Republic of the Philippines
DEPARTMENT OF TRANSPORTATION
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES
MIA Road, Pasay City 1300

AIRCRAFT ACCIDENT INVESTIGATION AND INQUIRY BOARD

FINAL REPORT

RP-R2018
THRUSH AIRCRAFT S2R-T34

OPERATOR: AIRWOLF AVIATION CORPORATION.

TYPE OF OPERATION: AGRICULTURAL SPRAYING

DATE OF OCCURRENCE: JUNE 26, 2023

PLACE OF OCCURRENCE: DAPCO AERODROME RUNWAY 36, PANABO, DAVAO DEL NORTE, PHILIPPINES

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(Thrush Aircraft S2R-T34, RP-R2018 Final Report)

FOREWORD

This report was produced by the Aircraft Accident Investigation and Inquiry Board (AAIIB), Civil Aviation Authority of the Philippines, MIA Road, Pasay City, Philippines.

The report is based upon the investigation carried out by the AAIIB in accordance with Annex 13 to the Convention on International Civil Aviation, Republic Act 9497 Section 42, and Philippine Civil Aviation Regulation Part 13.

Readers are advised that the AAIIB investigates for the sole purpose of enhancing aviation safety. Consequently, AAIIB reports are confined to matters of safety significance and may be misleading if used for any other purpose. It should be noted that the information in AAIIB reports and recommendations is provided to promote aviation safety, and in no case is it intended to imply blame or liability.

Furthermore, no part of the AAIIB report or reports relating to any accident or investigation shall be admitted as evidence or used in any suit or action for damages arising out of any matter mentioned in such report or reports.

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FINAL REPORT

TITLE: Serious incident involving a Thrush S2R-T34 type of aircraft with Registry Number RP-R2018, operated by Airwolf Aviation Corporation had a runway excursion upon landing at Runway 36 of Dapco Airstrip, Panabo, Davao del Norte, Philippines on June 26, 2023, at around 0728H.

Notification of Occurrence to National Authority

The serious incident was reported by the Operator to the CAAP AAIIB on June 26, 2023.

Identification of the Investigation Authority

The Aircraft Accident Investigation and Inquiry Board (AAIIB), the mandated accident investigation organization within the Civil Aviation Authority of the Philippines (CAAP) as the state of Occurrence/Registry/Operator conducted the investigation.

Organization of the Investigation

In accordance with the provisions of Philippine Civil Aviation Regulation (PCAR) Part 13, an Investigator-In-Charge was appointed.

Authority Releasing the Report

The Final Investigation Report was released by Aircraft Accident Investigation and Inquiry Board (AAIIB) and published on the CAAP website on **31 May 2024.**

Synopsis:

On or about 0728H on June 26, 2023, a Thrush S2R-T34 aircraft with registration number RP-R2018, operated by Airwolf Aviation Corporation, experienced a runway excursion incident upon landing on Runway 36 of the Dapco Airstrip located in Panabo, Davao del Norte, Philippines. The aircraft took off at around 0531H, and the flight was uneventful from its first (1st) to its fifth take-off until the incident occurred during its fifth landing. The pilot exited the aircraft without any reported injuries, while the aircraft sustained minor damage. The investigation determined that the probable cause of this serious incident was the pilot's failure to maintain directional control of the aircraft after landing, attributed to insufficient training and the unavailability of the standard checklist during flight.

LIST OF ACRONYMS AND ABBREVIATIONS

AAIIB	:	Aircraft Accident Investigation and Inquiry Board
AMT	:	Aircraft Maintenance Technician
CAAP	:	Civil Aviation Authority of the Philippines
CoA	:	Certificate of Airworthiness
CPL	:	Commercial Pilot License
EQC	:	Equipment Qualification Course
FSIS	:	Flight Standards Inspectorate Service
OFSAM	:	Office of the Flight Surgeon and Aviation Medicine
PCAR	:	Philippine Civil Aviation Regulations
PTO	:	Permit-To-Operate
UTC	:	Coordinated Universal Time
VFR	:	Visual Flight Rules
VMC	:	Visual Meteorological Condition

1. FACTUAL INFORMATION

Aircraft Registration No.	:	RP- R2018
Aircraft Type/Model	:	Thrush Aircraft S2R-T34
Operator	:	Airwolf Aviation Corporation
Address of Operator	:	Doña Socorro St., Belisario Heights, Lanang, Davao City, Philippines
Place of Occurrence	:	Dapco Aerodrome Runway 36, Panabo, Davao Del Norte, Philippines
Date/Time of Occurrence	:	June 26, 2023 at about 0728H/2328 UTC
Type of Operation	:	Agricultural Spraying
Phase of Flight	:	Landing
Type of Occurrence	:	Runway side excursion

1.1 History of Flight

On or about 0728H of June 26, 2023, a Thrush S2R-T34 aircraft with registration number RP-R2018, operated by Airwolf Aviation Corporation, experienced a runway excursion incident upon landing on Runway 36 of the Dapco Airstrip. Only the pilot was on board the aircraft when the incident happened.

