.8**	**8.5**	39.0	3.3	3.3	133.7	160.6
	Grand Total	297.5										

1.5.8 In accordance with the information above, it shows the pilot's flying experience on the tail dragger aircraft was 27.8 dual hours and 8.5 hours as pilot-in-command (PIC) .

1.5.9 After the pilot had become competent on the Cessna C188 tail dragger, his flying experience on type as PIC increased from 8,5 hours to 158,1 hours (+149,6 hours).

Note: According to CAR, Part 61 (Subpart 25) – "Requirements for Agriculture Pilot Rating" the following are required:

(i) A valid commercial pilot licence (CPL).

(ii) A class type rating.

(iii) A pest control operator's certificate issued in terms of the Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act.

(iv) A total of not less than 300 flying hours on the aeroplane in aerial applications under supervision.

(v) The pilot must have undergone the skills test under an appropriately rated Grade I flight instructor with an agriculture pilot rating or designated person, shown his ability to perform as PIC of an aeroplane and be able to carry out the procedures and manoeuvres as prescribed in SA-CATS 61 with a degree of competency appropriate to the privileges granted to the holder of an agriculture pilot rating.

(vi) The pilot must have at least 2 hours' flight experience on dual instruction conducted by the holder of a Grade I or Grade II instructor rating with appropriate category, class or type rating and agriculture pilot rating;

(vii) The balance of the prescribed flight experience may be gained under the supervision of the holder of a valid CPL or ATPL with an agricultural pilot rating.

1.5.2 Agriculture Rated Supervision Pilot:

Nationality	South African	Gender	Male	Age	40
Licence Number	0271007734	Licence Type	Commercial Pilot		
Licence valid	Yes	Type Endorsed	No		
Ratings	Instrument, Night, Flight Test – Single and Multiple Engine Piston, Agricultural Pilot Ratings				
Medical Expiry Date	31 March 2015				
Restrictions	None				
Previous Accidents	CA18/2/3/8024, 18 October 2005, Vrede Farm, Caledon – Western Cape, Crop Spraying Operation.				

Flying Experience:

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

1.5.3 The Supervising Pilot was issued with an SPL on 30 May 2002 and received flight training on Cessna 172 type aircraft at Fantini Air Flight Training School, ATO/CAA 0086. After he had completed the training, he was subjected to a practical flight test on 17 June 2002 and thereafter issued with a private pilot licence (PPL) on 19 June 2002. The Cessna 172 type rating was endorsed on the PPL.

1.5.4 During October 2002 he commenced with crew online technical examinations to obtain his commercial pilot licence (CPL). While busy writing all the technical examinations, other aircraft type ratings were included on the PPL after receiving aircraft differences or familiarisation flight training. By January 2003 he had completed all the technical examinations successfully. Also, he flew the CPL required grand total of about 222,50 hours (PIC = 109,10 hours) using predominantly a Cessna 172 type of aircraft. The CPL was issued to him on 18 February 2003.

1.5.5 Based on his pilot file, he was issued with an agricultural rating on 30 October 2003. He received the rating after producing evidence of the following items to the SACAA:

(i) Proof of his CPL;

(ii) Proof of pest control operator's certificate issued on 07 October 2003;

(iii) Proof of acquired experience of 497,3 hours total flight time in aerial applications under supervision on the Cessna 172 (10,1 hours' dual training) and Cessna 188 (42.2 hours' dual/155,8 hours supervision training) types of aircraft.

Note: The supervising pilot never submitted a conversion training application to have the Cessna 188 type rating endorsed on his licence, nor does he have an instructor rating. Also, based on AMO 166 he assisted with the inspection of the ZS-ION rudder bell crank installation and the serviceability thereof after it had undergone maintenance.

(iv) Proof of skills test on 15 October 2003 from an appropriately rated Grade II flight instructor (CA 13327) with a valid agricultural pilot rating;

1.5.6 The supervising pilot experience logbook, last entry dated 12 September 2014, states the following:

Flight experience summary up to 12 September 2014												
Aircraft	Date Last Flown	Cross Country				Single Engine A/C Total		IF	FSTD	Multiple Engine A/C Total	
		DAY		NIGHT		DAY	NIGHT			DAY	NIGHT
As per CPL	10 April 2014	132.7	6619.5	3.9	157.4	6752.2	161.3	75.25	None	14.90	3.28
	Totals	6752.2		161.3		6913.5		75.25	None	18.18	
	Grand Total	6931.68									

1.5.2.4 The agricultural supervision pilot's flight and duty times for the last 48 hours could not be determined because he was not willing to provide the information in the investigation.

1.5.6 Aircraft Maintenance Engineer (AME): The AME carried out the bell crank installation maintenance:

Nationality	South African	Gender	Male	Age	45
Licence Number	0272008111	Licence Type	AME		
Licence valid	Yes	Type Endorsed	Yes		
Categories	Airframe (A) and Engine (C)				
Restrictions	None				
Previous Offences	None				

1.5.7 The AME licence was initially issued in July 1998. The AME had several ratings (Airframe – Category A and Engine – Category C) endorsed on his licence. The Cessna 188 aircraft licence was included and issued to him on 16 August 1995.

Note: According to the aircraft maintenance organisation (AMO), in terms of CAR Part 145, the AME was certified and authorised to exercise the privileges and limitations of his licence to carry out maintenance on the C188 aircraft type. The AME complied with the applicable requirements and he acquired the appropriate experience which entitled him to certify in accordance with CAR, Part 43 the release to service (CRS) of the specified types of aircraft endorsed on the licence.

1.6 Aircraft Information

Airframe:

Type	Cessna C188B	
Serial Number	18800846	
Manufacturer	Cessna Aircraft Company	
Date of Manufacture	1972	
Total Airframe Hours (At time of Accident)	7 818,5	
Last MPI (Date & Hours)	18 June 2014	7 724.0
Hours since Last MPI	94,5	
C of A (Issue Date)	19 December 2013	
C of R (Issue Date) (Present owner)	13 May 2014 Trio Lugbespuiting CC	
Operating Categories	Part 137	

Engine:

Type	Continental IO-550-D
Serial Number	1006439
Hours since New	145,8
Hours since Overhaul	TBO not reached

Propeller:

Type	Mc Cauley D3A34C401
Serial Number	120367
Hours since New	145,8
Hours since Overhaul	TBO not reached

1.6.1 The aircraft documentation was inspected during the investigation to determine validity and it was found to be in order.

1.6.2 The aircraft maintenance documentation (i.e. Airframe Logbook, Flight Folio and MPI Work Pack) were all inspected. The following observations were made:

1.6.2.1 Based on the airframe logbook, the history of maintenance shows that the aircraft was maintained by four AMOs, namely Ferreira Aviation (AMO 133) from 1980 to 1992, Alton Aero Engineering (AMO 282) from 1992 to 2008, A G Spray Pty Ltd (AMO 282) from 2009 to 2012 and Sky Sprayers Pty Ltd (AMO 166) from 2013 to date.

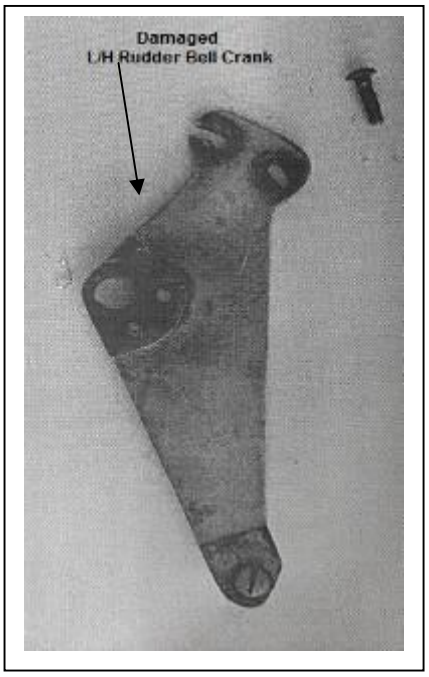
1.6.3 In terms of major defects sustained, based on previously issued CRMA No: 3163 and 3667 dated 27 January 2012 and 01 November 2012 by Aviation Rebuilders CC (AMO 188), the information shows that at some point the aircraft was subjected to a rebuild. The rebuild activity came as a result of an accident on 8 January 2010. The aircraft was still under A G Spray Pty Ltd (AMO 282) when involved in the accident. While the aircraft was undergoing the rebuild, the owner/operator decided to move the aircraft to Sky Sprayers Maintenance (Pty) Ltd (AMO 166).

1.6.3.1 According to a CRMA issued by AMO 166, certified under Job Card No: 017/13, it shows that during December 2013 the aircraft had another MPI at TTSN = 7672,7 hours. Thereafter the aircraft was certified airworthy and returned to service.

1.6.4 After the aircraft had been flown for approximately 51,3 hours, it was returned to AMO 166 for another MPI at TTNS = 7724,0 hours. The job card no. 093/14 shows that the MPI started on 09 June 2014 and ended on 17 June 2014. A document titled *"Pre-Inspection Engineer's Briefing"* attached to the MPI Work Pack had a list of items discussed with the owner/operator. After the parties had reached an agreement, AMO 166 then continued with the MPI.

1.6.5 A letter from Master Tech Aviation indicated that the owner/operator of the aircraft appointed them to carry out maintenance on the aircraft. Master Tech then forwarded a technical report to inform the regulator of an unreported incident of the aircraft on 9 September 2014. The technical report stated the following:

- The pilot responsible for the incident visited Master Tech carrying aft bulkhead rudder bell cranks Part No: 0712309-16AGW. He indicated that the parts were removed from the aircraft. He requested that Master Tech should carry out repairs on the bell cranks for him.



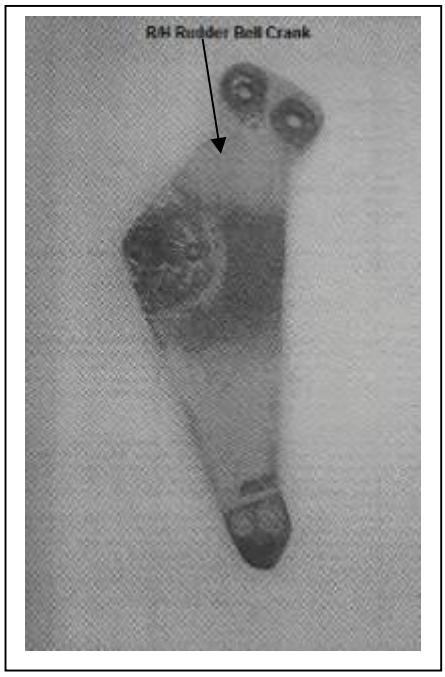


Figure 2 & 3 Damaged bell cranks which were removed from the aircraft

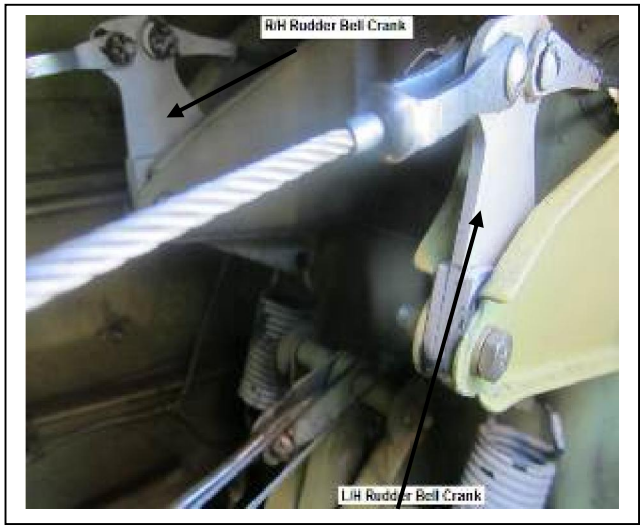


Figure 4 & 5 Example of access panel and bell crank installation in a similar type of aircraft

- Master Tech technical personnel's response to the pilot was that the bell cranks had been removed from the aircraft primary flight control system. There was no repair scheme for the bell cranks. The pilot then requested that Master Tech supply him with two new or serviceable bell cranks. The pilot was informed to consult with another AMO which specialised in sheet metal work with the aim to have the bell cranks manufactured. The pilot gave Master Tech permission to go ahead to manufacture the two bell cranks. The pilot signed a job card (no. 23) on 09 September 2014 requesting that Master Tech expedite the work. The aircraft ZS-ION was grounded due to the unserviceable bell cranks.

- While the pilot was still with them, they asked him to explain what had happened to the bell cranks. He informed them that the rudder system had failed, which resulted

in a fully deflected rudder and loss of brakes. The pilot indicated that he had managed to stop the aircraft without exposing it to further damage.

- After a few days, the pilot informed Master Tech that he had managed to locate two bell cranks as temporary replacements. Master Tech offered to install the two bell cranks, provided they were traceable. While waiting for the pilot to revert back to them, they were very surprised to hear that the aircraft had been involved in the fatal accident.

1.6.6 The issue of the two replacement bell cranks was discussed with Sky Sprayers (AMO 166) in the investigation. Their response was the following:

- On 13 July 2014 they received a telephone call from Master Tech requesting the aircraft logbooks. Master Tech indicated that the logbooks were required because the owner/operator decided to move the maintenance responsibility to them. Sky Sprayers forwarded the logbooks to Master Tech as requested. After the logbooks arrived at Master Tech, the owner/operator contacted Sky Sprayers to enquire whether they had complied with the special inspection documents (SIDs) requirements.

Note: The reason the owner/operator requested the information of the SID compliance from Sky Sprayers was:

- At the time when the information of the bell cranks incident was made known, the logbooks had already been handed over to Master Tech.
- The entry of the rudder bell crank removal and installation was not in the logbook.
- There was no CRMA for the work attached in the logbook.
- There was no evidence of SID inspection in the logbook.

1.6.7 On 17 July 2014, Sky Sprayers forwarded a copy of an SID certificate to Master Tech. The certificate was dated 7 November 2013. The issue with the certificate was that it was not properly certified, i.e. with an authorised signature or stamp. As regards the bell cranks, the certificate indicated that item SID 55-30-01 *"Vertical Stabilizer, Rudder and Attachments"* was completed on 13 December 2013, which is not in synch with the last MPI.

