

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



**FINAL REPORT**  
**A - 125/CENIPA/2016**

<b>OCCURRENCE:</b>	<b>ACCIDENT</b>
<b>AIRCRAFT:</b>	<b>PR-DTA</b>
<b>MODEL:</b>	<b>E55</b>
<b>DATE:</b>	<b>22SEPT2016</b>



## NOTICE

*According to the Law nº 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 nº 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 22SEPT2016 accident with the E55 aircraft, registration PR-DTA. The accident was classified as “[LOC-I] Loss of Control in-Flight”.

During the passenger flight from Goiânia - GO, to Sorriso - MT, the aircraft lost control in unenlightened circumstances, colliding with the ground in the rural area of Campinápolis - MT.

The aircraft was destroyed.

The pilot and the three passengers perished in the impact.

An Accredited Representative of the National Transportation Safety Board (NTSB) – USA, (State where the aircraft was designed) was designated for participation in the investigation.



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**GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS**

AIS	Aeronautical Information Service
ANAC	Brazil's National Civil Aviation Agency
CA	Airworthiness Certificate
CB	Cumulonimbus
CG	Center of Gravity
CENIPA	Aeronautical Accident Investigation and Prevention Center
CM	Registration Certificate
CMA	Aeronautical Medical Certificate
DCTA	Department of Science and Airspace Technology
IAM	Annual Maintenance Inspection
IFRA	Instrument Flight Rating - Airplane
MLTE	Airplane Multi Engine Land Rating
NTSB	National Transportation Safety Board (USA)
PCM	Commercial Pilot License – Airplane
SACI	Integrated Civil Aviation Information System
SBGO	ICAO Location Designator – Santa Genoveva Aerodrome, Goiânia - GO
SBSO	ICAO Location Designator – Sorriso Aerodrome - MT
SERIPA VI	Sixth Regional Aeronautical Accident Investigation and Prevention Service
SILC	ICAO Location Designator – Bom Futuro Municipal Aerodrome, Lucas do Rio Verde - MT
SIGWX	Significant Weather
SIPAER	Aeronautical Accident Investigation and Prevention System
SISCEAB	Brazilian Airspace Control System
SWEK	ICAO Location Designator – Canarana Municipal Aerodrome - MT
TPP	Registration Category of Private Aircraft Service
UTC	Universal Time Coordinated
VMC	Visual Meteorological Conditions

## 1. FACTUAL INFORMATION.

<b>Aircraft</b>	<b>Model:</b> E55 <b>Registration:</b> PR-DTA <b>Manufacturer:</b> Beech Aircraft	<b>Operator:</b> Private
<b>Occurrence</b>	<b>Date/time:</b> 22SEPT2016 - 2230 UTC <b>Location:</b> Campinápolis Rural Area <b>Lat.</b> 14°28'23"S <b>Long.</b> 052°49'28"W <b>Municipality – State:</b> Campinápolis – MT	<b>Type(s):</b> [LOC-I] Loss of Control in-Flight <b>Subtype(s):</b> NIL

### 1.1 History of the flight.

The aircraft took off from the Santa Genoveva Aerodrome (SBGO), Goiânia - GO, to the Sorriso Adolino Bedin Regional Aerodrome (SBSO) - MT, at 2050 (UTC), with a visual flight plan, in order to transport personnel, with a pilot and three passengers on board.

At about 2225 (UTC), when passing near the municipality of Campinápolis - MT, in the middle of the route, the aircraft was spotted by locals, flying low, as if searching for a place to land.

Moments later, the aircraft crashed into the ground in a wooded area.

The aircraft was destroyed. The pilot and three passengers perished at the accident site.

### 1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	1	3	-
Serious	-	-	-
Minor	-	-	-
None	-	-	-

### 1.3 Damage to the aircraft.

The aircraft was destroyed.

### 1.4 Other damage.

None.

### 1.5 Personnel information.

#### 1.5.1 Crew's flight experience.

Hours Flown	Pilot
Total	447:00
Total in the last 30 days	09:45
Total in the last 24 hours	00:00
In this type of aircraft	46:10
In this type in the last 30 days	08:00
In this type in the last 24 hours	00:00

**N.B.:** The data related to the flown hours were obtained through the records of the Integrated Civil Aviation Information System (SACI) and the aircraft flight logbook.

