TITLE

GENERAL INFORMATION:

Name of Operator:	Air Services Limited
Aircraft Manufacturer:	Thrush Aircraft Inc. Georgia, USA
Aircraft Model:	S2R-T34
Nationality and Registration Marks:	8R-AAG
Place of Accident/Region:	Bath Settlement Airstrip(SYBS) Region5, Guyana – 06 22 34.27N 057 36 25.10W
Date of Accident:	30th July 2016
Time of Accident:	12:23hrs UTC

Incident No. GAAIU: 3/1/11

This investigation was conducted in accordance with ICAO Annex 13 and therefore, it is not intended to apportion blame, or to assess individual or collective liability. Its sole objective is to draw lessons from the occurrence which may help to prevent future accidents. Consequently, the use of this report for any purpose other than for the prevention of future accidents could lead to erroneous conclusions.

Note: - All times in this report are Coordinated Universal Time (UTC) unless otherwise stated. UTC is four hours ahead of Guyana Standard Time (GST).

CONTENTS:

GLOSSARY OF ABBREVIATIONS

AIP	-	Aeronautical Information Publication
AMO	-	Approved Maintenance Organisation
AOC	-	Air Operator Certificate
AMEL	-	Aircraft Maintenance Engineering Licence
AMO	-	Approved Maintenance Organisation
ASL	-	Air Services Limited
CPL	-	Commercial Pilot Licence
EFCIA	-	Eugene F. Correia International Airport
GAAIU	-	Guyana Aircraft Accident and Incident Investigation Unit
GCAA	-	Guyana Civil Aviation Authority
GUYSUCO	-	Guyana Sugar Corporation (Aircraft Department)
ICAO	-	International Civil Aviation Organisation
MEL	-	Minimum Equipment List
RWY	-	Runway
S/N	-	Serial Number
Sta.	-	Station
TBO	-	Time before Overhaul
TSN	-	Time since New
TSO	-	Time since Overhaul
VMC	-	Visual Meteorological Conditions

Synopsis:

During the landing roll, the aircraft started to drift left of the imaginary centerline of the narrow runway. An attempt was made to correct the aircraft to bring it back to the center of the runway, by using full right rudder and some brake input. This was unsuccessful, so the tail wheel was unlocked. The aircraft swerved sharply to the right and ran off the runway.

The pilot, the only occupant of the aircraft, was not injured.

The aircraft's propeller and engine were damaged.

There was no fire.

1. Factual Information

1.1. History of the Flight

The aircraft departed from the company base at the Eugene F. Correia International Airport (EFCIA) for Bath Settlement Airstrip (SYBS), on 30th July 2016. The aircraft was being positioned to carry out a series of crop-dusting operations, on rice fields in the vicinity of the airstrip.

At the time of the occurrence the aircraft was in its landing roll. After the aircraft landed and with all three wheels on the ground, it drifted to the left. An attempt was made to correct the direction by using a combination of right rudder and right brake, but the aircraft did not respond to these inputs. The tail wheel was then unlocked, and the aircraft swerved sharply to the right. Despite application of brakes and reverse thrust, the aircraft continued to the right and ran off the runway. It came to a stop 953ft from the end of the runway at a 90°angle to it, at the edge of a trench that was on the right side of RWY08.

1.2. Injuries to Persons

Table: 1- Showing Injuries to Persons

Injury	Crew	Passengers	Others	Total
Fatal	0	0	0	**0**
Serious	0	0	0	**0**
Minor/None	1	0	0	**1**
Total	**1**	**0**	**0**	**1**

The pilot was the sole occupant of the aircraft.

1.3. Damage to aircraft

The aircraft suffered a prop-strike and the three blades of the propeller were twisted inwards at the tip. The nose of the aircraft was badly damaged.

The propeller was sent to a repair station for inspection and possible overhaul. It was however reported that the propeller was unsafe to disassemble due to instability of the spring assembly. The propeller was considered to be damaged beyond repair.

The engine was sent to an aircraft engine maintenance, repair and overhaul facility where it was determined that several components of the engine including the exhaust duct, the baffle assembly, disk assembly, the PT-shaft housing, small exit duct assembly, CT disk assembly, 1st stage compressor rotor assembly, compressor centrifugal impeller and its housing were all damaged.

1.4. Other Damage

There was no other damage.

