

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



**FINAL REPORT**  
**A - 061/CENIPA/2019**

<b>OCCURRENCE:</b>	<b>ACCIDENT</b>
<b>AIRCRAFT:</b>	<b>PT-DME</b>
<b>MODEL:</b>	<b>ST-10</b>
<b>DATE:</b>	<b>13APR2019</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 by taking into account the contributing factors and hypotheses raised. The report is, therefore, a technical document that 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 Final Report has been made available to the ANAC and the DECEA so that the technical-scientific analyses of this investigation can be used as a source of data and information, aiming at identifying hazards and assessing risks, as set forth in the Brazilian Program for Civil Aviation Operational Safety (PSO-BR).*

*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 into the Brazilian legal system by 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 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 13APR2019 accident with the ST-10 aircraft model, registration PT-DME. The accident was classified as “[SCF-PP] Engine Failure or Malfunction – Engine Failure in Flight”.

During the take-off from the Carlos Prates Aerodrome (SBPR), Belo Horizonte - MG, the pilot requested to return informing an emergency.

Subsequently, the plane crashed into the ground, in a residential area, located on the extension of runway 09 of SBPR.

The investigative evidence gathered led the investigators to conclude that there was an in-flight engine failure.

The aircraft was destroyed.

The pilot died at the accident site.

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 manufactured/designed) was designated for participation in the investigation.

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## GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AFIS	Aerodrome Flight Information Service
ANAC	Brazil's National Civil Aviation Agency
AEV	Special Flight Authorization
BEA	<i>Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile</i>
CA	Airworthiness Certificate
CIAC	Civil Aviation Instruction Center
CIV	Pilot's Flight Logbook
CMA	Aeronautical Medical Certificate
DIAM	Annual Maintenance Inspection Statement
CTR	Control Zone
DCTA	Department of Science and Airspace Technology
EASA	European Aviation Safety Agency
EO	Operating Specifications
EPTA	Station Provider of Telecommunications and Air Traffic Services
IAM	Annual Maintenance Inspection
IFRA	Instrument Flight Rules Rating - Airplane
INFRAERO	Brazilian Airport Infrastructure Company
METAR	Meteorological Aerodrome Report
MNTE	Airplane Single-Engine Land Rating
OM	Maintenance Organization
OS	Order of Service
PCM	Commercial Pilot License – Airplane
PN	Part Number
PIC	Pilot in Command
PPR	Private Pilot License – Airplane
RAB	Brazilian Aeronautical Registry
RBAC	Brazilian Civil Aviation Regulation
RBHA	Brazilian Aeronautical Certification Regulation
SACI	Integrated Civil Aviation Information System
SN	Serial Number
SBPR	ICAO Location Designator - Carlos Prates Aerodrome, Belo Horizonte - MG
TCDS	Type Certificate Data Sheet
TPP	Private Air Service Aircraft Registration Category
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

## 1. FACTUAL INFORMATION.

<b>Aircraft</b>	<b>Model:</b> ST-10 <b>Registration:</b> PT-DME <b>Manufacturer:</b> Socata	<b>Operator:</b> Private
<b>Occurrence</b>	<b>Date/time:</b> 13APR2019 - 1815 UTC <b>Location:</b> Carlos Prates Aerodrome (SBPR) <b>Lat.</b> 22°54'36"S <b>Long.</b> 043°09'45"W <b>Municipality – State:</b> Belo Horizonte – MG	<b>Type(s):</b> “[SCF-PP] Engine Failure or Malfunction” <b>Subtype(s):</b> Engine Failure in Flight

### 1.1 History of the flight.

The aircraft took off from the Carlos Prates Aerodrome (SBPR), Belo Horizonte - MG, at around 1810 (UTC) to perform a local test flight after maintenance, with a pilot on board.

After the take-off, the pilot requested to return, informing emergency. Seconds later, the pilot of another aircraft reported that the PT-DME had crashed on the runway extension.

The plane crashed into the ground, in a residential area located on the extension of runway 09, in the Aerodrome of origin.

