

**COMANDO DA AERONÁUTICA**  
**CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE**  
**ACIDENTES AERONÁUTICOS**



**FINAL REPORT**  
**A - 101/CENIPA/2014**

<b>OCCURRENCE:</b>	<b>ACCIDENT</b>
<b>AIRCRAFT:</b>	<b>PR-TKB</b>
<b>MODEL:</b>	<b>ATR-42-500</b>
<b>DATE:</b>	<b>30MAY2014</b>



## NOTICE

*According to the Law n° 7565, dated 19 December 1986, the Aeronautical Accident Investigation and Prevention System – SIPAER – is responsible for the planning, guidance, coordination and execution of the activities of investigation and prevention of aeronautical accidents.*

*The elaboration of this Final Report was conducted taking into account the contributing factors and hypotheses raised. The report is, therefore, a technical document which reflects the result obtained by SIPAER regarding the circumstances that contributed or may have contributed to triggering this occurrence.*

*The document does not focus on quantifying the degree of contribution of the different factors, including the individual, psychosocial or organizational variables that conditioned the human performance and interacted to create a scenario favorable to the accident.*

*The exclusive objective of this work is to recommend the study and the adoption of provisions of preventative nature, and the decision as to whether they should be applied belongs to the President, Director, Chief or the one corresponding to the highest level in the hierarchy of the organization to which they are being forwarded.*

*This Report does not resort to any proof production procedure for the determination of civil or criminal liability, and is in accordance with Appendix 2, Annex 13 to the 1944 Chicago Convention, which was incorporated in the Brazilian legal system by virtue of the Decree n° 21713, dated 27 August 1946.*

*Thus, it is worth highlighting the importance of protecting the persons who provide information regarding an aeronautical accident. The utilization of this report for punitive purposes maculates the principle of “non-self-incrimination” derived from the “right to remain silent” sheltered by the Federal Constitution.*

*Consequently, the use of this report for any purpose other than that of preventing future accidents, may induce to erroneous interpretations and conclusions.*

**N.B.: This English version of the report has been written and published by the CENIPA with the intention of making it easier to be read by English speaking people. Taking into account the nuances of a foreign language, no matter how accurate this translation may be, readers are advised that the original Portuguese version is the work of reference.**

## SYNOPSIS

This is the Final Report of the 30MAY2014 accident with the ATR-42-500 aircraft, registration PR-TKB. The accident was classified as “[WILD] Wildlife Strike”.

During the rotation, the aircraft collided with a tapir (*Tapirus terrestris*).

The aircraft had damages on the right main landing gear, which prevented its retraction after the takeoff. The hydraulic systems were affected by the collision and the crew proceeded to the destination Aerodrome with the landing gear down.

At the time of landing, after the touchdown of the broken landing gear on the ground, the aircraft made a yaw to the right, causing an excessive strain on the nose landing gear. The crew managed to keep the aircraft within the lateral limits of the runway.

The aircraft had substantial damage.

All the occupants left unharmed.

An Accredited Representative of the *Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile* (BEA) – France, (State where the aircraft was designed and manufactured) was designated for participation in the investigation.

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## GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AFA	Air Force Academy
AFIS	Aerodrome Flight Information Service
ANAC	Brazil's National Civil Aviation Agency
APP-MN	Manaus Approach Control
AT42	AT42 aircraft type rating (which included the ATR-42-500 model)
BEA	Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CFOAv	Aviation Officer Formation Course
CI	Investigation Team
CMA	Aeronautical Medical Certificate
CVR	Cockpit Voice Recorder
FDR	Flight Data Recorder
IFRA	Instrument Flight Rating - Airplane
NSCA	Aeronautics Command System Standard
PLA	Airline Pilot License – Airplane
PN	Part Number
QRH	Quick Reference Handbook
RBAC	Brazilian Civil Aviation Regulation
SIPAER	Aeronautical Accident Investigation and Prevention System
SN	Serial Number
TPR	Aircraft Registration Category of Regular Public Transport
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