1.5 Personnel Information - Pilot

Gender:	Male
Date of Birth/Age:	7th November 1974/42 years
Nationality:	Guyanese
License:	Guyana CPL #240
Date of issue:	9th December 1999.
Date of last medical:	3rd May 2016
Valid until:	30th November 2016
Aircraft type rating:	Piper-Pa34, C185, Thrush Commander-S2R, Turbo Thrush-S2R HG-T34, C208, BN2-Islander.
Last Proficiency Check on Type:	14th July 2015.
Total hours:	10000hrs
Total Hours on Type:	4000hrs (approx.)
Hours in last 30days:	86hrs
Hours in last 7 days:	7hrs
Hours in last 24 hours:	3:17Hrs

There are no limitations on the pilot's Class 1 Medical Certificate.

The pilot flies this aircraft type for two companies. Air Services Ltd and the Guyana Sugar Corporation Aircraft Department (GUYSUCO). His GUYSUCO flying time is given to ASL who keeps the records in a computerized system. This allows him to monitor his flying time. Although ASL is now getting into this type of flying, they maintain more documentation than GUYSUCO. This is because the ASL operations are commercial while the GUYSUCO operations are private.

1.6 Aircraft Information

1.6.1 General

Manufacturer:	Thrush Aircraft Inc.
Year of Manufacture:	2010
Aircraft Model:	S2R-T34
Aircraft S/N:	T34-337
Certificate of Registration:	Issued – 26th November 2014.
Certificate of Airworthiness:	Valid until 27th March 2017
Total Airframe Hours:	1232:5hrs
Maximum Take-off Weight:	6000lbs
Last Scheduled Inspection:	50hrs
Time since last Inspection:	36:09hrs
Next Inspection Due:	100hrs
Engine Model:	PT6A-34AG
Engine S/N:	PCE-PH0585
Engine TSN:	1232:5hrs
Engine TSO:	N/A
Cycle Data:	CSN:1526 cycles
Propeller Type:	Hartzell HC-B3TN-3D/T10282N+4
Propeller S/N:	BUA31370
Propeller TSN:	1232:5hrs
Fuel Type:	AVGAS 100LL

The Turbo Thrush S2R-T34 is a single-seater, agricultural aircraft, equipped with a PT6A-34AG engine. It has a tail dragger tricycle landing gear, with a free-castering tailwheel when it is unlocked. On the ground, the aircraft is steered by rudder control and brakes.

1.6.2. Maintenance

Examination of the aircraft maintenance records indicates that there were no outstanding maintenance issues. All required and scheduled maintenance had been performed and all Airworthiness Directives had been complied with. There were no outstanding MEL items on the aircraft.

1.6.3. Mass and Balance

There was no load on the aircraft.

1.7 Meteorological Information

The weather reported at the time of the occurrence by the pilot was – Wind 190/08, visibility – unlimited, with clear skies. The accident occurred in the morning, during daylight hours

1.8 Aids to Navigation

Not applicable.

1.9 Communications

Communication with the Air Traffic Services was satisfactory throughout the flight.

1.10 Aerodrome Information

The following information, pertinent to the Bath Settlement Airstrip, was taken from the Guyana Aeronautical Information Publication.

Aerodrome Identification:	SYBS
Coordinates:	06 22 34.27N 057 36 25.10W
Elevation:	0 ft.
Runway orientation:	08/26
Runway length:	2400ft
Runway width:	40ft

The airstrip is located in Region No.5 in the eastern coastal area of Guyana.

The measured length of the runway is 2100ft and the width is 36ft. Two-thirds, (1400ft) of the surface is finished with concrete and the remaining 700ft has a dirt and grass surface. The unpaved portion is not properly prepared for aircraft operations, as it has several undulations and loose stones on it. Thus, aircraft operations are largely restricted to the paved portion of the runway. The approach to the runway is free of obstacles. The runway is equipped with a windsock.

The runway strip is not properly prepared for aircraft operations and there are trenches immediately adjacent, along both sides of the runway strip.

The airstrip is mostly used to facilitate agricultural/crop dusting activities such as seeding, fertilizing and spraying of adjacent rice fields.

1.11 Flight Recorders

This aircraft is not required by regulation to be equipped with a flight recorder.

1.12 Wreckage and Impact Information

During the landing roll, the aircraft veered right, off the runway and stopped 253ft from the end of the concrete portion of the runway, and at the edge of the trench on the right of the runway. The tail wheel was 3ft off the runway and the engine and propeller were over the water. The tips of the propeller were twisted and the right wing tip had mud.

Picture showing final position of aircraft and damage to propellers

1.13 Medical and Pathological Information

The pilot was not subjected to any medical or pathological tests.