1.6.7.1 Further enquiries were made to Sky Sprayers to forward proof that the SID was complied with at the MPI, but no clear answer was forthcoming from them.

1.6.8 As regards the bell crank, Sky Sprayers indicated that they were contacted by the owner/operator during September 2014 to notify them of an incident. It was the same incident the pilot reported to Master Tech relating to rudder system failure which resulted in a fully deflected rudder and loss of brakes. According to the owner/operator, they explained to Sky Sprayers that the tail wheel steering cable/rudder cable bell crank assembly had failed while the aircraft was taxiing. That was when Sky Sprayers made an arrangement with the owner/operator to do the repairs on site. They agreed to do the repairs on 10 September 2014.

1.6.9 Sky Sprayers maintenance personnel/engineers then travelled to where the aircraft was operating to install the two serviceable bell crank assemblies. They took the parts from another aircraft of the same type. The work was checked by three other people, and a CRMA was issued which shows that a commercial pilot licence (CPL) holder carried out the duplicate inspection after the installation. 1.6.10 Master Tech found out that Sky Sprayers had done the installation of the two rudder bell cranks. As Master Tech had been appointed as the responsible AMO, they immediately made enquiries to ensure that all manufacturer's and regulatory requirements had been complied with. They asked for the details of the maintenance engineer/s who installed the bell cranks and person/s that did the rigging of the rudder system and the duplicate inspection. They asked this because the logbooks were at their facility at the time.

Note: The CRS which was carried on board the aircraft was issued by Sky Sprayers on 18 June 2014. The CRS became invalid when the aircraft was involved in the incident and became unserviceable. In this regard reference is made to the following: *"the certificate lapses at a total of 7824.0 hours of flight time or on 17 June 2015 (date), whichever occurs first, unless the aircraft is involved in an accident or becomes unserviceable, in which case the certificate is invalid for the duration of the period"*.

1.6.11 The flight folio was inspected and it was found that the last entry was made on 11 September 2014. There was no entry of the incident on 5 September 2014 about the bell cranks becoming unserviceable and being removed or installed by Sky Sprayers or anyone else.

1.6.12 The aircraft weight during the agriculture operation was considered to be within limits and did not contribute to the cause of the accident.

1.6.13 The fuel capacity of the aircraft during the agriculture operation was considered to be within limits and did not contribute to the cause of the accident.

1.7 Meteorological Information

1.7.1 No official weather report was obtained from South African Weather Service (SAWS) during the investigation. However, information obtained from witnesses at Waterkloof farm indicated that sunny and hot weather conditions (CAVOK) prevailed at the time of the accident.

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigation equipment which was approved for the aircraft type. Other navigation equipment installed was included on the approved equipment list. The pilot did not report any information of a defect or malfunction with the navigation equipment during the flight. The conclusion was that the navigation equipment was serviceable prior to the flight, but was damaged in the accident.

1.9 Communications

1.9.1 The aircraft was operating in an uncontrolled airspace. According to the aircraft equipment list, VHF communication equipment was installed. No evidence was found of any defects of the radio equipment, and it was considered to be in a serviceable condition during the flight.

1.9.2 There was no evidence of any transmissions made by the pilot to declare an emergency to any control tower or other aircraft.

1.10 Aerodrome Information

1.10.1 The accident occurred at a location outside the boundaries of an aerodrome. The accident site was an open gravel field at the Waterkloof farm, south west of Heidelberg in the Western Cape. The GPS coordinates of the accident site were S34°17.686' E20°42.319' elevation 1843 feet.

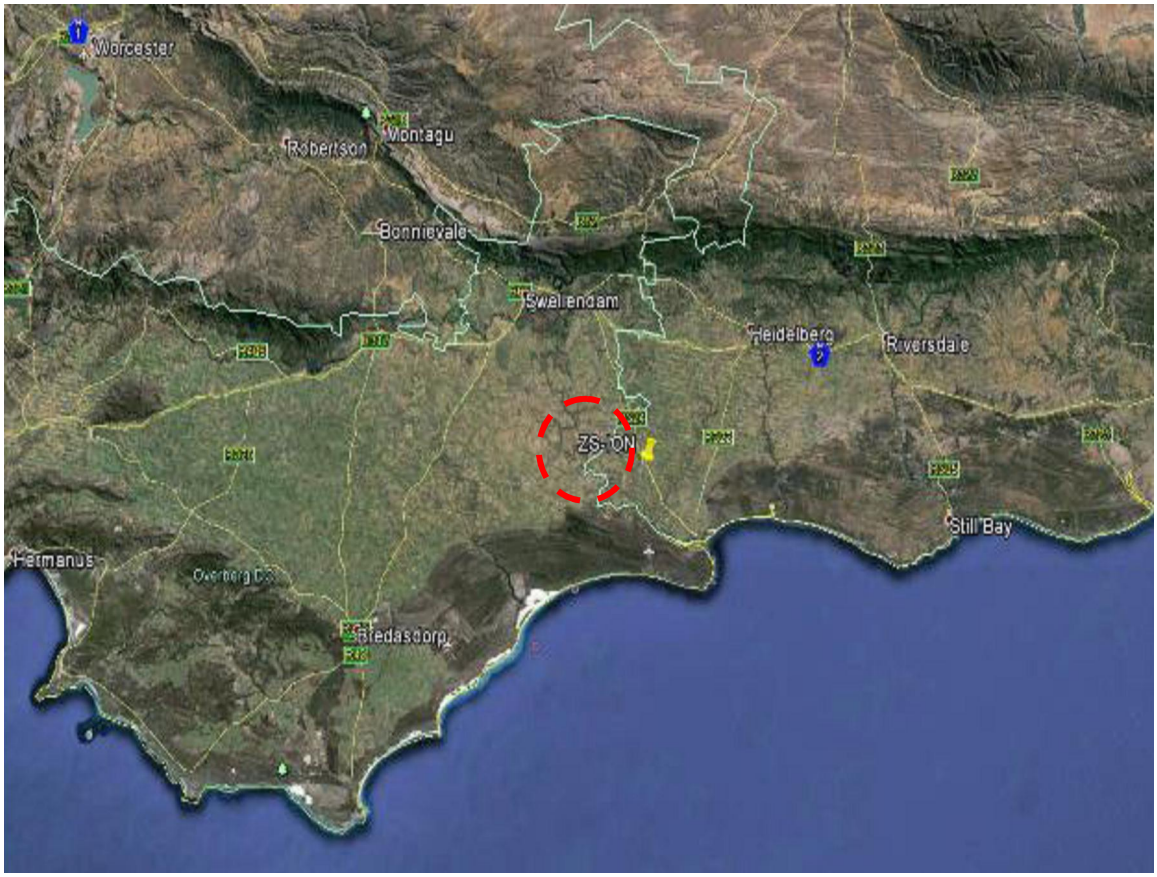


Figure 6 Showing the accident site

1.10.2 The accident site was determined to be situated adjacent to the regional R324 road from Swellendam to Witsand.

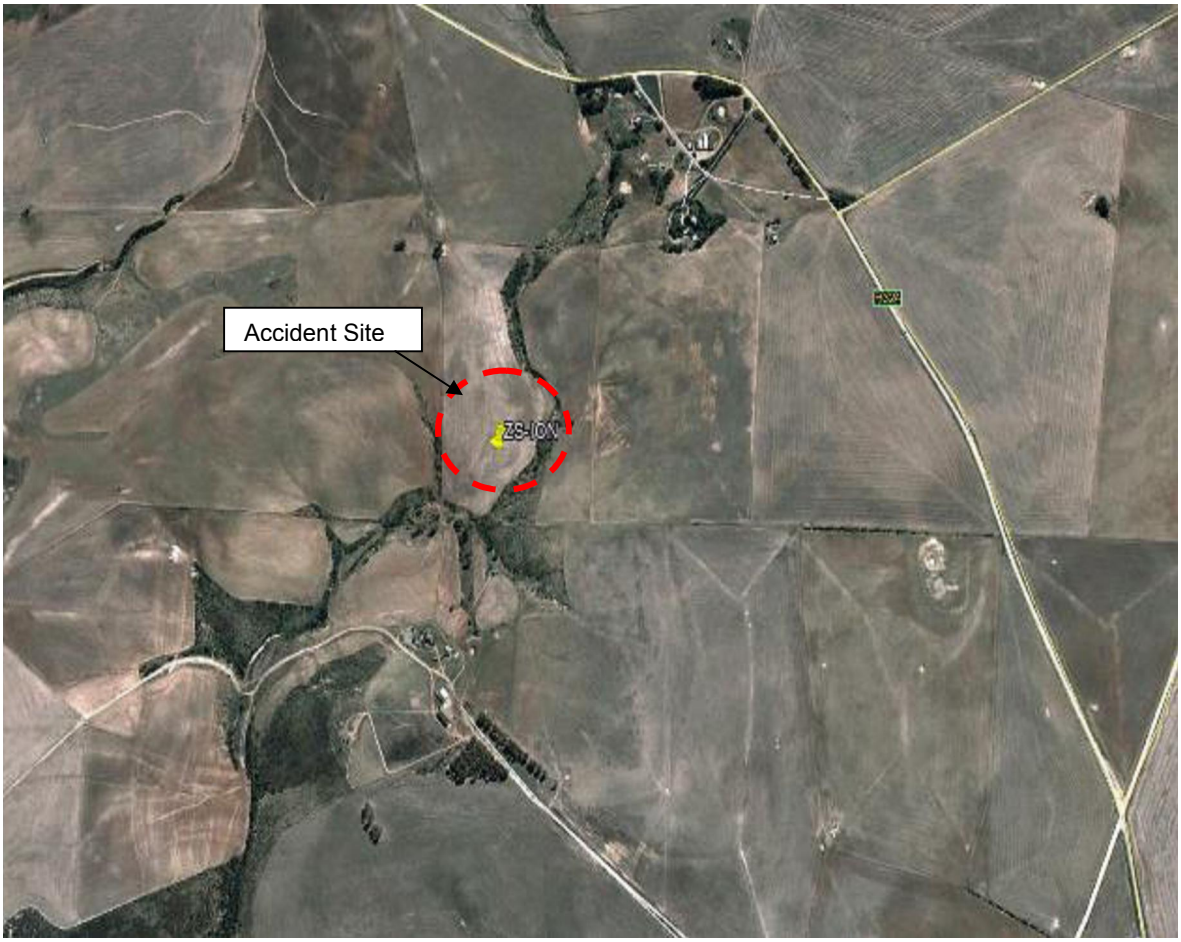


Figure 7 Location of accident site on Google map

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder or cockpit voice recorder. Neither was required by the relevant aviation regulations.

1.12 Wreckage and Impact Information

1.12.1 The aircraft was flying in a south-westerly direction during the crop spraying operation when it hit the high-tension wires crossing the area being crop sprayed.

1.12.2 According to witnesses, they heard the sound and saw the aircraft flying over their house at a very low level in the direction of the field. At the time the witnesses saw the aircraft flying overhead, it was heading straight towards the Electrical Wires.

Figure 8 The farm where the crop was sprayed

1.12.2 According to the witnesses, they heard a *"loud bang sound"* and saw the accident happen. See below the route which aircraft flew prior to the collision with the electrical wires.