## 1. FACTUAL INFORMATION.

Aircraft	<b>Model:</b> ATR-42-500	<b>Operator:</b> Total Airlines S/A
	<b>Registration:</b> PR-TKB	
	<b>Manufacturer:</b> Aerospatale and Alenia	
Occurrence	<b>Date/time:</b> 30MAY2014 - 2355 UTC	<b>Type(s):</b> [WILD] Wildlife Strike
	<b>Location:</b> Urucu Aerodrome (SBUY)	
	<b>Lat. 03°02'28"S Long. 060°03'02"W</b>	<b>Subtype(s):</b> NIL
	<b>Municipality – State:</b> Coari – AM	

### 1.1 History of the flight.

The aircraft took off from the Urucu Aerodrome (SBUY), Coari - AM, to the Eduardo Gomes International Aerodrome (SBEG), Manaus - AM, at about 2355 (UTC), to carry personnel, with four crewmembers and 45 passengers on board.

During the rotation, the commander noticed a crash against the aircraft and the right landing gear did not retract after the takeoff. The hydraulic systems were affected by the collision and the crew decided to proceed to SBEG with the landing gear down.

During the landing, after the touchdown of the broken landing gear on the ground, the aircraft turned to the right. The crew managed to keep the aircraft within the lateral limits of the runway.

The aircraft had substantial damage.

The four crewmembers and the 45 passengers left unharmed.



Figure 1 - Aircraft after stop at the SBEG runway.

### 1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	4	45	-

### 1.3 Damage to the aircraft.

The aircraft had substantial damage.

**1.4 Other damage.**

None.

**1.5 Personnel information.****1.5.1 Crew's flight experience.**

Flight Hours		
	Pilot	Copilot
Total	Unknown	5,898:15
Total in the last 30 days	82:20	68:10
Total in the last 24 hours	00:00	03:20
In this type of aircraft	2,601:20	548:15
In this type in the last 30 days	82:20	68:10
In this type in the last 24 hours	00:00	03:20

**N.B.:** The data related to the flown hours were informed by the crewmen.

**1.5.2 Personnel training.**

The pilot took the PPR course in 1989.

The copilot took the CFOAv at the Air Force Academy, in 1989.

**1.5.3 Category of licenses and validity of certificates.**

The pilot had the PLA License and had valid AT42 aircraft type (which included the ATR-42-500 model) and IFRA Ratings.

The copilot had the PLA License and had valid AT42 aircraft type and IFRA Ratings.

**1.5.4 Qualification and flight experience.**

The pilots were qualified and had experience in the kind of flight.

**1.5.5 Validity of medical certificate.**

The pilots had valid CMAs.

**1.6 Aircraft information.**

The aircraft, serial number 610, was manufactured by Aerospatiale and Alenia, in 2001 and it was registered in the TPR category.

The aircraft had valid Airworthiness Certificate (CA).

The technical maintenance records were updated.

**1.7 Meteorological information.**

Nil.

**1.8 Aids to navigation.**

Nil.

**1.9 Communications.**

Nil.

**1.10 Aerodrome information.**

The Aerodrome was private and operated under VFR and IFR, day and night.

The runway was made of asphalt, with thresholds 09/27, dimensions of 1,320m x 30m, with elevation of 210 feet.

The AFIS operator of the SBUY had no runway visualization. As such, it had information on the presence of fauna, only when alerted by the crews operating at the site.

The Aerodrome operator, according to surveys, was aware of events involving wildlife prior to the accident.

The Urucu Aerodrome had no operational area isolation.

### 1.11 Flight recorders.

The aircraft was equipped with a FDR L-3, FA2100 model (solid-state memory), PN 2100-4043-00 and SN 849097.

It was also equipped with a CVR L-3, A200S model (solid-state memory), PN S200-0012-00 and SN 00826, capable of recording for two hours.

Both, flight data and cabin voice recorders registered the occurrence data.

### 1.12 Wreckage and impact information.

The aircraft main right landing gear collided with a tapir (*Tapirus terrestris*) during the rotation of the aircraft. After the collision, the aircraft lost the normal braking system and its directional control system was used on landing to stay on the runway.



Figure 2 - Damage to the right landing gear.

The shock absorber, hydraulic lines, aerodynamic fairings and doors of the right main landing gear have been damaged.

The nose landing gear and its shock absorber strained above the specified maximums, making them unavailable for return to service.





Figure 3 - Damage to the nose landing gear.

### **1.13 Medical and pathological information.**

#### **1.13.1 Medical aspects.**

Not investigated.