The flight took off from Dapco Aerodrome at around 0531H for its first agricultural spraying activity of the day within the nearby banana farms. The pilot has scheduled nine (9) spraying sorties for that day. The flight was uneventful from its first (1st) to its fifth take-off (5th) until the incident happened on its fifth (5th) landing. The aircraft touched down a few meters beyond the threshold of Runway 36. The plane rolled normally until it began to drift to the right side of the runway centerline. The pilot used the rudder to bring the aircraft back to the runway center, but it was ineffective. The plane continued to roll and collided with a concrete perimeter fence post on the runway's side. The propeller struck the concrete post, causing significant damage.

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1.2 Injuries to Person (s)

Injuries	Crew	Passengers	Others	TOTAL
Fatal	0	0	0	0
Serious	0	0	0	0
Minor	0	0	0	0
None	1	0	0	1

1.3 Damage to Aircraft

The aircraft incurred minor damage (Figure 1).

Figure 1 – Bended propeller due to propeller strike.

1.4 Other Damages

One (1) perimeter fence concrete post was damage due to contact with the aircraft propeller.

1.5 Personnel Information

1.5.1 Pilot

Gender	:	Male
Date of Birth	:	November 17, 1984
Nationality	:	Filipino
License	:	106031 CPL valid until October 31, 2023
Type rating	:	Single Engine Land - C172, AgCat G164A 450HP/600HP, S2RT, Instrument
Medical Certificate	:	Class 1 valid until May 20, 2024
Date of last medical	:	May 20, 2023
Total flying time	:	1,900 + 00 Hours

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Total flying time on type : 52 + 00 Hours

1.6 Aircraft Information

The Thrush S2R-T34 is an agricultural aircraft primarily used for crop dusting and spraying operations. Developed by Thrush Aircraft, it is part of the Thrush S2R series, which has a long history in the agricultural aviation industry.

The design of the Thrush S2R-T34 is centered around its ability to efficiently and effectively apply various agricultural chemicals, fertilizers, and pesticides to crops. It features a rugged airframe constructed from aluminum alloys, designed to withstand the rigors of low-level flying and repeated takeoffs and landings in agricultural fields.

Powered by a Pratt & Whitney Canada PT6A turboprop engine, the S2R-T34 is known for its reliability, performance, and fuel efficiency. The engine drives a large-diameter propeller optimized for low-speed, high-thrust operation, allowing the aircraft to operate effectively at the low airspeeds required for crop spraying.

The aircraft is equipped with a hopper for carrying chemical payloads, as well as specialized spraying equipment such as booms, nozzles, and pumps. These components are carefully integrated into the aircraft's design to ensure optimal weight distribution, aerodynamic performance, and ease of operation for the pilot. With its high payload capacity, maneuverability, and ability to operate from short, unimproved airstrips, the Thrush S2R-T34 is a versatile and valuable tool for agricultural operations around the world.

1.6.1 Aircraft Data

Registration Mark	:	RP-R2018
Manufacturer	:	Thrush Aircraft, Inc.
Country of Manufacturer	:	United States of America
Type/Model	:	S2R-T34
Operator (Lessee)	:	Airwolf Aviation Corporation
Serial No.	:	T34-437DC
Year of Manufacture	:	2016
Certificate of Airworthiness	:	Valid until October 03, 2023
Certificate of Registration	:	Valid until August 19, 2027
Category	:	Restricted
Gross Weight	:	10,500 lbs.
Number of Flight Crew	:	1
Number of Passenger	:	1
Airframe total time	:	3,961 + 00 Hours as of January 26, 2023

1.6.2 Engine Data

Manufacturer	:	Pratt and Whitney
Type	:	Turboprop
Model	:	PT6A-34AG
Engine Serial No.	:	PCE-PH1083
Engine TBO	:	4,000 Hours
Engine TSO	:	3,404 + 00 Hours since last C of A

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Engine Total Time	:	3,404 + 00 Hours since last C of A

1.6.3 Propeller Data

Manufacturer	:	Hartzell Prop. Inc.
Type	:	Constant Speed, Variable Pitch
Model	:	HC-B3TN-3D
Propeller Serial No.	:	BUA34889
Date last Installed	:	April 20, 2022
Propeller TBO	:	3,000 Hours
Propeller TSO	:	302 + 00 Hours since last C of A
Propeller total time	:	1,881 + 00 Hours since last C of A

1.7 Meteorological Information

Visual Meteorological Conditions (VMC) prevailed at the time of the occurrence.