#### 1.5.2 Personnel training.

Unknown.

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

The pilot had the PCM License and had valid MLTE and IFRA Ratings.

### **1.5.4 Qualification and flight experience.**

The pilot was qualified and had enough experience in the type of flight, but had little experience in this aircraft model.

### **1.5.5 Validity of medical certificate.**

The pilot had valid CMA.

### **1.6 Aircraft information.**

The aircraft, serial number TE-871, was manufactured by Beech Aircraft, in 1972 and was registered in the TPP category.

The aircraft had valid Airworthiness Certificate (CA).

The airframe, engines and propellers logbooks records were updated.

The last inspection of the aircraft, the "100 hours" type, was performed on 09SEPT2016 by the maintenance organization QUICK Aircraft Maintenance Ltd., in Goiânia - GO, having flown 08 hours and 50 minutes after the inspection.

The pilot had acquired the aircraft a few weeks before the accident, and a pre-purchase inspection report on the assessment of the condition of the aircraft, dated 08JUL2016, was found next to the wreckage.

According to the report, the inspection performed by Birigui Aircraft Maintenance Ltd. included documentary analysis and operational tests of the airframe and engines, which found no relevant discrepancies.

### **1.7 Meteorological information.**

The meteorological conditions at the origin and at the destination were favorable for the visual flight. According to the sunrise and sunset table, the sunset time at SBSO, destination of the flight, at the time of the accident, was 2138 (UTC). The accident occurred at night.

The SIGWX Chart valid from 1800 UTC on 22SEPT2016 to 1800 UTC on 23SEPT2016, with significant weather forecast in the region of the occurrence, is shown in figure 1.

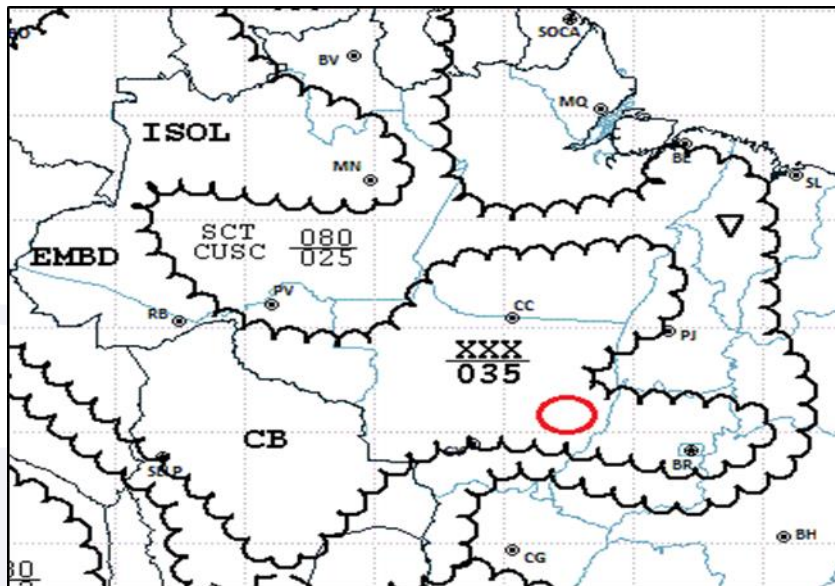


Figure 1 - Location of the occurrence highlighted in red.

This chart showed the probability of cloud formation of the Cumulonimbus type, embedded, based on 3,500ft to unlimited (XXX).

#### 1.8 Aids to navigation.

Nil.

#### 1.9 Communications.

Nil.

#### 1.10 Aerodrome information.

The occurrence took place outside the Aerodrome.

#### 1.11 Flight recorders.

Neither required nor installed.

#### 1.12 Wreckage and impact information.

The accident occurred in a rural area, in the municipality of Campinápolis - MT. The accident area was in the shape of a depression, being flat in the vicinity of the first impact and downhill after a few meters. The distribution of the wreckage was of the linear type (Figure 2).