#### **1.13.2 Ergonomic information.**

Nil.

#### **1.13.3 Psychological aspects.**

Not investigated.

### **1.14 Fire.**

There was no fire.

### **1.15 Survival aspects.**

Nil.

### **1.16 Tests and research.**

Nil.

### **1.17 Organizational and management information.**

Nil.

### **1.18 Operational information.**

The aircraft was within the weight and balance limits specified by the manufacturer. It was a charter flight from the operating company to transport workers from the contracting company.

As reported by the crewmembers, they reported to take the flight at 2030 (UTC), they were not tired and there was no known reason why they could not participate in the SBUY to SBEG flight leg.

The crewmembers did not notice and were not informed about any animals' movement during the taxi.

During the takeoff run, at the time of the rotation, the aircraft collided with a tapir.

According to the crew, they noticed the animal's presence only after the collision.

While performing the intended procedures after the takeoff, the right main landing gear did not retract. The crewmembers declared emergency at the AFIS frequency of the SBUY and decided to proceed to SBEG with the landing gear down and speed 160kt.

During the cruise flight, the "HYD LO LVL" (Blue System) light turned on and the crew followed the procedures described in the QRH.

After establishing contact with the APP-MN, the crew coordinated a low pass near the control tower to check landing gear conditions.

The crew performed the low pass. Visually, everything seemed to be normal with the position of the landing gear.

During landing, the aircraft swung to the right, movement counteracted by the use of the directional control. The braking was performed with the emergency brake that was used 400m after touching the runway.

Firefighters preventively used foam on the landing gear.

The disembarkation of the occupants of the aircraft occurred without problems after the stoppage of the propellers.

#### **1.19 Additional information.**

The Investigation Team (CI) has conducted research on similar occurrences in Urucu (SBUY) and has raised the following:

- on 08MAY2013, an aircraft crashed against some herons that crossed the runway after landing an aircraft;
- on 19SEPT2013, two large tapirs were sighted near the runway during the landing of an aircraft;
- In January 2014, two crewmembers reported the presence of snakes in the maneuvering area; and
- On 15MAY2015, during the take-off run, several herons crossed the runway and an aircraft crashed into one of them.

The RBAC 164, which dealt with the Wildlife Risk Management at **Public Aerodromes (our emphasis)**, approved on 30MAY2014, date of the accident, stated as follows:

#### **"164.5 Terms and Definitions**

...

(8) Wildlife Hazard Assessment - WHA - means the document presenting a preliminary approach to wildlife hazard, in which the fauna species present in and around the Aerodrome that pose a risk to air operations are identified, as well as the main focal points of attraction and risk reduction measures;

...

(13) Wildlife Hazard Management Plans - WHMP - means the document that, based on the results obtained from IPF, aims to structure Aerodrome operations for the permanent management of wildlife risk to air operations;

#### **164.53 Final Provisions**

(a) Aerodrome operators shall submit to ANAC the IPF and the corresponding PGRF within 18 (eighteen) months from:

- (1) the entry into force of this Regulation, for Aerodromes that already meet one of the conditions set out in paragraph 164.1 (b); or
- (2) the date on which the Aerodrome meets one of the conditions set out in paragraph 164.1 (b).

164.53 (d) Even if it does not meet any of the criteria for conducting a WHA - and therefore the WHMP, no Aerodrome operator shall dispense with basic operational and site maintenance procedures for the mitigation of wildlife risk [...].

164.53 (d) (1) [...] ensures that the protection system does not allow the presence of animals in the operational area [...]. "

From 2009 to 2013, 436 land wildlife strikes were registered in Brazil.

## 1.20 Useful or effective investigation techniques.

Nil.

## 2. ANALYSIS.

It was a charter flight from SBUY to SBEG.

The aircraft, at the moment of rotation, collided with a tapir. In this context, it is possible that due to the nighttime, the crew's precise perception of the animal did not occur in a timely manner to avoid collision.

The crewmembers noticed the presence of the animal when it was no longer possible to make the diversion. Even if it was possible to perceive the presence of the animal before the collision, the crew would not be able to perform the takeoff abortive without extrapolating the runway limits.

The crewmembers decided to proceed to SBEG with the landing gear down and, upon contacting APP-MN, they coordinated a low passage to check the position of the landing gear.