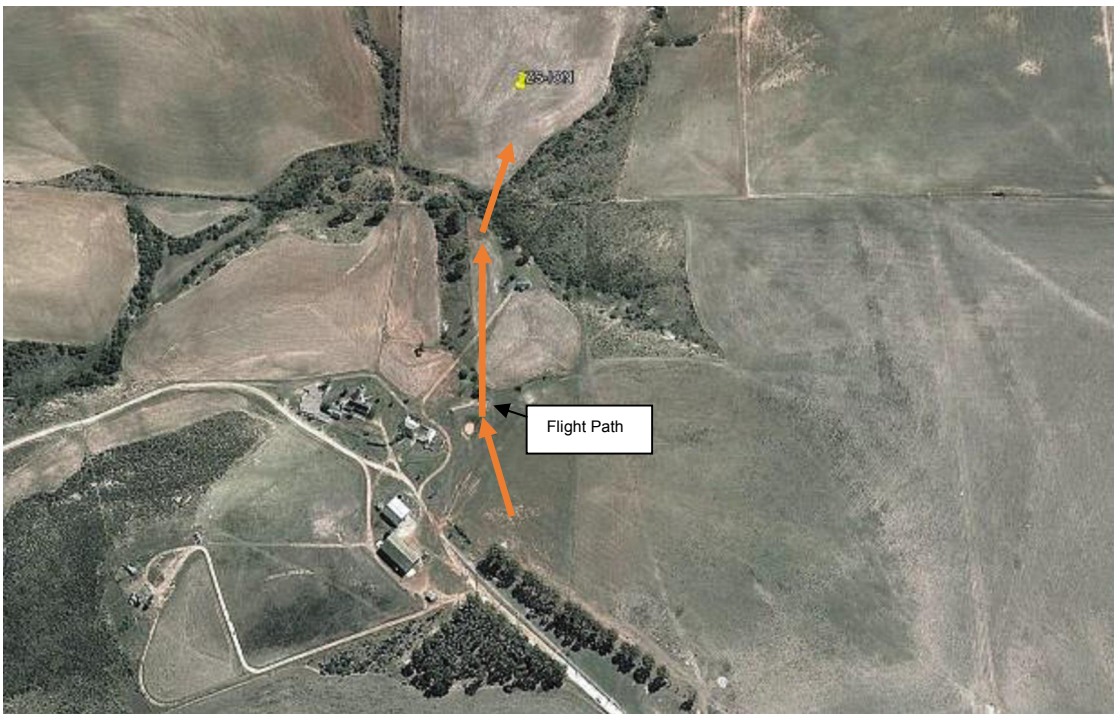


Figure 9 Showing the flight path

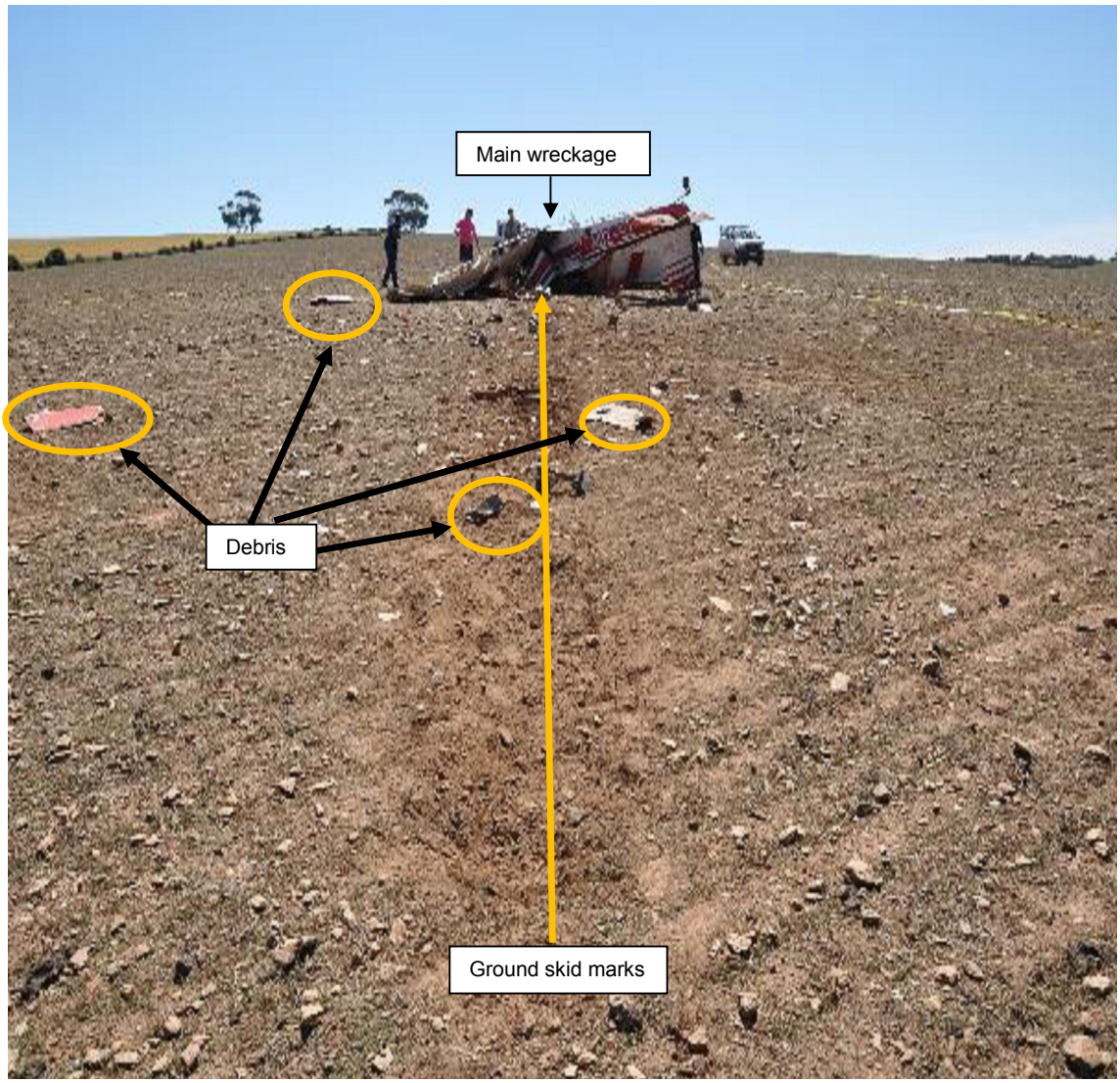


Figure 10 shows the wreckage distribution and ground impact marks

1.12.4 During the on-site investigation it was determined that the aircraft hit the lower high-tension wire. The main wreckage was found at position approximately 200 m – 300 m from the Electrical Wires. The ground marks show that the wreckage skidded for at least approximately 30 m before it came to a complete stop. Small pieces of debris were found scattered along the ground impact path.

1.12.5 An on-site investigation showed that the aircraft left wing tip collided with the lower wire of the power line. During the impact sequence the wing tip separated from the wing. The wing tip was found on the ground not far from the power line.

Figure 11 The impact point of the electrical wires

1.12.6 The evidence shows that after the aircraft collided with the electrical wires, the aircraft turned over, and as can be seen on the pictures above and below, the aircraft then impacted the ground in that overturned attitude with the canopy skidding on the ground.

Figure 12 Showing the main wreckage at the rest position

Note: During the ground impact sequence, the pilot sustained traumatic head injuries as evidenced by the overturned aircraft skidding on the ground.

1.12.7 The propeller was found destroyed as a result of damage sustained during the ground impact. The damage caused to propeller blades was assessed and indicated that forces induced by the rotation of the two blades in the propeller separating from the engine.

(i) Blade #1 was found a short distance away on the right side of the tail section of the aircraft. Damage was caused to the blade tip. It appears that the blade tip broke off when the blade struck the ground while in high mechanical rotation (RPM), hence the indicated failure mode. Thereafter the blade dislodged from the propeller hub assembly and separated from the aircraft.

(ii) Blade #2 was found close to the main wreckage, under the overturned right wing. The blade tip sustained what is believed to be a hard prop strike with the ground during the ground impact sequence. The damage caused to the propeller blade tip indicated high mechanical rotation (RPM), hence the failure mode. It appears as though this blade impacted the ground shortly after the first blade.

(iii) Blade #3 was found a bit further away from the main wreckage. The blade tip sustained the same damage as blade #2. The blade tip also broke off in very high rotation (RPM).

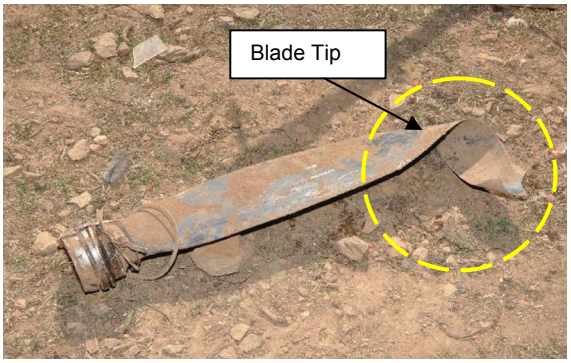


Figure 13, 14 & 15 showing propeller blade damage

1.12.8 The engine was examined during the on-site investigation. The evidence was that the engine sustained substantial ground impact damage. There was no evidence of the engine experiencing any defects or anomaly during the flight before the aircraft collided with the Electrical Wires. Based on the damage caused to the propeller, it was considered that the engine was serviceable at the time of the accident.

1.13 Medical and Pathological Information

1.13.1 The pilot held a valid Class 2 aviation medical certificate without restrictions. There was no evidence or report of the pilot experiencing any medical condition having a negative impact on him during the flight. The conclusion was that he was medically fit.

1.13.2 The medico-legal post-mortem examination report concluded that the cause of death was multiple injuries caused by the aviation accident.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 This accident was considered not survivable. The evidence found shows that the aircraft was destroyed due to the high impact forces with which it impacted the ground. The aircraft was found lying on its roof. The cockpit/cabin was completely destroyed. The evidence shows that the pilot had his seatbelt and harness securely fastened during the flight. The body of the pilot was found trapped inside the wreckage. He first had to be removed by the rescue services before he could receive medical treatment.

1.15.2 The pilot did not survive the accident. The evidence was that he sustained serious multiple injuries, and it was determined that he required immediate professional medical treatment to stabilise him. While he was still receiving medical care, a South African Red Cross Air Mercy Services (AMS) SkyMed helicopter was dispatched to the scene from Oudtshoorn to transport the critically injured pilot to a hospital.

1.15.3 The first responders (National Sea Rescue Institute – NSRI, Emergency Medical Services – EMS, South African Police Service – SAPS, Municipal Fire Fighting and Rescue Services – FFRS and farmers) all arrived on scene to assist the pilot. When arriving on the scene, the medical personnel of the NSRI immediately gave the pilot medical treatment.

1.15.4 When the pilot had been stabilised and the AMS helicopter landed on the scene, the critically injured pilot was put on board the helicopter and airlifted to George Hospital.

1.16 Tests and Research

1.16.1 As regards the SID issue: Based on the Cessna 188 Service Manual and Illustrated Parts Catalog (IPC), the aircraft manufacturer published inspection criteria for the aircraft operating usage and operating environment. The inspection criteria provide for mandatory time and inspection time intervals for components and structures, including information on disassembly, overhaul and parts breakdowns. The manufacturer also provides for a corrosion prevention and control programme (CPCP). The CPCP served to help prevent or control corrosion compromising the continued airworthiness of the aircraft. Furthermore, the manufacturer included maintenance inspection items to be examined after the first 100 hours and repeated every 600 hours or 12 months, whichever came first. After the initial inspection, these inspections should be done every 600 hours.

1.16.1.1 The manufacturer included a supplemental inspection document (SID) in the Service Manual. The SID lists items that are to be examined after 12 000 hours or 20 years, whichever comes first. Furthermore, the Service Manual has items which are to be inspected after 6 000 hours or 10 years, whichever comes first, and repeated every 1,000 hours or 5 years, whichever comes first.

1.16.1.2 More specific to the rudder control system, the Service Manual included guidance material regarding corrosion control and inspection. Reference is made to the following rudder items:

- Rudder attachments - hinge brackets, hinge bolts and hinge bearings;
- Rudder structure - skins, ribs, forward and aft spars, and torque tube;
- Rudder pedal torque tube;
- Rudder cable attachments;
- Rudder cable system - control cables and pulleys.

1.16.2 Confined spaces: A confined space can be defined as being a space that has limited or restricted means of entry or exit, associated with potential physical hazards that intentionally or unintentionally enter the space.

1.16.2.1 Operations that are conducted within an agricultural confined space require proper management, including:

- Identification of the confined space;
- Awareness of the areas considered to be confined spaces;
- Proper identification or marking required.

1.16.3 Below is a list (not exhaustive) of supervision responsibilities which a candidate should subscribe to:

- Briefings prior to execution require discussion between agriculture-rated supervisor and agricultural training pilot;
- Review all potentially hazardous conditions with the aim to prepare;
- Oversee the operation to ensure everything is done safe and securely;
- Stop any obviously unsafe operation.

1.16.4 Below is a list (not exhaustive) of a trainee pilot's responsibility which a candidate should subscribe to:

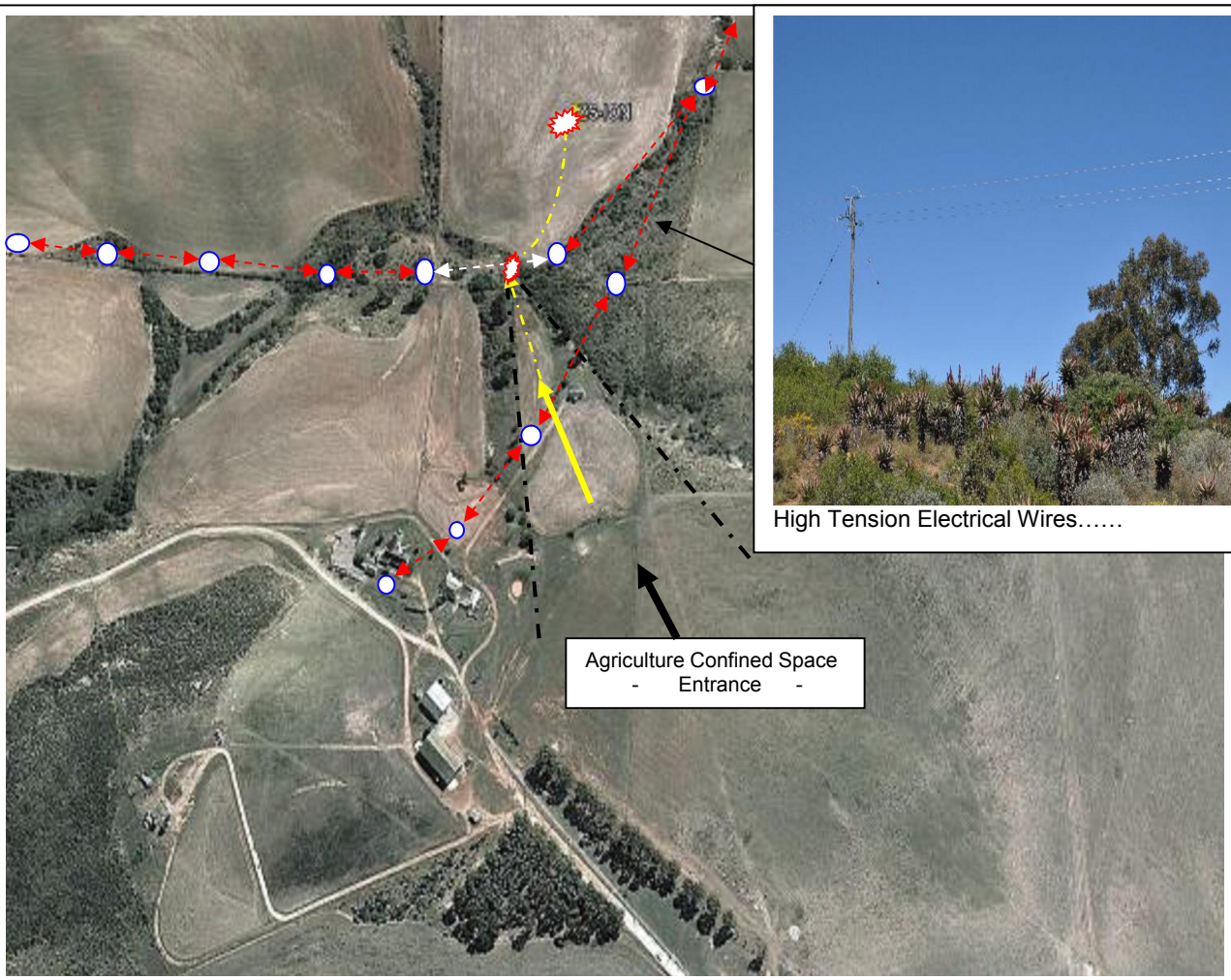
- Attend and participate in the briefing process;
- Ensure familiarity or awareness of all the potentially hazardous conditions;
- Carry out a pre-inspection or assessment of area;
- Understand the appropriate entry and exit procedure.