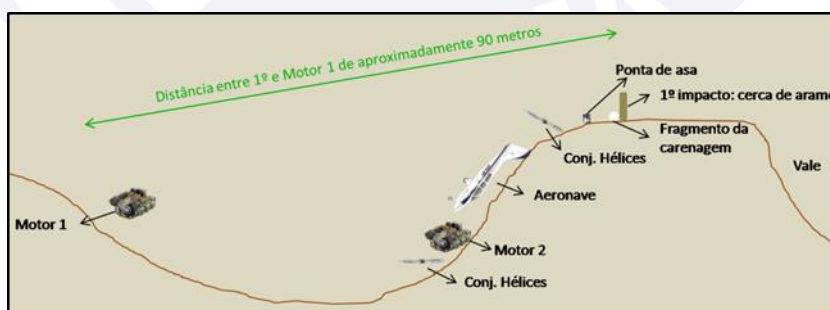


Figure 2 - Sketch of the accident dynamics (view of the relief cut).

The first impact of the aircraft occurred on the fence that delimited a private property, breaking the barbed wire and leaving marks on the fence where it was fixed.



Parts of the left wing tip indicate that the impact occurred with this wing, suggesting that the plane was practically on the back, with a lateral slope of about  $120^{\circ}$  to the right, with a leveled nose (Figure 3).

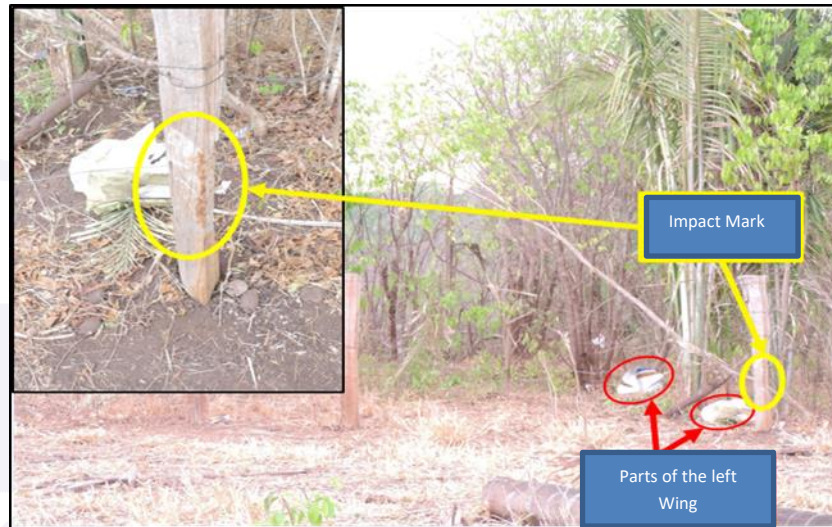


Figure 3 - View of the first impact area and the trajectory of the aircraft.

Subsequent markings, both on the ground and on the vegetation, suggest that the first impact caused a nose yaw and an aircraft bearing.

After rolling for about one and a half turns around its longitudinal axis, there was the separation between the engines and their wings.

The left engine, in turn, when it detached itself from the wing, was thrown against a tree, distant about 50 meters from the resting place of the right engine.

The fuselage was found in the back position, in the sloped area and separated from the engines (Figure 4).



Figure 4 - Fuselage resting on back and separate engines.

The aircraft destruction degree prevented a more detailed verification of equipment and instruments.

### 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.

No evidence was found that problems of physiological nature or incapacitation could have affected the flight crew performance.

### 1.14 Fire.

There was no fire.

### 1.15 Survival aspects.

There were no survivors.

### 1.16 Tests and research.

The Continental engines model IO-520-CB, n/s 571495, and IO-520-CB, n/s 561582, of the aircraft E55 model, PR-DTA registration, were inspected and subsequently dismantled for internal component verification, in a maintenance company in Goiânia - GO.

This work was performed by professionals of this company and was accompanied by the representatives from the SERIPA VI and from the DCTA.

The result of the investigation carried out in the two engines concluded that:

"... both engines were operational and running at the moment the aircraft got involved in the accident. As for the power level, it could not be determined by the fact that the collision occurred against an obstacle considered as soft. This causes deformations, folds and kneading in the propeller that are classified as random. This condition may lead to an erroneous analysis regarding the development of the engine power. In this case, what can be said is that the engine was running when the aircraft was involved in the accident, because of the transverse scratches observed in the propeller blades."