After confirming the condition of the landing gear, the crewmembers proceeded to the emergency landing, performed on runway 10 of SBEG.

After touching the ground, due to damage to the right main landing gear, the aircraft made a yaw and the movement was countered by the crew that managed to keep it within the lateral limits of the runway. The emergency brake was used and allowed the aircraft to stop within the runway limits.

The dynamics of SBEG landing resulted in efforts beyond the maximum limits set on the nose landing gear, which made it impossible for the component and its shock absorber to return to service.

Ground wildlife strikes pose a high risk to aviation, as the impact energy generated in these events is directly proportional to the animal's mass and aircraft speed at the moment of impact, and may exceed the impacted components resistance limits.

From 2009 to 2013, 436 land wildlife strikes were registered throughout the national territory, demonstrating that this was a recurring situation in the country.

During the investigation, it was found that there were already records of fauna, including tapirs, about the runway used for takeoff. This fact indicated that the lack of protection fence added to the impossibility of AFIS operator to identify and alert the presence of fauna was an unsafe condition of the Aerodrome.

Concerning the airport operator, it was found that he was aware of events involving wildlife prior to the accident, and had not taken effective mitigation measures until the date of the occurrence, such as the installation of an operational area isolation fence, the that would prevent the land animal from entering the runway for landings and takeoffs, avoiding the accident.

Although there are several legislations on the ANAC website, about the responsibilities of Aerodrome operators with regard to their infrastructure care, they all required only public Aerodromes to take these measures.

Thus, although the contribution of Airport infrastructure was present in this investigation, there was no obligation for the Aerodrome operator to comply with the standards required by those laws.

Even so, the Team found that several of those obligations were voluntarily fulfilled by that operator following meetings between the aircraft operator, the flight contractor (Petrobras) and the Aerodrome operator, such as inspections throughout the perimeter of the runway and installation of fences.

### 3. CONCLUSIONS.

#### 3.1 Facts.

- a) the pilots had valid Aeronautical Medical Certificates (CMA);
- b) the pilots had valid AT42 aircraft type rating (which included the ATR-42-500 model) and IFRA;
- c) the pilots were qualified and had experience in that kind of flight;
- d) the aircraft had valid Airworthiness Certificate (CA);
- e) the aircraft was within the weight and balance limits specified by the manufacturer;
- f) the technical maintenance records were updated;
- g) during takeoff, the aircraft collided with a land animal (*Tapirus terrestris*);
- h) the right main landing gear was damaged in the collision;
- i) the nose gear was damaged during landing;
- j) the takeoff Aerodrome had no isolation from the operational area;
- k) there were wildlife records, including tapirs, on the SBUY Aerodrome runway;
- l) the aircraft had substantial damage; and
- m) all occupants left unharmed.

#### 3.2 Contributing factors.

- **Airport infrastructure – a contributor.**

The lack of isolation of the operational area allowed the land animal to enter the runway for landings and takeoffs, contributing to the accident.

- **Perception – a contributor.**

The crew did not notice the presence of the land animal on the runway early enough to abort the takeoff without extrapolating the runway limits and avoiding collision.

- **Wild – a contributor.**

The presence of the land animal (*Tapirus terrestris*) interfered with the operation and led to the collision of the right main landing gear.

### 4. SAFETY RECOMMENDATION.

*A proposal of an accident investigation authority based on information derived from an investigation, made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident. In addition to safety recommendations arising from accident and incident investigations, safety recommendations may result from diverse sources, including safety studies.*

*In consonance with the Law n°7565/1986, recommendations are made solely for the benefit of the air activity operational safety, and shall be treated as established in the NSCA 3-13*

*“Protocols for the Investigation of Civil Aviation Aeronautical Occurrences conducted by the Brazilian State”.*

**Recommendations issued at the publication of this report:**

Nil.

**5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.**

The Investigation Team has found that a number of obligations under public Aerodrome legislation have been voluntarily fulfilled by the SBUY operator, such as inspections across the runway perimeter and installation of fences.

Total Airlines has issued a Safety Alert, alerting its pilots to double their attention when using the apron and, if they see any animals, to report to the Aerodrome Flight Safety Agent.

In addition, it warned the crews to be alert to wildlife during landings and takeoffs.

On July 24<sup>th</sup>, 2020.