1.16.5 A survey of the last field sprayed was done during the investigation. Due to the following hazardous condition identified, the survey showed that the pilot may have found himself in an agricultural confined space:

(i) High-tension electrical Wires found on the flight path, in front and aft of the spray field. In order to spray the field, the pilot had two options to approach the field: by flying either over or under the Electrical Wires. Witnesses stated that they heard a loud noise of the aircraft flying very low over their house in the direction of the spray field heading toward the Electrical Wires. It is unlikely that he would have attempted to fly under the Electrical Wires.

(ii) There were big trees lined up on the left and right edges of the spray field. The observation was that the spray field had a conical shape with the trees on the sides. The smaller, narrow side created a tunnel shape leading to the Electrical Wires the aircraft collided with.

(iii) Gradient (up and down slopes) of the terrain around the spray field may have influenced the pilot to make an accurate judgement



High Tension Electrical Wires……

Figure 16 shows the area where the accident occurred and the power-lines

1.17 Organisational and Management Information

1.17.1 Operator Information:

1.17.1.1 The operator of the aircraft was a company indicated as Trio-Lugbespuiting CC. However, the investigation determined that Trio Lugbespuiting CC was in fact the name of the owner. The operator was determined to be J S Lugbespuiting.

1.17.1.2 The evidence was that J S Lugbespuiting had a valid general air service licence (no. G608D) issued by the South African Air Service Licensing Council. The licence authorised the operator to do G1 – acrobatic operations and G5 – agricultural spraying, seeding and dusting air services in VMC/day conditions only and using A3/A4 category aircraft.

1.17.1.3 J S Lugbespuiting also had a valid Part 135 and 137 air operating certificate (AOC) (no. CAA/G608D). The AOC was issued on 14 May 2014 and expired on 11 May 2015. The aircraft ZS-ION was approved on the AOC, which stipulates that the holder has been authorised to operate the air services in terms of the air service licence which are non-scheduled and general air service operations as indicated above.

1.17.1.4 The J S Lugbespuiting Flight Operations Manual states that the agriculture-rated supervision pilot was appointed in the position of air service safety officer. It was his responsibility to ensure that all personnel had appropriate knowledge, qualifications, skills, experience and training to perform their assigned duties safely.

1.17.1.5 The flight operations manual, chapter 1 states that the pilot of an aircraft engaged in an agricultural operation shall hold:

(i) A valid agricultural pilot rating issued in terms of Part 61 for the category of aircraft used; and
(ii) A pest control operator's certificate issued in terms of the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act.

Note: The flight operations manual further stated that J S Lugbespuiting would only employ pilots with a valid commercial pilot licence (with a minimum of 450 hours' total time and 50 hours' application experience), i.e. agricultural pilot rating and rated on the type operated and registered as a pest control operator.

1.17.1 6 Chapter 2 states that before commencing with an agricultural operation, the field had to be surveyed as follows: fly around the entire perimeter at least once to firmly establish the location of wires, standpipes, surface gradients or other obstacles; determine the direction the field will be flown; check the surrounding area on the downwind side for possible drift damage; make a note of houses or areas to avoid during turning.

1.17.1.6 Flight Operation Manual, Chapter 3 states that when entering a field, the pilot should make the first run on a flat land, crosswind. If not, the first pass should be made into the wind. Two passes will be made before the first downwind turn is required. Avoid making the first pass into the sun. If obstructions border the field, reduce speed slightly and make a high approach. When the obstacle is near enough, nose down smoothly to an angle which will clear the obstruction and apply power to prevent high-speed stall on round-out. Avoid flying just above obstruction height and abruptly pitching over.

1.17.1.7 Flight Operation Manual, Chapter 4 states that J S Lugbespuiting does not provide any training, only familiarisation. All training is outsourced to SACAA-approved designated pilots.

1.17.2 Aircraft maintenance organisation (AMO) information:

1.17.2.1 The organisation responsible for carrying out maintenance on the aircraft was Sky Sprayers Maintenance Pty (Ltd). The organisation was issued with a valid AMO approval certificate (no. 0166) on 05 March 2014 with expiry date 28 February 2015.

1.17.2.2 The organisation was authorised to exercise the operating privileges stipulated in its specific operating specifications, category ratings A, B, C, D, W & X at the main base located at Secunda Airfield, Mpumalanga.

1.18 Additional Information

1.18.1 According to the Cessna 188 aircraft pilot operating handbook (POH), this aircraft was designed specifically for safe, efficient, easy-to-fly aerial applications. The flying characteristics were carefully developed so that it could be manoeuvred near to the ground for long periods with maximum safety and minimum effort. In addition, their rugged structure and equipment was simple and easy to maintain, further enhancing their reliability and efficiency.

1.19 Useful or Effective Investigation Techniques

1.18.1 None.

2. ANALYSIS

2.1 The agricultural training pilot involved in the accident was engaged on an agricultural operation. He was using a Cessna 188 type of aircraft to do the operation. The aircraft design allows only for one occupant. The aircraft was configured with the necessary equipment to do aerial application work, i.e. pest control equipment to do crop spraying work. The place where he did the crop spraying work was on Waterkloof Farm at Witsand/Malgas district in Heidelberg (K), Western Cape. The operator (J S Lugbespuiting CC) indicated that it was a commercial operation carried out under the authority of their air operation certificate (AOC).

2.2 The operator's principal place of business is located at Frankfort Airstrip in the Free State. According to J S Lugbespuiting the aerial application work which they sent the training pilot to do was an away from base operation carried out from a small airstrip, "Reinier", in the Heidelberg area. This airstrip was used to park/store the aircraft between operations and to replenish the aircraft with fuel and pesticides.

2.3 According to J S Lugbespuiting, whenever they conduct aerial application work away from base, as in this case, they will normally deploy a full contingent of ground handling personnel with the flying crew to assist with loading of the pesticides and refuelling so that the flight crew can focus on the flying. Entries made in the aircraft flight folio show the frequency of the flights flown to and from the base airstrip for replenishing purposes.

2.4 According to the agriculture training pilot's experience logbook, the aerial application operation carried out by J S Lugbespuiting in the Western Cape commenced on 26 June 2014. The aircraft was then flown by the agricultural training pilot from the commencement date up to 12 September 2014 (22 days). Based on the logbook, the pilot flew a total of approximately 85,8 hours over the period. The calculation shows that the average time was approximately 3,9 hours. The logbook shows that the highest time logged was 7,1 hours on 26 June 2014 and lowest was 1,1 hours on 15 August 2014. The calculation of the flight hours shows that the pilot complied with the flight duty time flight operations requirements of J S Lugbespuiting and applicable regulations. No anomaly was identified in this regard.

2.5 According to the flight folio, the next flight flown was on 11 September 2014. The aircraft was flown by the agricultural training pilot, performing aerial application flights. He accumulated a total of 5,8 hours' flying time with 11 landing on that day. There was no evidence of a defect or system malfunction experienced by the training pilot. Everything appeared to be functioning smoothly on each of the 11 flights logged on the day. The aircraft landed safely back at the Renier airstrip. The training pilot then rested until the next morning, when he resumed the operation.

2.6 It is unclear when exactly he started with the aerial application operation on 12 September 2014. The agriculture-rated supervision pilot did not show any willingness to help determine what the starting time was that morning. In fact he did not help with any information, despite several attempts to obtain the information from him. However, there was no evidence of a defect or malfunction when the aircraft flew to Waterfall Farm. On arrival at Waterfall Farm, the training pilot immediately started with the crop-dusting operation.

2.7 According to J S Lugbespuiting, the flight operation procedure requires that *"before commencing with agriculture operation the flight crew must survey the field by flying around the entire perimeter at least once to firmly establish the location of wires, standpipes, surface gradient or other obstacles. The aim is to determine the direction the field will be flown. The flight crew to check the surrounding area on downwind side for possible drift damage and to make a note of houses or areas to avoid during turning".* It is believed that the training pilot complied with the procedure as required in doing the following:

(i) The spray pressure and height above ground are very important. The pilot's primary responsibility will be to fly the aircraft at a safe height above the ground; applying the pesticide on the field is secondary to flying the aircraft safely. If an emergency is experienced with the flying, it is important to take necessary precautionary measures immediately to safeguard the aircraft. There should be a safety management system in place in case of an emergency during the operation. The information of such an emergency situation should be communicated with all involved, whereupon proper decisions are made to ensure safety.

2.8 According to J S Lugbespuiting, the initial information received was that the pilot was busy with crop-dusting. During his second last spraying run, the aircraft inadvertently hit electrical wires and crashed. Witnesses were interviewed during the investigation to obtain information from their observations involving the accident. The witnesses indicated that they heard the loud noise of the aircraft flying at low level heading in the direction of the canola fields. The witnesses were concerned that the aircraft would collide with the electrical wires located at the upper end of the canola field being sprayed. While the witnesses were looking on and thinking about the possibility of a collision, they saw the aircraft heading straight on a collision path toward the electrical wires. They saw the collision with the electrical wires, following which it immediately hit the ground.

2.9 J S Lugbespuiting flight operations procedures require that *"when entering a field to make the first run on a flat land, crosswind. If not the first pass must be made into wind. Two passes will be made before the first downwind turn is required. Avoid making first pass into the sun. If obstructions border the field, reduce speed slightly and make a high approach. When the obstacle is near enough, nose down smoothly to an angle which will clear obstruction and apply power to prevent high-speed stall on round out. Avoid flying just above obstruction height and abruptly pitching over".*

2.10 The wreckage was examined during the investigation. Evidence was found of impact damage caused to the left wing leading edge by the collision with the electrical wires. The wing cut through two of the electrical wires. It is believed that the left wing inadvertently collided with the electrical wires when the training pilot attempted a right bank pull-up manoeuvre at the end of the canola field. It is a fact that the training pilot was already aware of the power line, as he had flown the aircraft several times during the operation at Waterkloof Farm. It is just unfortunate that he found himself in a very hazardous situation, flying low in what is defined as an agricultural confined space leading him straight to the electrical wires.

2.11 The wreckage investigation further showed that as the left wing impacted the two electrical wires, the wing speed was reduced to a point where it experienced a stall condition. The nose then immediately started to yaw to the right, followed by the airframe, and the aircraft entered a roll attitude. The aircraft then rolled over and started losing height in that attitude, descending straight to the ground. The aircraft hit the ground with its nose section first, followed by the canopy, and ended up skidding on the ground inverted until it came to a stop.

2.12 The aircraft left wing leading edge was substantially damaged when it collided with the electrical wires. Further damage was caused after the ground impact. The debris of the three propeller blades found on the scene shows that the propeller impacted the ground under high load, meaning that the engine performance was according to specification. No anomaly was identified with the mass and balance and the fuel status of the aircraft.

2.13 The evidence was that the weather conditions were CAVOK and did not have a negative influence on the crop spraying operation.

2.14 It should be noted that the agricultural training pilot was required to perform his duties under direct supervision of an agriculture-rated supervision pilot. The following observations were made in this regard.

2.15 The agriculture training pilot's training, qualifications and experience were reviewed during the investigation. The aim of the review was to determine if the pilot had received adequate training, if he had attained applicable qualifications and whether or not he had appropriate practical flying experience to do the operation. The evidence was that the pilot had not been issued with a valid agricultural rating, as he was still receiving training and was required to perform the crop spraying operation under supervision. However, on the day in question the evidence is that he was by himself when spraying the canola field at Waterfall farm on the day of the accident. Apparently the agriculture-rated supervision pilot was busy in the area, but spraying another field on a different farm.

2.16 The applicable regulation states that in order to be issued with an agricultural rating the pilot was required to have a valid commercial pilot licence (CPL), a valid class or type rating, a pest control operator's certificate issued in terms of the Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act and, in his case, to have acquired experience of at least 300 hours on the aeroplane and experience of aerial applications under supervision. The pilot's experience logbook shows that he had acquired only a total of approximately 149,6 hours' flying time on the Cessna 188 aircraft. The pilot still required a total of 151,4 hours' supervised flying time to qualify for the agricultural rating.

2.17 The agriculture-rated supervision pilot's training, qualifications and experience were also reviewed during the investigation. The aim was to determine if he was suitably trained, qualified and experienced to be an agricultural supervision pilot. His file and experience logbook show that he was issued with an agricultural rating on 30 October 2003. He received the rating after providing the SACAA with proof of the following: a valid commercial pilot licence (CPL), a pest control operator's certificate issued on 07 October 2003 and experience of 497,3 hours' total flying time in aerial applications under supervision on the Cessna 172 and Cessna 188 types of aircraft. Also, that he carried out skills test on 15 October 2003 under an appropriately rated Grade II flight instructor with valid agricultural pilot rating. Based on the information, he had the right training and qualifications to be an agricultural supervision pilot.

2.18 The J S Lugbespuiting flight operations procedures manual was also reviewed. According to the manual, the agriculture-rated supervision pilot was actually appointed as air service safety officer. He was charged with the responsibility to ensure that all personnel should have appropriate knowledge, qualifications, skills, experience and training to perform their assigned duties in respect of aviation safety. He clearly did not take his responsibility seriously, otherwise he wouldn't have compromised safety so recklessly. He neglected to ensure that the agricultural training pilot complied with the above prior to his appointment. At the time when J S Lugbespuiting appointed the agricultural training pilot, he did not have the appropriate minimum total of 450 hours' flying time and 50 hours' application experience, nor did he have a valid agricultural pilot rating issued in terms of Part 61 of the regulations.

3. CONCLUSION

3.1 Findings

3.1.1 The agricultural training pilot had a valid commercial pilot licence (CPL) and the Cessna 188 type rating was endorsed on it. He also had a valid Class 1 aviation medical certificate with no restrictions and was considered medically fit.

3.1.2 The agriculture training pilot's flying experience was reviewed and calculated in the investigation. It was determined that he had approximately 438,9 hours in total and approximately 149,6 hours on the Cessna 188 type.

3.1.3 The agricultural training pilot's experience logbook was reviewed in the investigation. It shows that he commenced with agricultural flying training after completing a conversion on type PA25-235 aircraft on 14 March 2013. During this time the training flights he carried out totalled 19 hours and ended on 21 March 2013.