1.8 Aids to Navigation

The flight departed under VFR. Using VFR, the pilot must be able to operate the aircraft with visual references to the ground and visually avoiding obstructions and other aircraft.

1.9 Communications

The aircraft is equipped with a standard radio transceiver. Communications were carried out between the pilot and the plantation's operations personnel overseeing the spraying activity.

1.10 Aerodrome Information

Dapco Aerodrome is a private airstrip located in Dapco, Panabo City, Davao del Norte, Philippines. It is operated jointly by Dole-Stanfilco and Airwolf Aviation Corp. The aerodrome holds a valid Aerodrome Permit-To-Operate (PTO) issued by the Civil Aviation Authority of the Philippines (CAAP) dated January 12, 2015. Operations at the airstrip are restricted solely to agricultural spray aeroplanes certified by the CAAP FSIS.

1.11 Flight Recorders

The aircraft is not equipped with any flight recorders, and existing Philippine Civil Aviation Regulation (PCAR) does not require it to be installed for that type of aircraft.

1.12 Wreckage and Impact Information

The aircraft final resting point was recorded at coordinates 7º 22' 51.3" N, 125º 35' 15.4" E and with a final heading of 117º. The location is approximately 285 meters from the threshold

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of runway 36.
Based on observed tire marks, the aircraft exited the runway around 231 meters from the threshold.

Further inspection of the incident site revealed the following:

a. Evidence of some braking actions can be observed on the paved portion of the runway and on the soft ground located on its right-hand side;

b. The only notable damage on the aircraft was the bent propeller blades that struck the concrete perimeter fence post located on the right-hand side of the runway strip.

Figure 2 – Location of the aircraft from runway 36 threshold area.

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Figure 3 – Evidence of tire skid marks on the soft ground adjacent the runway.

Figure 4 – The aircraft at its final stopping point.

1.13 Medical and Pathological Information

The pilot involved underwent the required post-incident medical check-up at the local hospital in Davao, including the drug and alcohol test. The results were then endorsed to the CAAP Office of the Flight Surgeon and Aviation Medicine (OFSAM) and later cleared by the said office.

1.14 Fire

Inspection of the aircraft revealed no evidence of a post-crash fire.

1.15 Search and Survival Aspects

The incident was survivable, as the aircraft was completely intact after the occurrence. The pilot was able to immediately get out of the aircraft, and company personnel were able to respond immediately to assist the subject.

1.16 Organizational and Management Information

Airwolf Aviation Corporation is a holder of a CAAP-issued Agricultural Aircraft Operator Certificate No. 11-2010002, issued on September 22, 2022 and valid until September 21, 2027. The company's primary base of operation is located at Dapco Aerodrome, Panabo, Davao del Norte, Philippines and with a registered head office at Doña Socorro St., Belisario Heights, Lanang, Davao City, Philippines. The company is engaged in domestic non-scheduled agricultural spraying services, primarily catering to requirements of Dole-Stanfilco.

Moreover, the company's approved Operations Specifications listed RP-R2018, RP-R2808

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and RP-R2809 aircraft as part of its operating fleet, supporting its day-to-day operations.

2. ANALYSIS

2.1 Pilot

2.1.1 Trainings and Qualifications

A review was made of the available pilot's records and was able to establish the following:

a. The pilot involved has been flying agricultural spraying aircraft since CY 2018, using AgCat type aircraft, and only began flying turboprop Thrush S2R-T34 aircraft in CY 2023. On record, he accumulated around 1,600+00 hours flying the AgCat type of aircraft;

b. For the Thrush S2R-T34 aircraft, he finished his Equipment Qualification Course (EQC) on January 26, 2023, under a CAAP-approved in-house instructor. He began his flight training on the same aircraft type with a CAAP approved in-house Flight Instructor from April 12-24, 2023. He then passed his check ride with a CAAP designated checker on May 23, 2023, to obtain an additional rating for this aircraft type.

c. At the time of the incident, he had logged approximately 50+00 hours of flying experience on an S2R-T34 type, which includes his observer and actual training with a flight instructor;

d. Part of his training on an S2R-T34 involved conducting simulated spraying activities using water, during which he accumulated approximately twelve (12+00) hours of flying time;

e. The pilot has accumulated around 60-70 touch-and-go/stop-and go flight in an S2R-T34 type as part also of his training on the involved aircraft;

2.1.2 Flight/Duty Schedule

During the interview with the subject pilot and based on other gathered details, such as his plotted and actual duty schedule, it was found that the pilot has no present physical limitations and was reported to be properly rested when assuming flying duties. On the day of the incident, the subject reported for work in a fitting condition to carry out his pilot responsibilities effectively and safely.

2.2 Aircraft Status

2.2.1 Pre-Flight Inspection

The pilot and maintenance personnel assigned to RP-R2018 on June 26, 2023, stated that they conducted the required pre-flight inspection on the aircraft before its first sortie that

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morning. There was nothing unusual found on the aircraft, and everything was normal even after the aircraft completed its fifth (5th) take-off prior to its landing incident.