### 1.17 Organizational and management information.

Nil.

### 1.18 Operational information.

The aircraft was within the limits of weight and center of gravity (CG) specified by the manufacturer.

According to the records of the SISCEAB, the pilot had initially presented a visual flight plan in the AIS room of SBGO, proposing to take off at 1920 (UTC) to the Canarana Municipal Aerodrome (SWEK).

Sometime later, the pilot presented a change message, anticipating the takeoff time to 1815 (UTC) and then presented another message, delaying the takeoff to 1920 (UTC).

Later, he presented a new visual flight plan, through the telephone, to the AIS room in Anápolis, proposing to take off from SBGO to SBSO, at 2040 (UTC). Lastly, he presented a message asking for confirmation of the availability of the light aid in SBSO, a place that would allow overnight landing because of its infrastructure.

The Canarana Municipal Aerodrome did not contemplate the possibility of night landing.

The aircraft ended up taking off from SBGO at 2050 (UTC), with landing expected at around 2340 (UTC), about two hours after sunset.

The locality of Campinópolis, where the accident happened, is approximately in the middle of the route between SBGO and SBSO. Being a rural area, the lighting of the

terrain in that region was quite reduced, not offering many visual references to the pilot in the night period.

No records were found in the SISCEAB of aircraft movements during the period between 14SEPT2016 (date of the last flight logbook record) and the date of the accident, and therefore it is not possible to reconstitute the routes it has traveled during this period.

The last records of the logbook dated from 14SEPT2016 and indicated the takeoff from SBGO at 1210 (UTC), to SWEK, and from SWEK, at 1530 (UTC), to the Bom Futuro Municipal Aerodrome (SILC), located in the municipality of Lucas do Rio Verde - MT.

The lack of records prevented the determination of the initial place where the passengers boarded, as well as their final destination.

According to what was found, the pilot had a total of 450 flight hours approximately, most of this experience being acquired in single-engine aircraft. He obtained his MLTE Rating less than three months before the accident, having accumulated just under 50 flight hours in this aircraft model.

In view of the aircraft's degree of destruction, it was not possible to verify the amount of fuel at the time of the accident. However, it was found that the aircraft had been fuelled with 431 liters of aviation gasoline before SBGO take off.

Considering an average consumption of 120 liters per hour, the fuelling made at SBGO would guarantee about three and a half hours of endurance, which would be compatible with the presented flight plan.

On the other hand, two empty plastic reservoirs with a capacity of 40 liters were found next to the wreckage.

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

The pilot had acquired the aircraft about two months before the accident, according to a purchase and sale agreement found amid the wreckage. However, the aircraft had not yet been transferred to the new owner.

The initial investigative action was carried out about 40 hours after the accident, and the area was altered by the Civil Police and popular action.

#### **1.20 Useful or effective investigation techniques.**

Nil.

## **2. ANALYSIS.**

It was a passenger transport flight between SBGO and SBSO.

Elements collected during the investigation, including test results on engines and propellers, did not clearly indicate a reason for the aircraft's loss of control.

The tests performed on the engines and their components established that their operation was normal at the time of the accident, although it was not possible to determine the power level developed at impact.

The degree of destruction of the aircraft prevented a better verification of equipment and instruments.

The aircraft had enough fuel to make the flight.

According to reports from residents of the area, the aircraft was circulating at low altitude moments before impact, suggesting that the pilot might be looking for some runway to land.

Faced with such facts, the lack of evidence to indicate any material failure in the aircraft, and considering that the accident site was located on the proposed route of the Flight Plan, it was not possible to determine exactly the contributing factors for the accident.

However, it is possible to delineate two hypotheses capable of leading to the consummation of the accident.

The first one contemplates a scenario in which the pilot would have tried to land at the Canarana Municipal Aerodrome (SWEK), even if it was situated outside the route proposed by the pilot.

The flight plans, initially completed by the pilot, pointed to an intention of landing on SWEK. Due to the absence of conclusive information about the movements of the aircraft in the days preceding the accident, it is possible to infer that some of the passengers had boarded on SWEK and that this was, therefore, the intended final destination.