3.1.4 The agricultural training pilot's experience logbook further showed an entry on 21 March 2013 by a Grade I designated flight examiner (DFE). The entry states that he successfully completed the agricultural spraying training and was authorised to exercise the privileges of an agricultural pilot, but under supervision of an appropriately rated operator.

3.1.5 The agricultural training pilot's experience logbook shows that the Cessna 188 type rating was issued to him when he had completed a differences flying training on 15 March 2014. Thereafter he commenced with agricultural spraying operations under the supervision of J S Lugbespuiting. This was also the time he started his employment with the company.

3.1.6 The J S Lugbespuiting Flight Operations Manual stated that they would only appoint personnel with appropriate knowledge, qualifications, skills, experience and training to perform their assigned duties. Such personnel had to have a minimum of 450 hours' total time and 50 hours' application experience and a valid agricultural pilot rating issued in terms of Part 61.

3.1.7 The evidence was that at the time when the agricultural training pilot was appointed by J S Lugbespuiting, he did not have the required minimum of 450 hours' total time, 50 hours' application experience and a valid agricultural pilot rating as required by the flight operations manual.

3.1.8 The agriculture training pilot was appointed with the intention to receive agriculture supervision training from J S Lugbespuiting to reach the required experience in order to be issued with an agriculture rating.

3.1.9 J S Lugbespuiting sent the agriculture training pilot out on deployment away from base to carry out aerial application work at Waterfall Farm, Witsand/Malgas in the Western Cape. He was doing the aerial application work under the direct supervision of another employee, the flight safety officer, who was given the added responsibility of being their agriculture-rated supervision pilot.

3.1.10 The evidence found was that the agriculture-rated supervision pilot was not Cessna 188 type rated. At the time he was carrying out the agricultural supervision training, he was not complying with the J S Lugbespuiting flight operations manual, which states that the operator does not provide any training, only familiarisation, and that all training was outsourced to SACAA-approved designated pilots.

3.1.11 The agricultural training pilot was using the Cessna 188 ZS-ION on the aerial application flight at Waterkloof farm. He was the sole occupant of the single-seater aerial application aircraft.

3.1.12 Based on the agricultural training pilot's experience logbook, the evidence is that the aerial application work in Heidelberg area started on 3 September 2014 and ended on 12 September 2014, when the aircraft was involved in the accident. Apparently the agricultural training pilot was flying ZS-ION and the agriculture-rated supervision pilot another aircraft during this time.

3.1.13 The aircraft ZS-ION was allegedly involved in an incident in which the rudder control system experienced a defect on 5 September 2014. It was determined that the aft bulkhead rudder bell cranks had failed, resulting in the aircraft becoming unserviceable.

3.1.14 The information of the incident was not recorded in any of the aircraft documentation, e.g. flight folio, neither was any information of the aft bulkhead rudder bell cranks that failed.

3.1.15 The two unserviceable aft bulkhead rudder bell cranks were removed from the aircraft by an unidentified person and taken to Master Tech on 6 September 2014 by the agricultural training pilot to be repaired. Master Tech would not repair the bell cranks, as no repair scheme was allowed, and advised the pilot to install two new/serviceable bell cranks.

3.1.16 J S Lugbespuiting arranged with Sky Sprayers Maintenance to assist with two serviceable bell cranks, which they did; but they were removed from another but similar type of aircraft, ZS-JMD. The serviceable bell cranks were installed on the aircraft on 10 September 2014 at Heidelberg by Sky Sprayers.

3.1.17 A CRMA was then issued certifying that the maintenance had been carried out in terms of the manufactures and regulations requirements. However, evidence was found of noncompliance with applicable regulatory requirements in so far as the rudder control system rigging and dual inspections were concerned.

3.1.18 Other cases of noncompliance identified concerned maintenance work not recorded in the relevant aircraft maintenance documentation, i.e. flight folio and airframe logbook, immediately after completion.

3.1.19 The CRS carried on board the aircraft became invalid due to the incident and aft bulkhead bell cranks becoming unserviceable, which also affected the validity of the CoA subsequently. Both aircraft documents (CRS and CoA) became valid again after the rectification maintenance had been performed by Sky Sprayers and issuance of the CRMA.

3.1.20 The aircraft was allegedly test flown by the agricultural training pilot to check that the complete aircraft performance was as per specification. However, no proof was found of any entries made in the flight folio and agricultural training pilot's experience logbook indicating that the post-maintenance test flight was flown.

3.1.21 After the rudder control system maintenance, the agricultural training pilot flew the aircraft on 11 September 2014, accumulating a total of 5,8 hours flying time with 11 landings as per the flight folio. The aircraft was considered to be serviceable and airworthy because no evidence of a defect or malfunction was reported by the pilot on this day.

3.1.22 Witnesses saw the aircraft flying low and heading toward the canola field to do crop dusting before the accident. The aircraft was observed colliding with high-tension electrical wires just after the end of the canola field before impacting the ground.

3.1.23 The aircraft wreckage was examined during the investigation and impact damage was found on the left wing leading edge which shows that the aircraft was attempting a right bank pull-up manoeuvre over the electrical wires, but inadvertently struck the electrical wires.

3.1.24 The analysis of the wreckage shows that the aircraft entered what is believed to be an incipient spin which resulted in it turning over onto its roof, and in that attitude it impacted the ground.

3.1.25 The analysis of the canola field shows that the agriculture training pilot found himself in a very hazardous condition due to rows of trees on the edges of the field, entering what is considered to be an agriculturally confined space, thus setting him up to fly straight towards the electrical wires.

3.2 Probable Cause/s

3.2.1 Aircraft collided with electrical wires during an agricultural operation.

4. SAFETY RECOMMENDATIONS

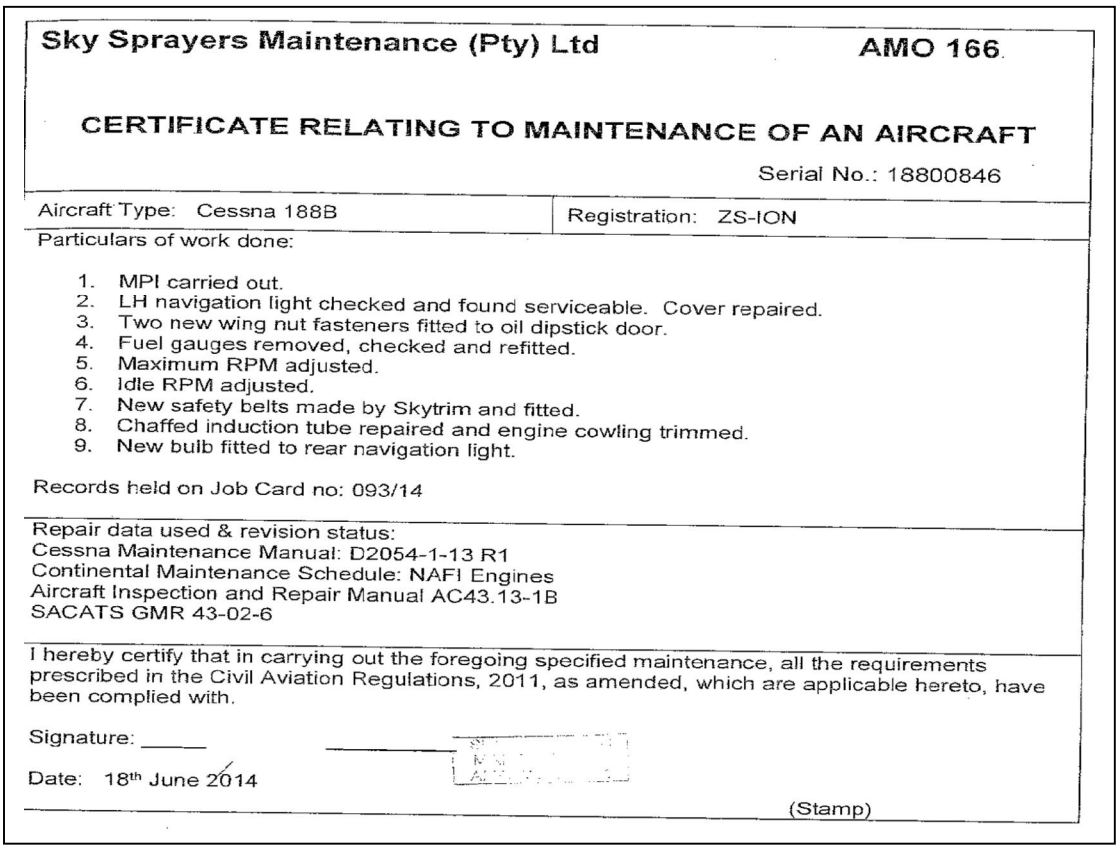
4.1 None

5. APPENDICES

5.1 None.

Appendix A:

- MPI Certificate Related to Maintenance of an Aircraft (CRMA):



Sky Sprayers Maintenance (Pty) Ltd AMO 166

CERTIFICATE RELATING TO MAINTENANCE OF AN AIRCRAFT

Serial No.: 18800846

Aircraft Type: Cessna 188B	Registration: ZS-ION

Particulars of work done:

1. MPI carried out.
2. LH navigation light checked and found serviceable. Cover repaired.
3. Two new wing nut fasteners fitted to oil dipstick door.
4. Fuel gauges removed, checked and refitted.
5. Maximum RPM adjusted.
6. Idle RPM adjusted.
7. New safety belts made by Skytrim and fitted.
8. Chaffed induction tube repaired and engine cowling trimmed.
9. New bulb fitted to rear navigation light.

Records held on Job Card no: 093/14

Repair data used & revision status:
Cessna Maintenance Manual: D2054-1-13 R1
Continental Maintenance Schedule: NAFI Engines
Aircraft Inspection and Repair Manual AC43.13-1B
SACATS GMR 43-02-6

I hereby certify that in carrying out the foregoing specified maintenance, all the requirements prescribed in the Civil Aviation Regulations, 2011, as amended, which are applicable hereto, have been complied with.

Signature: _____

Date: 18th June 2014

(Stamp)

- Certificate of Release to Service (CRS) and Certificate of Airworthiness (CoA)

SKY SPRAYERS MAINTENANCE (PTY) LTD

1701

AMO: 166
REG. No. 2004/031760/07

P.O. Box 6583
SECUNDA, 2302
Cell: 083 454 6363
083 454 6364
Fax: 017 634 8742
Tel:017 634 3511

CERTIFICATE OF RELEASE TO SERVICE

Nationality and registration marks

ZS-ION

Aircraft type: CESSNA 188B Serial No.: 18800846

I hereby certify that I am satisfied that the abovementioned aircraft and all its equipment are in every way serviceable for flight and that all maintenance has been carried out in accordance with the Civil Aviation Regulations 2011, and its Approved Maintenance Schedule.

This certificate lapses at a total of: 7824.0 hours of flight time or on

17.6.2015 (date), whichever occurs first, unless the aircraft is involved in an accident or becomes unserviceable, in which case the certificate is invalid for the duration of the period.

Signed: Licence No.:

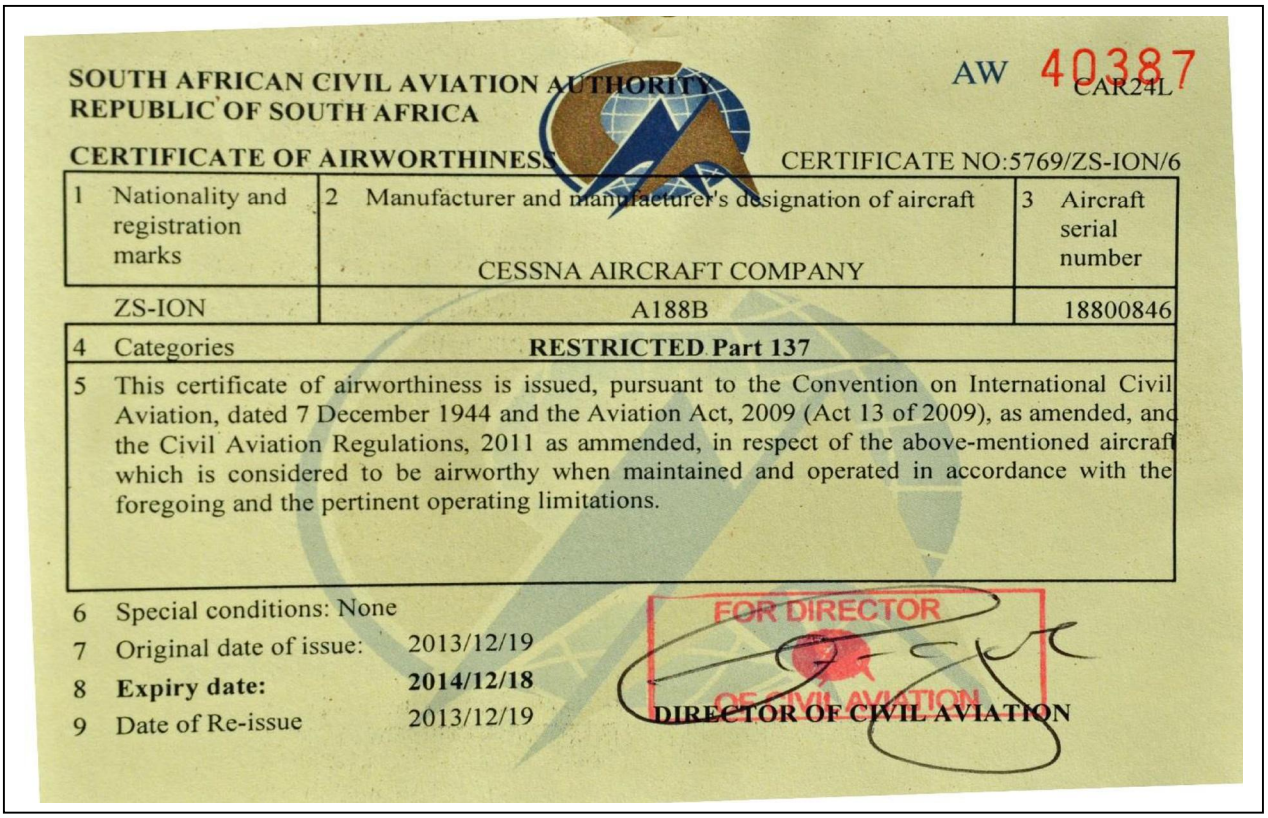
* Aircraft maintenance engineer / organisation

Date: 18.6.2014 Time: 1615

* Delete whichever is not applicable.