The aircraft was destroyed. The pilot suffered fatal injuries.

### 1.2 Injuries to persons.

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

### 1.3 Damage to the aircraft.

The aircraft had damage to its entire structure and was partially consumed by the fire that followed the impact (Figure 1).



Figure 1 - Image of the aircraft wreckage at the accident site.



## 1.4 Other damage.

There was damage to the power grid, gates, walls, and roofs of some residential properties at the scene.

## 1.5 Personnel information.

### 1.5.1 Crew's flight experience.

Flight Hours	PIC
Total	400:00
Total in the last 30 days	00:00
Total in the last 24 hours	00:00
In this type of aircraft	51:04
In this type in the last 30 days	00:00
In this type in the last 24 hours	00:00

**N.B.:** The data relating to the flown hours were obtained through the registers in the pilot's digital CIV.

### 1.5.2 Personnel training.

The PIC took the PPR course at Starflight *Escola de Aviação Civil* Ltd., MG, in 2002.

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

The PIC had a PCM License and had valid MNTE and IFRA Ratings.

### 1.5.4 Qualification and flight experience.

The Flight Logbook, as well as other mandatory documents, were possibly consumed by fire.

The digital CIV records, contained in the ANAC's SACI indicated that the pilot had been operating the ST-10 aircraft, registration PT-DME, since July 2011 and had the SBPR Aerodrome as a frequent destination.

However, there were no records of flights after 06JUN2018.

Thus, it was not possible to determine whether the pilot had the necessary recent experience to consider him qualified to perform the flight.

### 1.5.5 Validity of medical certificate.

The pilot had valid CMA.

## 1.6 Aircraft information.

The aircraft, serial number 05, was manufactured by Socata in 1971 and was registered in the TPP Category.

The aircraft's CA expired in 25JAN2019.

The airframe, engine, and propeller logbook records were outdated.

The last aircraft inspections, the "IAM/75 hours/100 hours" types, were carried out on 24JAN2018 by the OM *Tecnologia Brasileira de Aeronáutica S/A* (TBA), Pará de Minas - MG. It was not possible to determine how many hours the plane had flown after these inspections.

The ANAC's SACI consultation showed that the plane's CA was suspended on 24JAN2019.

On 28APR2017, the ANAC held an internal meeting to define actions arising from the need to issue a TCDS for the Socata ST-10 aircraft, after the holder's request.

At that meeting, it was decided that:

- the aircraft would be operated with standard CA, after the issuance of a TCDS (or similar document) by the GGCP, based on the EASA.SAS documents. A.049, Issue 4, of 12/AUG/2014 (Annex 3) and in the original TCDS (*Fiche de Navegabilidade* n° 122) issued by DGAC France in 1971;

- there is a need to restrict the TCDS to the serial numbers of aircraft currently registered in Brazil, that is, the importation of these aircraft will not be accepted;
- additionally, information on continuing airworthiness must be included in this document, such as:
  - a) accepted revision for the technical publications of the aircraft (Maintenance Manual and Flight Manual);
  - b) warning about the possibility of canceling the TCDS (or similar document) in the event of an unsafe condition for which no solution is presented; and
  - c) procedure for accepting spare parts.
- finally, considering the current situation of the aircraft, performing an IAM is sufficient for the CA to return to normal condition.

Based on public data made available by the RAB, it was found that, on the date of approval of this report, there were 5 Socata ST-10 model aircraft registered in Brazilian territory, with no OM certified to perform maintenance services in this aircraft model.

### 1.7 Meteorological information.

The METAR from the Carlos Prates Aerodrome brought the following information:

METAR SBPR 131700Z 06006KT 9999 BKN030 18/31 Q1018=

METAR SBPR 131800Z 10008KT 9999 BKN030 17/30 Q1017=

METAR SBPR 131900Z 10006KT 9999 SCT025 18/31 Q1018=

**Weather conditions were favorable for the visual flight** with visibility above 10 km and a cloud ceiling at 3,000 ft. The wind had intensity varying between 6 kt and 8 kt and direction between 060° and 100°. At the time of the take-off, a wind with an intensity of 7 kt and a direction of 060° was reported.