1.14 Fire

There was no fire.

1.15 Survival Aspects

The cabin and the cockpit of the aircraft remained intact after the accident. The pilot's seat harness and seat belt were intact.

1.16 Tests and Research

No special tests or research were carried out.

1.17 Organisational and Management Information

Air Services Ltd (ASL) is one of the oldest aircraft operators in Guyana. It is also the largest operator, with a fleet of twenty-five aircraft comprising Cessna single engine variants, BN2A Islanders, Thrush Commanders (crop dusters), Pipers and various helicopters.

The company acquired its Guyana Air Operator Certificate No. 001 from the Guyana Civil Aviation Authority in 2002. This AOC allows the company to do domestic scheduled and charter, passenger and cargo operations. The company also has an Aerial Application Certificate which permits it to conduct aerial work. The management structure includes the Accountable Manager, the Director of Operations, the Chief Pilot and the Safety Manager.

The company carries out its own maintenance and acquired an Approved Maintenance Organisation certificate No.003 issued by the GCAA in 2003.

1.18 Additional Information

The aircraft made a straight in approach to the runway. It did not overfly the runway as is required.

Although the airstrip is equipped with a windsock, the pilot stated that he judged the wind direction by the presence of smoke in the vicinity of the runway. The windsock was not visible to the pilot while conducting this straight in approach.

When the aircraft is on the ground, with its tail wheel locked, it would keep the aircraft straight in line with its longitudinal axis.

The pilot stated that he landed on the center line of the runway and near to the runway orientation marks. He had used brakes and reverse thrust on landing, but this did not stop the aircraft. The aircraft's engine was still running, when it eventually came to a stop more than 1000ft from the threshold. He stated that the

aircraft can be stopped within a distance of one thousand feet with brakes and reverse thrust after touchdown.

The pilot was asked to explain, if the aircraft touched down in the center of the runway, why it started to drift to the left. He speculated that there was the possibility that the tail wheel may have been misaligned. He did not notice the misaligned tail wheel during his pre-flight inspection nor did he mention this possibility to the engineers.

He explained that his initial training on the aircraft was done on a tandem seater aircraft, so he had an instructor on board. But after then all checks were done with him alone in the aircraft and a check pilot observing from the ground. After his initial training he never went back to the school for refresher training nor was he given simulator training. He agreed that simulator/refresher training would be beneficial. He stated that he does not fly slow/close to the stall speed but keeps it at a speed that is comfortable for him.

He stated that he normally does about seven landings per day. Each flight last about 45 minutes. He does not feel stressed by the operation as the hours are not excessive. He is not regularly rostered to fly any other aircraft type. He flies about 50hrs per month. The nature of agricultural flying is influenced by the time of day and weather, so he does not find it difficult.

1.19. Useful or Effective Investigation Techniques

No special investigation techniques were used.

2. Analysis

2.1. The Pilot

The pilot is 42 years old. He obtained his Guyana CPL #240 in 1999. He is properly qualified for the flight. There was no evidence of any pre-existing medical or behavioural conditions which may have adversely affected the pilot's performance during this flight.

The pilot was familiar with the airstrip, having operated there regularly for several years. Thus, he was aware of the existing limitations, of length and width, of the airstrip. He neglected to adhere to the requirement to overfly the runway before landing to check the surface conditions and prevailing winds.

2.2. The Aircraft

2.2.1. Maintenance

The aircraft has a Certificate of Airworthiness which is valid until 27th March 2017. Records indicate that the aircraft was being maintained in accordance with the approved maintenance schedule. There were no noted defects or deferred maintenance items from the previous flight.

2.2.2. Mass and Balance

The pilot was the sole occupant of the aircraft. It was not loaded for operations.

2.3. The Airstrip

The narrowness of the runway, along with the poor condition of the strip and the presence of the trenches along both sides of the strip, contributed to the damage sustained by the aircraft.

2.4. The Weather

This accident occurred during the morning. At the time of the accident, it was reported that there was bright sunshine and clear skies at the airstrip, wind was reported as 190/08, ceiling and visibility ok. For a landing on RWY 08, a wind component of 190/08 is in

fact a quartering tail wind, which presents directional control challenges for a pilot after touchdown. Furthermore, the higher ground speed extends the ground roll after touchdown.

2.5. The Landing

The aircraft made a straight-in approach to land on Runway 08. The pilot did not observe the required procedure to overfly the runway when approaching to land at uncontrolled airstrips. This procedure allows the pilot to observe conditions on the runway and to make a proper assessment of the wind before attempting the landing.