Bethal Echo Drukkers bk# 13-02-279

TIFICATE OF SAFETY FOR FLIGHT



SOUTH AFRICAN CIVIL AVIATION AUTHORITY
REPUBLIC OF SOUTH AFRICA

AW 40387 CAR24L

CERTIFICATE OF AIRWORTHINESS

CERTIFICATE NO:5769/ZS-ION/6

1 Nationality and registration marks	2 Manufacturer and manufacturer's designation of aircraft	3 Aircraft serial number
ZS-ION	CESSNA AIRCRAFT COMPANY A188B	18800846

4 Categories **RESTRICTED Part 137**

5 This certificate of airworthiness is issued, pursuant to the Convention on International Civil Aviation, dated 7 December 1944 and the Aviation Act, 2009 (Act 13 of 2009), as amended, and the Civil Aviation Regulations, 2011 as ammended, in respect of the above-mentioned aircraft which is considered to be airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations.

6 Special conditions: None

7 Original date of issue: 2013/12/19

8 **Expiry date:** **2014/12/18**

9 Date of Re-issue 2013/12/19

FOR DIRECTOR OF CIVIL AVIATION

DIRECTOR OF CIVIL AVIATION

Appendix B:

- Master Tech Letter to Sky Sprayers – SID issue.

Master Tech
Aircraft Maintenance
Quality we care about

Sky Sprayers Pty Ltd
Secunda

6th September 2014

For the Attention of

Dear

Please find enclosed one airframe logbook for ZS-ION, Cessna 188B Serial No. 18800846.

This aircraft will be coming to our facilities for an M.P.I. in the near future. On receipt of the logbooks for this aircraft, I could not find anywhere a mention of the S.I.D. carried out on this aircraft. The enclosed copy of the S.I.D. inspection was sent later. Could you please attach the original, signed and stamped, together with the certifying declaration into the airframe logbook that the S.I.D. was carried out as I cannot accept this facsimile.

This is a scheduled inspection so the left hand page of the logbook must also be filled in.

I would appreciate the prompt return of the completed logbook.

Thank you for your assistance.

Kind regards

Accountable Manager
Master Tech Aircraft Maintenance CC
Hangar 5
Robertson Airport
Robertson 6705
Tel: 0834130131

Enclosures:
1 Air frame Logbook
1 Facsimile S.I.D. Inspection

- SID certificate

Cessna 188 SID Inspections

Aircraft Registration	ZS-ION	TT Hours	7672.7
Aircraft Model	188B	Date	07/11/2013
Serial No	18800846		

SID	Description	Initial	Repeat	Complied	Next due	Inspector
27-10-01	Aileron cable & control system inspection	600 hrs 1 year	600 hrs 1 year	N/A on S/N		
27-20-01	Rudder pedal torque tube	10000 hrs 20 years	3000 hrs 5 years	7672.7 13/12/2013	10672.7 12/12/2018	
27-30-01	Elevator trim system inspection	1000 hrs 3 years	1000 hrs 3 years	7672.7 13/12/2013	8672.7 12/12/2016	
32-13-01	Landing gear spring corrosion inspection	20 years	10 years	7672.7 13/12/2013	12/12/2023	
32-13-02	MLG fittings inspection	3000 hrs 5 years	1000 hrs 5 years	7672.7 13/12/2013	8672.7 12/12/2018	
53-10-01	Tubular fuselage inspection	2 years	2 years	7672.7 13/12/2013	12/12/2015	
53-47-01	Seat rail & structure corrosion	10 years	10 years	7672.7 13/12/2013	12/12/2023	
55-10-01	Horizontal stabilizer elevator & attachments	10000 hrs 20 years	3000 hrs 5 years	7672.7 13/12/2013	10672.7 12/12/2018	
55-30-01	Vertical stabilizer rudder & attachments	10000 hrs 20 years	3000 hrs 5 years	7672.7 13/12/2013	10672.7 12/12/2018	
57-10-01	Wing spar spray boom hole inspection	1000 hrs 3 years	1000 hrs 3 years	7672.7 13/12/2013	8672.7 12/12/2016	
57-11-01	Wing structure inspection	12000 hrs 20 years	2000 hrs 10 years	7672.7 13/12/2013	8672.7 12/12/2023	
57-11-02	Wing structure corrosion inspection	20 years	10 years	7672.7 13/12/2013	12/12/2023	
57-11-03	Wing splice joint at strut attach inspection	20 years	10 years	7672.7 13/12/2013	12/12/2023	
57-40-01	Strut & strut wing attachment inspection	12000 hrs 20 years	2000 hrs 10 years	7672.7 13/12/2013	9672.7 12/12/2023	
57-51-01	Aileron support structure	3000 hrs 20 years	500 hrs 5 years	7672.7 13/12/2013	8172.7 12/12/2018	
57-53-01	Flap tracks & attachmnets inspection	20 years	10 years	7672.7 13/12/2013	12/12/2023	
71-20-01	Engine mount inspection	10000 hrs 20 years	Engine O/H	7672.7 13/12/2013	8872.7 Engine O/H	

* *Note:* A signature in this column will be taken as certification that the maintenance specified has been carried out and all requirements as laid down in the Civil Aviation Regulations 1997, as amended have been met in every respect.

47

- Certificate Relating to Maintenance of an Aircraft (CRMA) – SID issue

Sky Sprayers Maintenance (Pty) Ltd **AMO 166**

CERTIFICATE RELATING TO MAINTENANCE OF AN AIRCRAFT

Serial No.: 18800846

Aircraft Type: Cessna 188B	Registration: ZS-ION

Particulars of work done:

1. All SID inspections carried out in accordance with the attached schedule dated 13/12/2013. Attach to logbook page 47.

Records held on Job Card no: 136/14

Repair data used & revision status:
Cessna Maintenance Manual: D2054-1-13 R1
Continental Maintenance Schedule: NAFI Engines
Aircraft Inspection and Repair Manual AC43.13-1B
SACATS GMR 43-02-6

I hereby certify that in carrying out the foregoing specified maintenance, all the requirements prescribed in the Civil Aviation Regulations, 2011, as amended, which are applicable hereto, have been complied with.

Signature: _____

Date: 12th September 2014

(Stamp)

- Certificate Relating to Maintenance of an Aircraft (CRMA) – Bell Cranks Installation

Sky Sprayers Maintenance (Pty) Ltd **AMO 166**

CERTIFICATE RELATING TO MAINTENANCE OF AN AIRCRAFT

Serial No.: 18800846

Aircraft Type: Cessna 188B	Registration: ZS-ION

Particulars of work done:

1. Two serviceable bellcrank assemblies, P/N 0712309-16 AGW installed on rudder control system using new bolts, nuts and cotter pins.

Dual inspection carried out by:- [ ] Type rated CPL

Records held on Job Card no: 136/14

Repair data used & revision status:
Cessna Maintenance Manual: D2054-1-13 R1
Continental Maintenance Schedule: NAFI Engines
Aircraft Inspection and Repair Manual AC43.13-1B
SACATS GMR 43-02-6

I hereby certify that in carrying out the foregoing specified maintenance, all the requirements prescribed in the Civil Aviation Regulations, 2011, as amended, which are applicable hereto, have been complied with.

Signature: _____

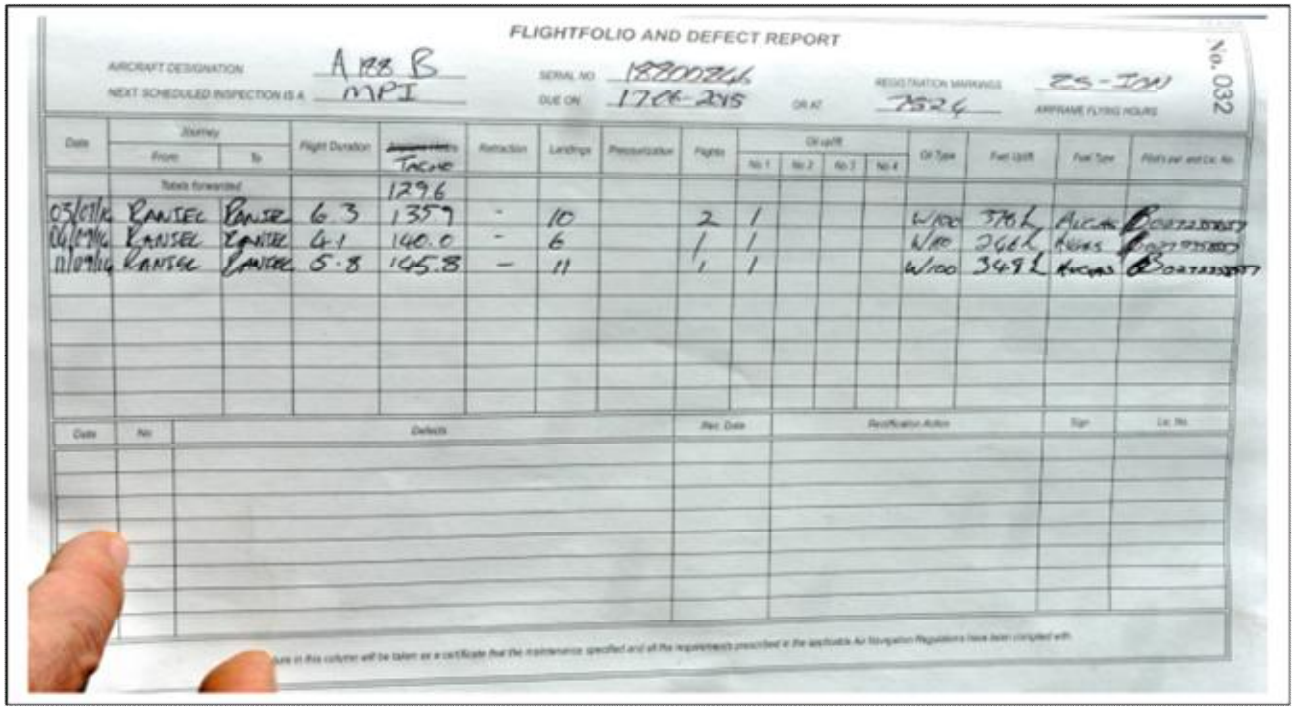
SKY SPRAYERS MAINTENANCE AMO 166 INSP 2

Date: 10th September 2014

(Stamp)

Appendix C

- Flight Folio – Last Entries



FLIGHTFOLIO AND DEFECT REPORT

AIRCRAFT DESIGNATION A188 B — SERIAL NO 18800246 — REGISTRATION MARKINGS ZS-ION — No. 032

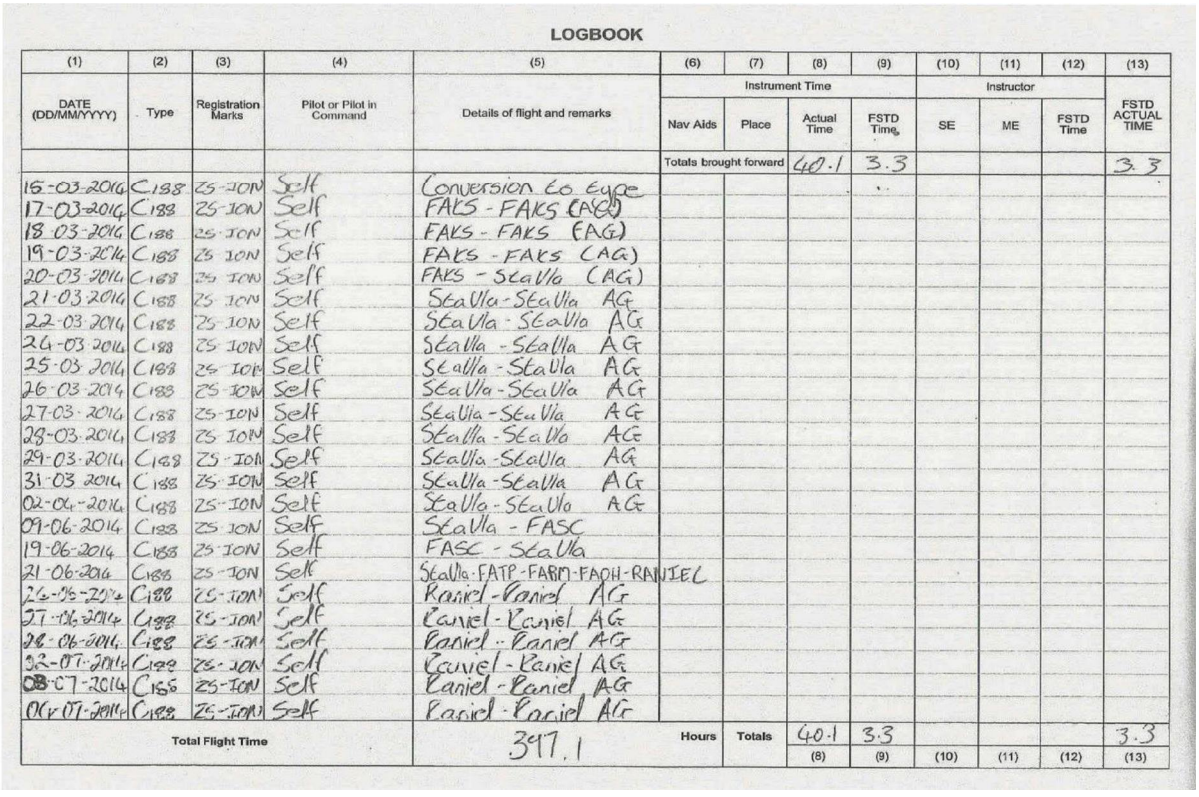
NEXT SCHEDULED INSPECTION IS A MPI — DUE ON 17-04-2015 — OR AT 7526 — AIRFRAME FLYING HOURS

Date	Journey From	Journey To	Flight Duration	Tacho	Retraction	Landings	Pressurization	Flights	Oil uplift No.1	No.2	No.3	No.4	Oil Type	Fuel Uplift	Fuel Type	Pilot's name and Lic. No.
Totals forwarded				1296												
03/07/14	RANIEL	RANIEL	6.3	1359	-	10		2	1				W100	37ltr	AVGAS	
06/07/14	RANIEL	RANIEL	4.1	140.0	-	6		1	1				W100	26ltr	AVGAS	
11/07/14	RANIEL	RANIEL	5.8	145.8	-	11		1	1				W100	34.9ltr	AVGAS	

Date	No	Defects	Rec. Date	Rectification Action	Sign	Lic. No.