### 1.8 Aids to navigation.

Nil.

### 1.9 Communications.

Approximately 3 minutes after the take-off, according to reports collected, the pilot informed on the EPTA frequency that he was returning to runway 27 (opposite threshold), without stating the reason for the return.

The Carlos Prates AFIS operator questioned whether the PT-DME was declaring an emergency. The pilot then declared mayday, mayday. Seconds later, the pilot of another aircraft reported that the PT-DME crashed on the extension of runway 09.

According to reports, it was possible to notice in the pilot's voice the anxiety and tension moments before the accident.

### 1.10 Aerodrome information.

The Aerodrome was public, managed by the INFRAERO, and operated under VFR during the day.

The runway was made of asphalt, with thresholds 09/27, dimensions of 868 x 18 m, with an elevation of 3,045 ft.



The extension of runway 09 was characterized by being a densely populated area and did not offer easily identifiable places for a forced landing.

### 1.11 Flight recorders.

Neither required nor installed.

### 1.12 Wreckage and impact information.

The first impact was against the power grid.

Other points of impact showed that the aircraft reached the ground in a high-angle trajectory, practically at 90 degrees with the public road.



Figure 2 - Image of the accident site and estimated trajectory in the last moments of the flight.

Part of the left wing came off the plane during the first few impacts. It was found a few meters from the rest of the wreckage (Figure 3).



Figure 3 - Image of the accident site. In the red highlight, the part of the left-wing that separated from the plane.

The Vertical Speed Indicator (Climb) showed a rate of descent of 600 ft/min. However, it was not possible to certify that this was the aircraft's rate of descent at the time of collision with the ground (Figure 4).



Figure 4 - Vertical Speed Indicator (Climb) showing a descent rate of 600 ft/min.

The power and fuel levers were in full engine position.

Due to fire damage, it was not possible to identify the elevator trim adjustment. The command surface was in a position close to neutral, slightly pitched up.

The wreckage was concentrated, except for part of the left-wing.

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

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

The forensic examination concluded that the PIC's cause of death was blunt polytrauma, due to the plane's impact on the ground with great energy.

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

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

Nil.

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

According to the reports collected, friends, family, and people who flew with the PIC saw him as a reckless and fearful person during the flight, especially during takeoff and landing operations, as well as when the aircraft presented different responses than expected. Some people considered him "unprepared" to handle emergencies.

It was also reported that the PIC was very afraid of falling with the aircraft, that he had vast theoretical knowledge but little practice, and did not feel safe flying alone. He had piloting as a hobby and medicine as a profession.

According to the information gathered, the pilot used to perform pre-flight and post-flight memory checks and did not follow a formal procedure during his flights.

According to family and friends, the PIC was anxious and really wanted the aircraft to be ready as soon as possible, as he wanted to travel with his family the following week using the plane.

#### **1.14 Fire.**

The fire that started after the impact with the ground consumed the engine region and the cabin. Only the tail cone and the drift were not affected by the flames.

The engine had serious damage from the fire.

#### **1.15 Survival aspects.**

There were no survivors.

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

The engine had severe damage resulting from the impact and the action of the fire that followed the fall of the aircraft.

The fuel system had damaged or charred components.

The fuel inlet filter on the servo injector had the bottom spring bent. It could have been the result of an assembly failure, when it would not have been properly seated in its housing. However, there was no evidence to conclude that this condition could cause a restriction of fuel to power the engine.

Fragments found inside the filter were attributed to carbonization of the fuel hose of the servo injector due to the action of the fire. The hypothesis raised was that, during the movement of the wreckage, these fragments were detached and lodged inside this filter. Other internal components, such as diaphragms and sealing rings, were consumed or deformed by the fire.

The fuel pump broke at the base, and its body was not found. This fact made any kind of analysis or functional testing impossible, both on the servo injection and the fuel pump.

The spark plugs had characteristics that they had just been installed in the engine, as all the porcelain of the central electrodes had a white color, typical of little use.