Although the airstrip is equipped with a windsock, by not overflying the runway, the pilot could not make a proper assessment of the wind speed and direction. With a right quartering tail wind, it is not unexpected that the aircraft would drift to the left when it touched down.

In an effort to regain directional control, the pilot admitted that he used full right rudder and right brake, but still the aircraft continued to the left. He therefore decided to unlock the tail wheel and immediately the aircraft responded as it was commanded by turning sharply to the right and ran off the runway, ending up 90° to the runway. It is necessary, before unlocking the tail wheel, to reduce the rudder input to the amount required to regain directional control. The Airplane Flight Manual warns that care should be taken not to unlock the tail wheel prematurely, since a cross wind or the initiation of a turn could cause loss of control. The difficulty of taxying a tail dragger with the tail wheel unlocked was noted.

2.5. Survival Aspects

The aircraft is equipped with both harness and lap seatbelts. These functioned satisfactorily.

2.6. The Company

Air Services Ltd is a commercial aircraft operator that holds Guyana Air Operator Certificate # 001. It operates a wide variety of aircraft types. It is primarily a domestic charter operator, with operations from its base at the EFCIA. The company operates a variety of aircraft including BN2A Islanders, Cessna Single Engine Variants, Turbo Thrush Commanders and helicopters. Management positions are held by persons who are suitably qualified and experienced.

The company also holds Guyana Approved Maintenance Organization Certificate #003. The AMO has the required management, supervisory and line staff to effectively carry out the tasks it undertakes. It utilizes the AMEL system as the basis for maintenance certification. The maintenance facility is co-located with aircraft operations at EFCIA and includes hangar space, offices, and several specialized workshops. Base and line maintenance is done on airframes, engines, avionics, instruments and propellers for aircraft below 5700kg. The company is approved to carry out these tasks on the various aircraft types they own. The company also operates a fuel farm from which it dispenses fuel to its own aircraft.

3. Conclusion

3.1 Cause

The probable cause of this accident was due to an uncontrolled landing roll and efforts to regain control resulted in the aircraft running off the runway.

3.2 Contributory Factors

1. The pilot's failure to make a proper assessment of the wind speed and direction at the airstrip.

2. The pilot's decision to unlock the tail wheel, while holding full right rudder and brake, which resulted in the aircraft responding as commanded and running off the runway.

3.3 Findings

3.3.1. The Pilot

1. The pilot's licence was valid.
2. The pilot was qualified and experienced to carry out the intended operation.
3. The pilot holds Guyana CPL #240 which he obtained in 1999.
4. His current medical is valid until 31st December 2016. He was medically fit to operate the flight.
5. His last APC on type was satisfactorily completed on 14th July 2015.
6. The pilot was familiar with the airstrip conditions, having operated into the airstrip frequently for several years.
7. The pilot failed to observe the requirement to overfly the airstrip before attempting to land.
8. The pilot unlocked the tail wheel during the landing roll, while using right rudder and brake, causing the aircraft to veer right, resulting in the aircraft running off the runway.

3.3.2. The Company

1. The company holds an Aerial Application Certificate and an Approved Maintenance Organisation Certificate.

2. The company is suitably staffed and equipped for its operations.

3.3.3. The Aircraft

1. The aircraft had a valid Certificate of Airworthiness and was maintained in compliance with regulations.
2. There were no outstanding maintenance or MEL issues with the aircraft.

3.3.4. The Weather

The weather at the airstrip at the time of the accident was VMC. There was a quartering tail wind during the landing.

3.3.5. The Airstrip

The runway strip is not properly prepared and this together with the presence of the trenches along both sides of the runway contributed to damages sustained by the aircraft when it ran off the runway. The operator has indicated that they will start improvement works.

4. Safety Recommendations

4.1. The Pilot

The pilot should be required to complete the following: -

1. Revise the Aircraft Flight Manual especially the landing techniques and operation of the tail wheel.
2. Revise how different wind conditions may affect the touchdown and the landing roll of an aircraft.
3. Crew Resource Management refresher training, with emphasis on single crew operations. This must include airmanship, attitude, the need to guard against complacency and the importance of self-discipline, situational awareness, problem solving and decision making.

4.2. The Company

1. The company should consider sending the pilot for refresher simulator training periodically, which will allow him to hone his skill and benefit from professional advice.

4.3. The Airstrip

1. Plans to upgrade the airstrip should be expedited.