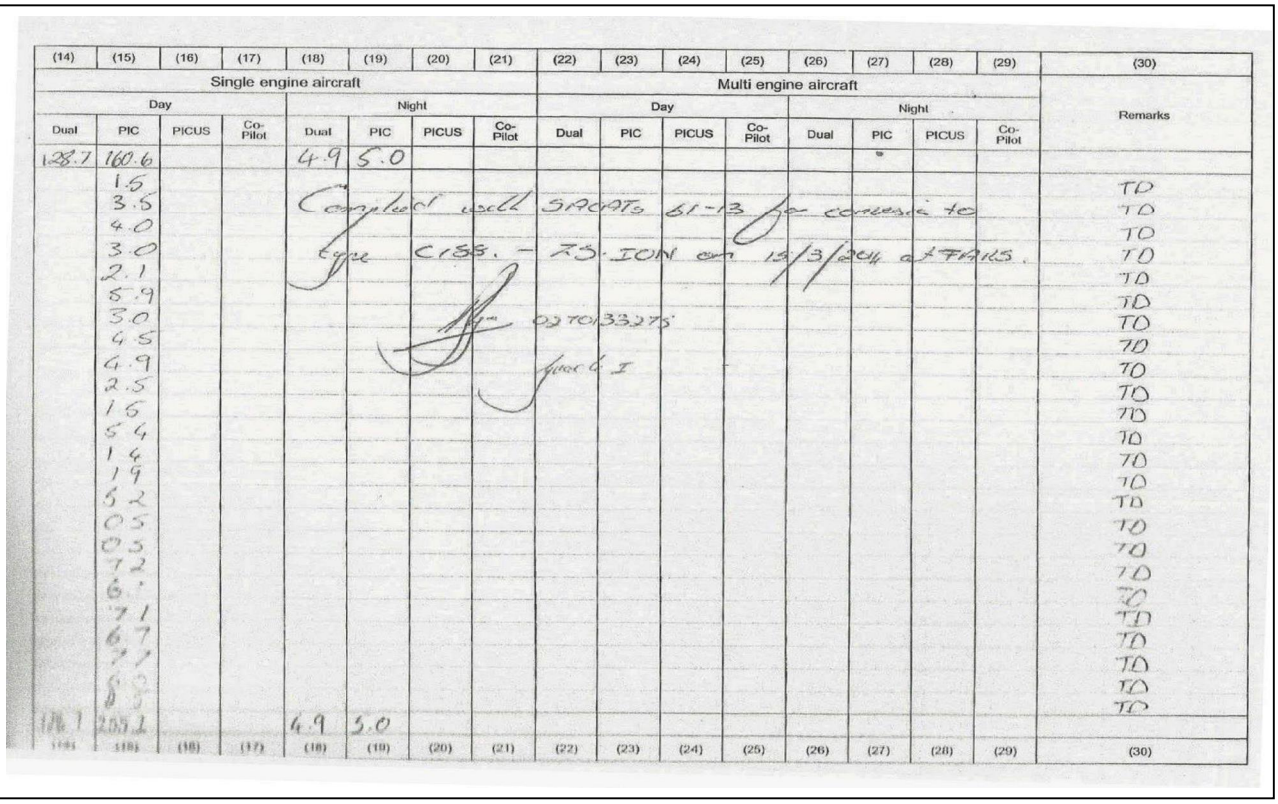
Appendix D:

- Agriculture Training Pilot's Experience Logbook

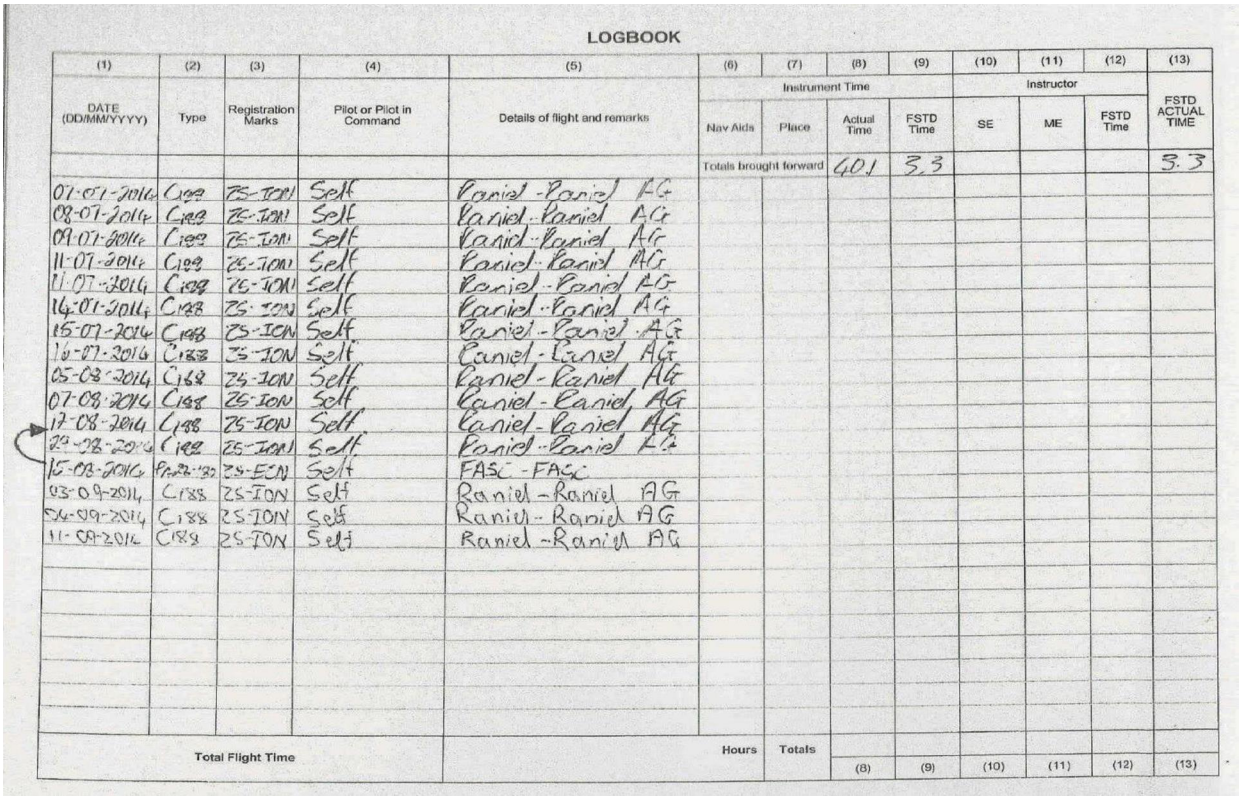


LOGBOOK

(1) DATE (DD/MM/YYYY)	(2) Type	(3) Registration Marks	(4) Pilot or Pilot in Command	(5) Details of flight and remarks	(6) Instrument Time Nav Aids	(7) Instrument Time Place	(8) Instrument Time Actual Time	(9) Instrument Time FSTD Time	(10) Instructor SE	(11) Instructor ME	(12) Instructor FSTD Time	(13) FSTD ACTUAL TIME
				Totals brought forward			40.1	3.3				3.3
16-03-2014	C188	ZS-ION	Self	Conversion to type								
17-03-2014	C188	ZS-ION	Self	FAKS - FAKS (AG)								
18-03-2014	C188	ZS-ION	Self	FAKS - FAKS (AG)								
19-03-2014	C188	ZS-ION	Self	FAKS - FAKS (AG)								
20-03-2014	C188	ZS-ION	Self	FAKS - Stella (AG)								
21-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
22-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
24-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
25-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
26-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
27-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
28-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
29-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
31-03-2014	C188	ZS-ION	Self	Stella - Stella AG								
02-04-2014	C188	ZS-ION	Self	Stella - Stella AG								
09-06-2014	C188	ZS-ION	Self	Stella - FASC								
19-06-2014	C188	ZS-ION	Self	FASC - Stella								
21-06-2014	C188	ZS-ION	Self	Stella-FATP-FARM-FACH-RANIEL								
26-06-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
27-06-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
28-06-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
02-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
03-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
06-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
Total Flight Time				397.1	Hours	Totals	40.1	3.3				3.3
							(8)	(9)	(10)	(11)	(12)	(13)

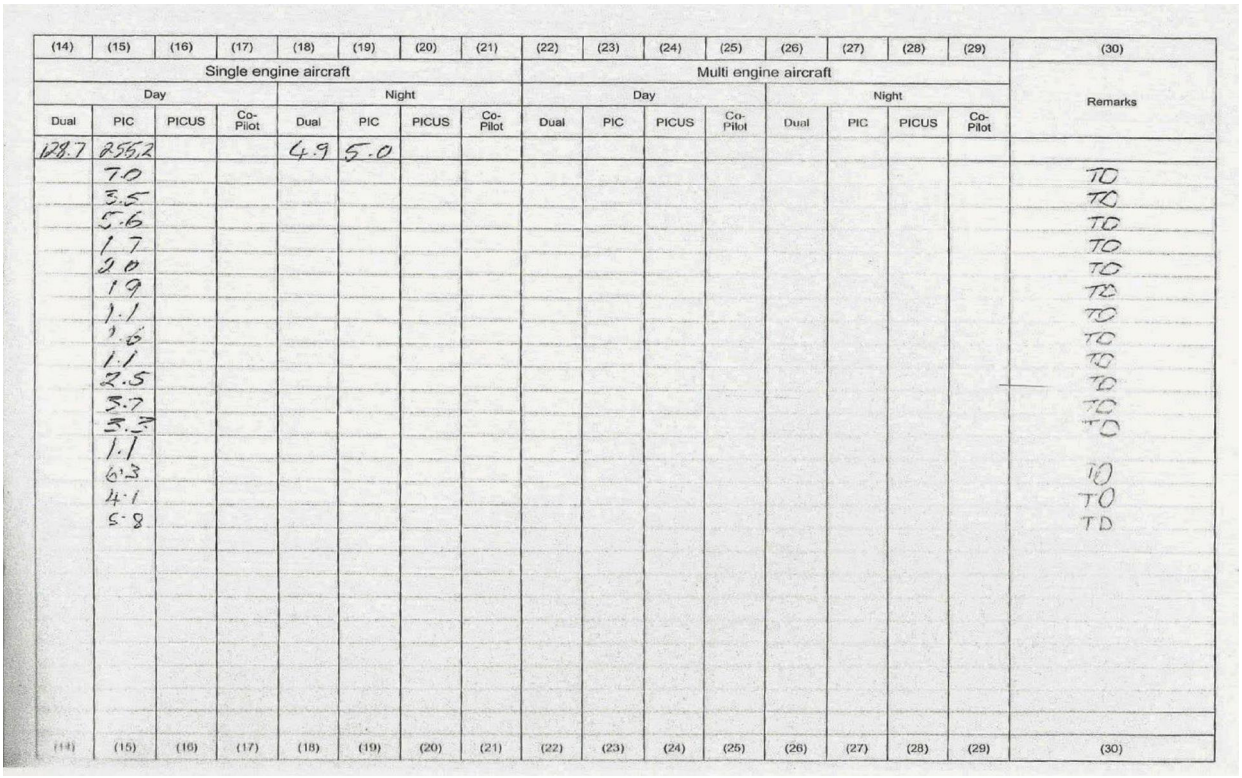


(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Single engine aircraft								Multi engine aircraft								
Day				Night				Day				Night				Remarks
Dual	PIC	PICUS	Co-Pilot	Dual	PIC	PICUS	Co-Pilot	Dual	PIC	PICUS	Co-Pilot	Dual	PIC	PICUS	Co-Pilot	
128.7	160.6			4.9	5.0											
	1.5															TD
	3.5			Completed well				SACATS 61-13 for conversion to								TD
	4.0															TD
	3.0			type C188. - ZS-ION on 13/3/2014 at FAKS.												TD
	2.1															TD
	5.9															TD
	3.0							09 TO 33275								TD
	4.5															TD
	4.9							Post C I								TD
	2.5															TD
	1.6															TD
	5.4															TD
	1.4															TD
	1.9															TD
	5.2															TD
	0.5															TD
	0.3															TD
	7.2															TD
	6.															TD
	7.1															TD
	6.7															TD
	7.7															TD
	8.8															TD
																TD
128.7	253.2			4.9	5.0											
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)



LOGBOOK

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
DATE (DD/MM/YYYY)	Type	Registration Marks	Pilot or Pilot in Command	Details of flight and remarks	Instrument Time				Instructor			FSTD ACTUAL TIME
					Nav Aids	Place	Actual Time	FSTD Time	SE	ME	FSTD Time	
				Totals brought forward			40.1	3.3				5.3
07-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
08-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
09-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
11-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
11-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
14-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
15-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
16-07-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
05-08-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
07-08-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
17-08-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
29-08-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
15-08-2014	PA32-300	ZS-ECN	Self	FASC - FASC								
03-09-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
04-09-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
11-09-2014	C188	ZS-ION	Self	Raniel - Raniel AG								
Total Flight Time					Hours	Totals	(8)	(9)	(10)	(11)	(12)	(13)



(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Single engine aircraft								Multi engine aircraft								Remarks
Day				Night				Day				Night				
Dual	PIC	PICUS	Co-Pilot	Dual	PIC	PICUS	Co-Pilot	Dual	PIC	PICUS	Co-Pilot	Dual	PIC	PICUS	Co-Pilot	
128.7	256.2			4.9	5.0											
	7.0															TO
	3.5															TO
	5.6															TO
	1.7															TO
	2.0															TO
	1.9															TO
	1.1															TO
	1.6															TO
	1.1															TO
	2.5															TO
	3.7															TO
	3.3															TO
	1.1															
	6.3															10
	4.1															TO
	5.8															TD
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)

Appendix D:

- J S Lugbespuiting Air Operation Certificate (AOC No: CAA/G608D)

OPERATING CERTIFICATE

PART 135

State of the Operator **SOUTH AFRICA**		
Issuing Authority **SOUTH AFRICAN CIVIL AVIATION AUTHORITY**		
AOC No: CAA/G608D	**Certificate #: FO 08787**	**Operator's Address:**
Expiry Date: **11 MAY 2015**	**This is to certify that:** **JOHNIE SMITH LUGBESPUITING CC**	**P.O. Box 10 Frankfort 9830 South Africa**
Main Base of Operation: **20 Human Street Frankfort South Africa**	**Is the holder of air service licence: G608D**	**Telephone:+27 58 813 2500 Fax: +27 58 813 2500 jsl@lantic.net**
The above holder of this certificate has been authorised to operate air service(s) in terms of the above license(s) held in accordance with- *the attached operations specifications; *the provisions of Part 135 of the Civil Aviation Regulations of 2011; *the provisions of the Air Service Licensing Act of 1990 (Act 115/1990) or the International Air Services Licensing Act of 1993 (Act 60/1993), as applicable.		
Date of Issue: **14 MAY 2014**		THABO FISHA SENIOR MANAGER FLIGHT OPERATIONS DEPARTMENT CIVIL AVIATION AUTHORITY
Issued at: **MIDRAND SOUTH AFRICA**	**SIGNATURE**	**NAME AND TITLE**
	SENIOR MANAGER: FLIGHT OPERATIONS	
This certificate and its annex were issued without any alteration or erasure CAA/FOD/AOC0000001526		

SOUTH AFRICAN CIVIL AVIATION AUTHORITY
CAA/FOD/AOC
0000001526

OPERATIONS SPECIFICATIONS
JOHNIE SMITH LUGBESPUITING CC ISSUE 6
ISSUED BY THE SOUTH AFRICAN CIVIL AVIATION AUTHORITY

These Operations Specifications forming part of the Operating Certificate are issued pursuant to Part 135 Subpart 6 of the Civil Aviation Regulations, of 2011.