The change of destination in the flight plan seems to have been due to the change in the departure time. This is because, at the time of the accident, SWEK allowed only operations under visual flight rules (VFR) in the daytime period.

Thus, the first flight plan, with takeoff scheduled for 1920 (UTC), would allow the daytime landing at SWEK at 2047 (UTC).

The last flight plan presented by the pilot was scheduled to take off at 20:40 p.m., which would not allow the land in SWEK. In this sense, it is possible to consider the hypothesis that the choice of SBSO, as a new destination, was only determined to allow the approval of the Flight Plan, since this locality could operate in the nighttime period.

The flight logbook records revealed that the pilot did not usually take long legs, with legs usually taking about an hour and a half of flight. If the destination of the flight was actually SBSO, the scheduled duration of the flight would be approximately of three hours, while the journey to SWEK would last about one hour and thirty minutes.

The fact that the aircraft was observed flying at low altitude, moments before the accident, together with the fact that no material fault or any type of communication that could justify an emergency landing was found, may suggest that the pilot tried the night landing at SWEK.

A second hypothesis would be that the pilot deviated from some meteorological formation, losing control of the aircraft.

Although the weather conditions at the origin and destination were favorable for the visual flight, isolated formations would not be unlikely since the SIGWX chart indicated the possibility of CB in the area at the time of flight. The Investigation Team itself encountered moderate rainfall, during the initial action, at the scene of the accident.

In this case, the search for better conditions for the flight may have caused the pilot to descend, flying closer to the ground.

Therefore, the lack of light, coupled with the likely effect of precipitation on the windshield, could have resulted in loss of control of the aircraft. In any case, it should be remembered that the pilot did not have much experience in that aircraft, which could generate a degree of insecurity in his operation under unfavorable circumstances, such as the night operation and / or under adverse weather conditions.

Little familiarity with the twin-engine operation could also aggravate the difficulties of maintaining flight parameters when operating by instruments.

In a context like this, the pilot often turns his attention to aspects that are imposing a greater difficulty to his performance.

Thus, it is possible that the pilot of this occurrence has turned to the search for visual references, failing to consider the indications of flight and navigation instruments, aspects that are important for the safety of the operation, as it would help in the maintenance of control of the aircraft.

### 3. CONCLUSIONS.

#### 3.1 Facts.

- a) the pilot had valid Aeronautical Medical Certificate (CMA);
- b) the pilot had valid MLTE and IFRA Ratings;
- c) the pilot was qualified and had experience in that kind of flight;
- d) the pilot had little experience in that aircraft model;
- e) the aircraft had valid Airworthiness Certificate (CA);
- f) the aircraft was within the limits of weight and balance;
- g) the airframe, engines and propeller logbook records were updated;
- h) there was the possibility of CB in the aircraft route;
- i) observers reported having seen the aircraft circling at low altitude moments before the collision against the ground;
- j) the aircraft crashed into the ground in an abnormal attitude;
- k) the aircraft was destroyed; and
- l) the pilot and the three passengers suffered fatal injuries.

#### 3.2 Contributing factors.

- **Control skills – undetermined.**

It is possible that the pilot attempted to avoid unfavorable weather conditions on the route by failing to effectively monitor flight and navigational instruments, placing the aircraft in a condition that favored loss of control in flight.

- **Attention – undetermined.**

It is possible that the pilot, given the context in which he was, focused his attention on the search for visual references, failing to monitor the indications of flight and navigation instruments, which would favor the loss of control of the aircraft.

- **Emotional state – undetermined.**

The pilot's little experience in the aircraft may have triggered a state of insecurity, which would adversely affect his operational performance against possible unfavorable conditions encountered in flight.

- **Adverse Meteorological Conditions – undetermined.**

It is possible that the presence of cloud formations on the route led the pilot to make detours, flying closer to the ground.

- **Insufficient pilot's experience – undetermined.**

Little experience on the aircraft may have made the flight management difficult, especially if the pilot encountered unfavorable weather conditions.

### 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.**

None.

On April 08<sup>th</sup>, 2019.