The internal components of the magnetos were consumed and/or damaged by impact and fire. For this reason, it was not possible to perform functional tests or analyses. Thus, doubts remained as to whether they were functioning normally.

Internally, the engine showed no signs of deficiencies in the lubrication system. All internal components were impregnated with lubricating oil. The oil filters showed no signs of filings.

The propeller blades had backward-facing bending at their ends. This type of deformation is characteristic of an engine that was not developing power when the aircraft collided with obstacles.

All the conditions observed in the examinations led to the conclusion that the engine was not developing power at the moment the aircraft crashed into the ground.

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

The aircraft arrived at the hangar of the Starflight Escola de Aviação Civil, which was a CIAC and an ANAC-certified OM, in September 2018.

As it turned out, the owner of this organization and the owner of the plane had a friendly relationship. It was at the CIAC linked to this OM that the PIC took its PPR course, which favored the informality of the processes related to the maintenance of the PT-DME.



According to the reports collected, the maintenance team did not fully monitor the aircraft and the services performed on it, especially in the check after changing the spark plugs, removing fuel, refueling, and taking off for the flight on which the accident occurred.

### 1.18 Operational information.

It was a private flight conducted under the RBHA No. 91, intended to verify the proper functioning of the aircraft after performing maintenance services.

The aircraft was within the weight and balance limits specified by the manufacturer.

According to the information obtained, the PT-DME was used privately (according to its category) for the owner's private use. The data collected showed that flights were carried out sporadically.

According to information collected in interviews with the OM team where the aircraft was being maintained, during a check after maintenance, the engine showed oscillations in the operating parameters, but the PIC judged the condition as normal. Respondents were unable to inform which parameters presented these variations.

Also, according to these reports, the pilot did not perform the engine checks before takeoff.

The take-off proceeded normally until, approximately three minutes after the plane left the ground, the pilot reported on the AFIS frequency that he was returning to runway 27 (threshold opposite the one used for take-off), without initially saying the reason for the return.

Asked by the EPTA operator if he was declaring an emergency, the PIC then declared mayday, mayday and, a few seconds later, the plane was seen crashing into the ground while apparently making a left turn.

The plane was flying over a densely populated area, and there were no suitable places for a forced landing (Figure 5).



Figure 5 - Sketch of the occurrence.

### 1.19 Additional information.

The RBHA 91, in force at the time of the occurrence, provided, in its section 91.403 - "General", letter (e), the following:

91,403 - GENERAL

[...]

(e) Except as provided in paragraph (f) of this section, no person may operate an aircraft under RBHA 91 or operate an aircraft under RBHA 135, not registered in

the TPR category, unless the owner or operator has submitted to the DAC or SERAC, as applicable, an appropriate Declaration of Annual Maintenance Inspection (DIAM) for said aircraft in the last 12 months, attesting to its airworthiness condition. Aircraft under this paragraph that were exempt from the IAM Declaration have until 30June2006, to comply with this requirement.

It was found that there was an OS No. 012/2019, opened by the OM of Starflight – *Escola de Aviação Civil* on 25MAR2019, for the performance of the IAM and CA renewal.

The closing of this OS took place on 15APR2019. The record contained all the services performed and the items that were replaced, including the installation of the servo injection pump, model RSA-5AD1, Part Number (PN) 2524054-9, Serial Number (SN) 794K, after carrying out a general overhaul, a review that was carried out by another Maintenance Organization, WIP Aviação. However, the respective primary records were not presented in the aircraft's logbooks.

It was also found that there was an Information Map of Component Control, prepared by the same OM, intended for the performance of the IAM and the CA renewal, dated 02APR2019, which did not include the existence of expired components.

In order to carry out the IAM and renew the CA, the OM requested, on 15FEB2019, a special authorization, given that the ST-10 model was not included in its EO, issued on 20JUL2016. On 15MAR2019, the ANAC issued the special authorization.

Once the aircraft's CA was suspended, a request would be necessary to carry out the test flight and the issuance of an AEV, according to section 21.197 of the RBAC No. 21, Amendment 04, in force at the time.