OPERATIONS SPECIFICATIONS PART 135
Subject to the approved conditions in the Operations Manual

ISSUING AUTHORITY CONTACT DETAILS.
Telephone: +27 11 545 1210: Fax: +27 11 545 1350: E-mail: fishat@caa.co.za

JOHNIE SMITH LUGBESPUITING CC

AOC Certificate #: FO 08787 valid until 11 May 2015

Air Service	Class	License No	A/C Category	Types of Air Service
General Air Service	III	G608D	A3 / A4	G1 / G5

Approved Air Services

G1 – acrobatic operations	G5 – agricultural spraying, seeding and dusting	

Non-Scheduled / General Air Service Operations	Non- scheduled, General Air Service or charter operations as approved may be conducted into any suitable airports provided the facilities and services are adequate for the safe operation of the aircraft. All operations shall be in accordance with the approved operations manual, SACAR and these operations specifications.

Specific Approvals

Nil

Area of operation:

South Africa

Restrictions and Limitations

G1 and G5 operations VMC/day only

Aircraft Approved for Part 135 Operations

ZS-OBR	ZS-ZSA	ZS-PUK	ZS-ION	ZS-AXA					

OPERATIONS SPECIFICATIONS APPROVAL

SIGNATURE	NAME IN BLOCK LETTERS	EFFECTIVE DATE
	THABO FISHA SENIOR MANAGER FLIGHT OPERATIONS DEPARTMENT CIVIL AVIATION AUTHORITY	19/5/14
SENIOR MANAGER: FLIGHT OPERATIONS	OPERATING CERTIFICATE NUMBER: FO 08787 CAA/FOD/OPSPEC0000003698	

1 of 1

SOUTH AFRICAN CIVIL AVIATION AUTHORITY
CAA/FOD/OPSPEC
0000003698

Appendix E:

- Agriculture Training Pilot No: 0272358557

FILE COPY ONLY - NOT A LICENCE

Civil Aviation Authority of South Africa

COMMERCIAL PILOT - AEROPLANE

(2)

Licence:
Last Name:
First Names:
ID Number:
Passport No:

Date of Issue: 18/09/2014
Time of Issue: 02:48:26 P

Issued By:
Licence No: 0272358557

Code		Description	From	To/Exp
		Licence Valid	05/12/2012	04/12/2022
		Medical Expiry Date		31/10/2014
		Instrument	05/12/2013	31/12/2014
		Instructor		
		Flight Test	05/12/2013	31/12/2014
L	A	Aeroplane		
I	I	Instrument Rating (A)	05/12/2013	31/12/2014
FT	SEP	Single Engine Pistion	05/12/2013	31/12/2014
D	N	Night Rating		
1P	C172	Cessna 172 Skyhawk, Cutlass, HawkXP, Reims Ro		
1P	C182	Cessna 182, Skylane		
1P	C188	Cessna Agwagon/Agtruck/Aghusky		
1P	C210	Cessna 210		
1P	P28A	Piper PA-28/140/150/151/160/161/180/181		
1P	PA25	Piper PA-25 Pawnee		
1P	UF10	Samba / Samba XL / UFM-10 Samba		
1P	Z010	Bush Patrol/Baby		

NO MORE INFORMATION

Appendix F:

- Agriculture Rated Supervision Pilot No: 0271007734

FILE COPY ONLY - NOT A LICENCE

Civil Aviation Authority of South Africa

COMMERCIAL PILOT - AEROPLANE

Licence: 0271007734
Last Name:
First Name:
ID Number:
Passport No:

Date of Issue: 18/02/2003
Time of Issue: 09:39:29 A
Issued By:
Licence No: 0271007734

Code		Description	From	To/Exp
		Licence Valid	12/08/2008	11/08/2018
		Medical Expiry Date		30/04/2017
		Instrument	12/08/2008	31/08/2009
		Instructor		
		Flight Test	03/05/2016	31/05/2017
L	A	Aeroplane		
I	I	Instrument Rating (A)	12/08/2008	31/08/2009
FT	SEP	Single Engine Piston	03/05/2016	31/05/2017
[redacted]	AR	Agricultural Pilot Rating		
D	N	Night Rating		
FT	MEP	Multi Engine Piston	03/05/2016	31/05/2017
1P	AT3P	Air Tractor 300/301/401		
1P	AT5T	Air Tractor 502/503/504 Turbine		02/02/2007
1P	BE58	Beech Baron 58		
1P	BL30	Bellanca Decathlon		
1P	C150	Cessna 150		
1P	C172	Cessna 172 Skyhawk, Cutlass, HawkXP, Reims Rocket		
1P	C208	Cessna 208 Caravan		
1P	C210	Cessna 210		
1P	C72R	Cessna 172 RG Cutlass RG		
1P	C82R	Cessna R182/TR182 (turbo) Skylane RG		
[redacted]	MO20	Mooney M-20		
1P	P28A	Piper PA-28/140/150/151/160/161/180/181		
1P	P28R	Piper PA-28R-180/200/201/Arrow2/3, Turbo Arrow		
1P	P750	750 XL		
1P	RV8	Van's RV-8		
1P	Z233	Cubby		

NO MORE INFORMATION

05/10/2016 09:39:35 AM

Page 1 of 1

Appendix G:

- J S Lugbespuiting Flight Operations Manual

(c) have the authority to disembark any part of the cargo, which in his opinion, may represent a potential hazard to the safety of the aeroplane;

(d) ensure that all Air Crew and Ground Crew are briefed on the location of emergency exits and the location and use of relevant safety and emergency equipment;

(e) ensure that all operational procedures and checklists are complied with, in accordance with Operations Manual;

(f) ensure that the weather forecast and reports for the proposed operating area and flight duration indicate that the flight may be conducted without infringing any minima as stated in the Operations Manual;

(g) decide whether or not to accept an aeroplane with unserviceabilities;

(h) take all reasonable steps to ensure that the aeroplane, and any required equipment is serviceable;

(i) in the absence of qualified person or engineer, ensure that the refuelling is supervised with particular attention being paid to:

* the correct grade and the amount of fuel;
* fuel water checks;
* fire safety precautions;
* checking filler caps for security and correct replacement after refuelling;

(j) take all reasonable steps to ensure that the aeroplane mass and balance is within the calculated limits for the operating conditions;

(k) confirm that the aeroplane's performance will enable it to complete safely the proposed flight;

(l) ensure that all documents and manuals as specified in this Flight Operations Manual are carried and the will remain valid throughout the flight or series of flights;

(m) ensure that the pre-flight inspection has been carried out;

(n) maintain a high standard of discipline, conduct and appearance as a representative of **JOHNIE SMITH LUGBESPUITING**;

(o) in an emergency situation that requires immediate decision and action, take any action he considers necessary under the circumstances. In such cases he may deviate from rules, operational procedures, and methods in the interest of safety;

(p) the PIC has the authority to apply greater safety margins, including aerodrome operating minima, if he deems it necessary;

(q) the PIC must ensure that should maintenance be required whilst away from base that the Responsible Person: Aircraft, be contacted for advice;

(r) the PIC shall ensure that a continuous listening watch is maintained on the appropriate radio frequencies at all times during the various phases of flight.

2.5 **AVIATION SAFETY OFFICER**

Responsibilities:

(a) Ensure that the air service operates in a safe and reliable manner.

(b) Ensure that the operator complies with the provisions of the Civil Aviation Offenses Act, 1972 (Act No. 10 of 1972), as amended, and the Civil Aviation Safety Regulations, 1981, as amended.

(c) Ensure that the provisions of this Operations Manual are fully complied with in respect of Civil Aviation Safety Regulations, as amended.

(d) Ensure that all personnel have the appropriate knowledge, qualifications, skills, experience and training to perform or supervise their assigned duties in respect of civil aviation safety.

(e) Review, in conjunction with the relevant responsible person, this Flight Operations Manual as and when required.

(f) Identify, record and report any safety, or security problems.

(g) Execute in conjunction with the relevant responsible person, audits of the procedures detailed in this operations manual.

(h) Ensure that all or any accidents and/or incidents which might be related to flight safety are reported and that the form as required in terms of this Flight Operations Manual is filled out correctly and is complete and that all the required information has been furnished in the said form.

(i) Implementation and maintenance of an Aviation Safety Management System.

(j) Conduct regular audits on the flight safety in the organisation.

This officer shall furthermore have the authority to:

(i) Stop or prohibit any action or operation which could jeopardise civil aviation safety; and

(ii) Stop or prohibit any action that is unsafe or unreliable.

I, Mr. [ ] *as the Air Service Safety Officer of JOHNIE SMITH LUGBESPUITING CC, hereby acknowledge and accept my duties, responsibilities, authority and accountability as set out in this Section.*

Signature: _____ _____

2.6 AIRCRAFT ENGINEERING AND MAINTENANCE

(a) All aircraft used in providing the air service shall comply with the aircraft engineer/engineering and maintenance provisions of the South African Civil Aviation Regulations Parts 43, 66 and 145; and the Civil Aviation Technical Standards.

(b) All aircraft which are used in providing the air service shall have a valid certificate of airworthiness issued in accordance with the South African Civil Aviation Regulations.

(c) All aircraft which are used in providing the air service shall be inspected, constructed, repaired, overhauled, maintained or modified in accordance with the provisions of the South African Civil Aviation Regulations.

(d) Flight folios and logbooks for aircraft, aircraft engines, aircraft components, aircraft engine components and other specified item or equipment shall be kept, preserved and maintained in accordance with the provisions of the South African Civil Aviation Regulations.

CHAPTER 4

TRAINING

The chapter in this Manual describing the training policy and practices, contains relevant information regarding formal instruction programmes to achieve and maintain risk awareness.

1.1 POLICY IN RESPECT OF NEW INTAKE OF CREW, RECURRENT TRAINING OF CREW AND COMPULSORY FLIGHT TESTING

JOHNIE SMITH LUGBESPUITING shall only employ pilots with a valid Commercial Pilot's Licence (with a minimum of 450 hours total time and 50 hrs application experience), i.e. agriculture pilot's rating and rated on type operated, and be registered as a Pest Control Operator. The Air Service Safety Officer will judge the pilot's skills and proficiency to perform adequately and professionally the task at hand, by, inter alia, reviewing the pilot's track record, CV, references and demonstration of his flying abilities.

Each pilot's performance in the course of daily operation will be visually monitored from the ground every six months by the CHIEF PILOT.

New crew will be allowed a period of familiarization with the aircraft and the **JOHNIE SMITH LUGBESPUITING** operation - which shall include; general flying, steep turns, stalls, low flying, pull-up and descent over obstacles, practice runs, emergency procedures. Thereafter a period of actual duty flying under supervision will be undertaken. The amount of actual flying hours to attain an acceptable level of expertise will be determined by the Air Service Safety Officer taking cognizance of other variable factors, including, the pilot's general aviation experience, talent, learning abilities, willingness, etc.

(a) **JOHNIE SMITH LUGBESPUITING** does not provide any training only familiarization.

(b) All training is out-sourced to SA:CAA approved designated pilots.

(c) Commercial renewals done by G1 Instructors. A brief outline of the training process is however provided. This is simply an outline and should be treated as such. Each Lesson is not intended to portray one hour of flight, but instead should be thought of as progressive steps in the learning process. One lesson may take 30 minutes and the next lesson five or six hours.

1.2 SYLLABUS AS A GUIDE TO LEARNING AG-TASKS

1.2.1 LESSON 1

REVIEW OF BASICS AND COORDINATION

* Straight and Level;
* Climbs and Glides;
* Turns;
* Turn Series;
* Slow Flight;
* Stalls (all);including accelerated stalls;
* Steep Turns; including maximum-rate turns;
* Dutch rolls;

1.2.2 LESSON 2

ADVANCED MANOEUVRES

* Chandelles;
* Lazy 8's;
* Spirals;
* Wing overs;

1.2.3 LESSON 3

TAKE-OFFS AND LANDINGS

* Soft Field;
* Short Field;
* Accuracy Landings;
* Aborted Take-off;
* Cross-wind and down-wind take-offs and landings;
* Wheel and full stall landings;