Further checking of records revealed that the maintenance personnel who conducted the pre-flight inspection had an Aviation Maintenance Technician (AMT) license issued by the CAAP on August 12, 2020, and valid until August 11, 2025.

2.2.2 Maintenance Records

A review of the aircraft documents revealed that there were no recorded discrepancies on the subject or any pending maintenance actions that may have been attributed to the occurrence on June 26, 2023. Likewise, all required maintenance documentation on the aircraft is available and found to be all in order.

2.3 Fifth (5th) Landing - June 26, 2023

During the interview, the pilot stated that this was his first revenue flight and that he began his scheduled nine (9) spraying assignments without encountering any issues. After completing his fifth (5th) sortie, he flew back to the Dapco airstrip to land and prepare for his next round of spraying. Upon landing, the aircraft touched down with its main landing gears, followed by its tail wheel. Once the aircraft started to roll and everything was stabilized, he engaged the thrust reversers and set the power to idle to slow down the aircraft. It was then that he noticed the aircraft veering to the right side of the runway, heading towards the soft ground.

The pilot immediately tried to correct the course by applying rudder correction and differential braking, but the aircraft remained on the soft ground. He subsequently applied full brakes and locked the tail wheel to prevent a possible ground loop, but the aircraft did not stop and continued to skid. Despite re-engaging the thrust reversers, applying full brakes, engaging the parking brakes, and setting the flaps to full, the aircraft only stopped when it hit the concrete post of the perimeter fence located at the side of the runway strip.

At the incident site, investigators noted tire marks indicating that the brakes were applied when the aircraft began to veer. However, the number of marks did not confirm that the brakes were applied repeatedly or consistently, as the pilot mentioned during his interview. There were only about two instances of significant tire pressure marks on the ground, indicating braking action along the aircraft's path.

Based on the aforementioned information, it appears that the pilot primarily relied on the rudder control when attempting to return the aircraft to the runway centerline and did not apply sufficient braking action to further slow down and stop the aircraft. When asked about the aircraft's speed as it veered towards the right-hand side of the runway, he estimated it to be approximately 20 knots, which is much lower than the published effectiveness of the rudder control, which is around 27 knots. This suggests that the pilot still requires additional experience and skill to effectively manage this type of aircraft in similar situations. The pilot's statement further supported this finding, indicating that he still struggles to maintain a smooth control flow in the cockpit. Likewise, he added that during training, one of the significant comments he had received from his FI was to further improve his quickness on the rudder control, as this was one of the major adjustments required in his transition from a much faster

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and more powerful type of aircraft.

Furthermore, it was found that the checklist available inside the aircraft was incomplete and lacked the necessary items related to landing procedures. It was also noted that the pilot typically chose to memorize the procedures rather than using the checklist. In situations where they needed to refer to the checklist, they relied on a non-standard, simplified version saved on their cellphones.

3. CONCLUSIONS

3.1 Findings

3.1.1 The involved pilot is a holder of a valid pilot license and medical certificate issued by the CAAP.

3.1.2 The pilot holds the appropriate rating to perform his functions for that specific type of aircraft.

3.1.3 The aircraft has valid Certificates of Airworthiness and Registration.

3.1.4 The aircraft was released for flight without any recorded maintenance issues. Likewise, documentation of the aircraft maintenance is available and in proper order.

3.1.5 The pilot is still in the process of familiarizing himself with the aircraft's operations.

3.1.6 Pilots are not using the standard checklist during flight.

3.2 Probable Cause

3.2.1 Primary Cause Factors

a. The pilot's failure to maintain directional control of the aircraft resulted in a runway excursion.

3.2.2 Contributory Cause Factor

a. Insufficient training of the involved pilot.

b. Unavailability and non-utilization of the standard checklist during flight.

4. SAFETY RECOMMENDATIONS

4.1 As a result of the investigation, the AAIIB proposed the following safety recommendations to the **CAAP-FSIS**:

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a. To ensure that the operator makes available all the required standard checklist for each aircraft and reiterate its utilization to all concerned pilots.

5. SAFETY ACTIONS

5.1 Following this occurrence, Airwolf Aviation Corp. initiated the following safety corrective actions on the issue regarding the proficiency of the involved pilot:

a. Conducted additional 15+00 hours flight training to the involved pilot from December 08, 2023 and completed last March 15, 2024. (Reference: Airwolf Aviation Corp. Quality Assurance Officer letter dated April 25, 2024)

b. Pilot Proficiency Flight Test conducted by a CAAP designated check airman last September 16, 2023. (Reference: CAAP Pilot Proficiency Flight Test Report No. 0023506 dated September 16, 2023)

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