21.197 Special flight authorization

(a) A special permit to fly may be issued for an aircraft that temporarily does not meet all applicable airworthiness requirements, but which still has conditions of safe flight.

The AEV, for carrying out the test flight after maintenance, was issued on 02APR2019.

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

Nil.

## **2. ANALYSIS.**

It was a private flight, conducted according to the requirements established in the RBHA 91, in force at the time of the occurrence, intended to verify the proper functioning of the aircraft after performing maintenance services.

The severe damage resulting from the impact and the action of the fire that followed the crash prevented the examination and functional testing of several components of the engine and systems of the plane, such as the servo injector, fuel pump and magnetos.

Nevertheless, the spark plugs showed characteristics that they had been newly installed, and the internal components of the impeller showed no signs of deficiencies in the lubrication system.

On the other hand, the propeller blades presented backward bending at their ends, characteristic deformation of an engine that was not developing power at the moment the aircraft collided with obstacles.

Likewise, the plane's trajectory in the final moments of the flight, indicated an unsuccessful attempt to return to the runway after an engine stop.

In addition, information gathered that, during a check after maintenance, the engine had exhibited oscillations in operating parameters suggested that there might be a discrepancy in the propellant that was not properly evaluated or corrected.

Thus, based on these data and the findings collected during the engine examinations, it was concluded that the propellant was not developing power when the aircraft collided with the ground.

The absence of primary records in the logbooks, referring to the conclusion of the OS related to the IAM and the CA's renewal, necessary for the approval of return to the service, suggests some degree of informality and lack of follow-up in the execution of the services.

Such circumstances raised doubts as to the quality of the maintenance services performed on the aircraft and on the components overhauled by other maintenance organizations.

The release of the aircraft to return to service without the respective primary records being made in the logbooks could be related to inadequate supervision of the planning and execution activities in the technical scope by the OM management.

From the data available in the ANAC's SACI and based on the information that was collected regarding the process of execution of the IAM and the CA's renewal, it was concluded that the PT-DME was submitted to procedures that aimed to restore the aircraft's airworthiness condition, compliant with the RBHA 91, while operating based on an AEV.

Furthermore, it is possible that a state of high motivation, due to the appreciation of self-interest, both on the part of the OM manager and the aircraft owner, because of their friendship, as well as the fact that the pilot intended to use the plane the following week, has stimulated the release of the aircraft and the completion of the flight.

In this scenario, reports that the pilot used to perform pre-flight and post-flight memory checks and that he did not follow a formal procedure during his flights, as well as the fact that engine checks were not performed before takeoff, revealed postures such as complacency, impulsiveness, improvisation, and non-observance of procedures.

Considering the reports that described the pilot as a reckless person, with difficulties in dealing with emergencies and who did not feel safe flying alone, it is possible that this attitude was associated with an emotional state of anxiety and fear, which may have degraded his performance while managing an unexpected situation (engine failure).

Even though the region where the accident took place did not have adequate places to perform a forced landing, the fact that the aircraft hit the ground at a high angle and perpendicular to the public road suggests that an inadequacy in the use of flight controls resulted in an uncontrolled approach.

These biases likely produced a state of stress that made it impossible for the pilot to seek an aircraft positioning that would allow better chances of survival in the face of the situation.

### **3. CONCLUSIONS.**

#### **3.1 Facts.**

- a) the pilot had a valid CMA;
- b) the pilot had valid MNTE and IFRA Ratings;
- c) it was not possible to establish whether the pilot had the necessary recent experience to consider him qualified to perform the flight;



- d) the aircraft had its CA expired since 25JAN2019;
- e) the OM, considering that its EO did not include the ST-10 model, requested, and received from the ANAC a special authorization to carry out the IAM and renew the CA;
- f) an AEV was requested, and subsequently provided, to carry out the test flight;
- g) the aircraft was within the weight and balance limits;
- h) the airframe, engine and propeller logbook records were outdated;
- i) the weather conditions were favorable for the flight;
- j) after the take-off, the pilot requested to return to the Aerodrome of origin, informing the emergency;
- k) the plane crashed into the ground, in a residential area, located on the extension of runway 09 of SBPR;
- l) the identified points of impact showed that the aircraft landed in a high-angle trajectory, practically at 90 degrees with the public road;
- m) the extension of runway 09 was characterized by being a densely populated area and did not offer easily identifiable places for a forced landing;
- n) the Investigation Team received reports that, during a check after maintenance, the engine presented oscillations in the operating parameters;
- o) the Investigation Team received reports that the pilot did not perform the engine checks before the take-off;
- p) friends, family, and people who flew with the pilot reported that they saw him as a reckless and fearful person during the flight;
- q) the conditions observed in the tests performed led to the conclusion that the engine was not developing power at the moment the aircraft collided with the ground;
- r) the aircraft was destroyed; and
- s) the PIC suffered fatal injuries.

### 3.2 Contributing factors.

#### - Control skills – undetermined.

Although the region where the accident took place did not have adequate places for carrying out a forced landing, the fact that the aircraft hit the ground with a high-angle trajectory and perpendicular to the public road, suggests that an inadequacy in the use of the controls of flight resulted in an uncontrolled approach.

#### - Attitude – undetermined.

Reports that the pilot used to perform pre-flight and post-flight memory checks and that he did not follow a formal procedure during his flights, as well as the fact that engine checks were not performed before take-off revealed attitudes such as complacency, impulsiveness, improvisation, and non-observance of procedures.

#### - Emotional state – undetermined.

It is possible that attitudes related to complacency, impulsiveness, improvisation and non-compliance with procedures were associated with an emotional state of anxiety and fear, which may have impaired the pilot's performance when managing an unexpected situation (engine failure).

**- Aircraft maintenance – undetermined.**

The absence of primary records in the logbooks, referring to the conclusion of the OS related to the IAM and the renewal of the CA, necessary for the approval of return to the service, suggests some degree of informality and lack of follow-up in the execution of the services, circumstances that could compromise the quality of maintenance services performed on the aircraft.

**- Motivation – undetermined.**

It is possible that a state of high motivation, due to the appreciation of self-interest, both on the part of the OM manager and the aircraft owner, because of their friendship, as well as the fact that the pilot intended to use the aircraft the following week, encouraged the release of the aircraft and the completion of the flight.

**- Organizational processes – undetermined.**

It is also possible that the criteria adopted for granting the special authorization to carry out the IAM and CA's renewal, as well as for the provision of an AEV related to the performance of the test flight, were not satisfactory to guarantee that the aircraft was properly inspected and placed in a sufficiently safe condition for the flight to take place.

**- Managerial oversight – undetermined.**

The release of the aircraft to return to service without the respective primary records being made in the logbooks could be related to inadequate supervision, by the OM management, of the planning and execution activities in the technical scope.

#### **4. SAFETY RECOMMENDATION.**

*A proposal of an accident investigation authority based on information derived from an investigation made intending to prevent 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 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:**

**To the Brazil's National Civil Aviation Agency (ANAC):**

**A-061/CENIPA/2019 - 01**

**Issued on 03/23/2023**

Work with the Maintenance Organization Starflight *Escola de Aviação Civil* (OM Certificate nº 1408-35/ANAC), for that OM to improve its management supervision mechanisms, particularly concerning quality control of services performed by it, and ensuring compliance with applicable regulations in the approval for return to service of the aircraft it maintains.

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**Issued on 03/23/2023**

Work with the WIP Aviation Maintenance Organization (OM Certificate No. 0107-01/ANAC) for that OM to improve its management supervision mechanisms, particularly concerning the quality control of the services performed in the general overhaul of the pumps injection molding machines, model RSA-5AD1, PN 2524054-9.

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Ensure that the criteria adopted for granting special authorizations for the purpose of performing services that are not included in the EO of a particular OM, are sufficiently adequate to guarantee their complete execution.

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

None.

On March 23<sup>th</sup>, 2023.

