COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
IG - 033/CENIPA/2020

OCCURRENCE:	**SERIOUS INCIDENT**
AIRCRAFT:	**N36DA**
MODEL:	**G-1159A**
DATE:	**01MAR2020**

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 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 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 01MAR2020 serious incident with the G-1159A aircraft model, registration N36DA. The accident was classified as “[SCF-PP] System/Component Failure or Malfunction Powerplant – Engine Failure in Flight”.

During the cruise flight at FL 450, multiple malfunctions occurred in the aircraft systems, culminating in the flameout of both engines or un-commanded shut-down of both engines. The crew managed to restart both engines and land at the Marechal Rondon Aerodrome (SBCY), Cuiabá - MT.

There was no damage to the aircraft.

The two crewmembers and the two passengers left unharmed.

An Accredited Representative of the Air Accidents Investigation Branch (AAIB) – United Kingdom, (State where the engine was designed/manufactured) was designated for participation in the investigation.

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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AAIB	Air Accidents Investigation Branch
ANAC	Brazil's National Civil Aviation Agency
APP	Approach Control
APP-CY	Approach Control - Cuiabá
ATP	Airline Transport Pilot License - Airline Pilot License issued by the FAA
AVANAC	ANAC's Flight Authorization
CA	Airworthiness Certificate
CAVOK	Ceiling and Visibility OK
CENIPA	Aeronautical Accident Investigation and Prevention Center
FAA	Federal Aviation Administration
IFRA	Instrument Flight Rating - Airplane
METAR	Aviation Routine Weather Report
MPMG	ICAO Location Designator – Albrook International Airport - Marcos A. Gelabert - Panama
PIC	Pilot in Command
SBCY	ICAO Location Designator - Marechal Rondon Aerodrome, Cuiabá - MT
SBKP	ICAO Location Designator – Viracopos International Airport, Campinas - SP
SIC	Second in Command
UTC	Universal Time Coordinated

1. FACTUAL INFORMATION.

Aircraft	**Model:** G-1159A **Registration:** N36DA **Manufacturer:** Gulfstream Aerospace Corporation	**Operator:** Aeronautical Airmotive Modifications INC.
Occurrence	**Date/time:** 01MAR2020 - 2250 UTC **Location:** en-route **Lat.** 15°01'17"S **Long.** 056°38'57"W **Municipality – State:** Rosário Oeste – MT	**Type(s):** "[SCF-PP] System/Component Failure or Malfunction Powerplant" **Subtype(s):** Engine Failure in Flight

1.1 History of the flight.

The aircraft took off from the Albrook International Airport "Marcos A. Gelabert" (MPMG) - Panama, to the Viracopos Aerodrome (SBKP), Campinas - SP, in order to perform a private flight with two pilots and two passengers on board.

During the cruise flight at FL 450, multiple malfunctions occurred in the aircraft systems, culminating in the flameout of both engines or un-commanded shut-down of both engines.

During the descent, when crossing FL 280, the pilots managed to re-ignite both engines.

The destination was switched to the Marechal Rondon Aerodrome (SBCY), Cuiabá - MT, and the landing took place normally.

The aircraft had no damage.

The two crewmembers and two passengers left unharmed.

1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	2	2	-

1.3 Damage to the aircraft.

Nil.

1.4 Other damage.

None.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Flight Hours		
	PIC	SIC
Total	14.500:00	Unknown
Total in the last 30 days	25:00	Unknown
Total in the last 24 hours	05:00	Unknown
In this type of aircraft	3.500:00	Unknown
In this type in the last 30 days	15:00	Unknown
In this type in the last 24 hours	05:00	05:00

N.B.: Note1: the data relating to the PIC's flown hours were obtained through his own statement.

Note 2: the SIC flight experience data was not provided by the him or by the operator.

1.5.2 Personnel training.

The PIC took the Private Pilot course at the American Flyers Aviation School - USA, in 1985.

The SIC did not inform the place and institution where he took the Private Pilot course.

1.5.3 Category of licenses and validity of certificates.

The PIC had the ATP License, issued by the FAA, and had valid G-1159 and IFRA Ratings.

The SIC had the ATP License, issued by the FAA, and had a valid G-1159 type aircraft Rating.

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 Medical Information.

1.6 Aircraft information.

The aircraft, serial number 450, was manufactured by Gulfstream American Corporate in 1986 and was registered as a Corporation on the FAA's Type Registration.

The Standard Airworthiness Certificate, issued by the FAA, equivalent to the CA was valid.

Airframe and engine logbooks were not presented.

Nothing was informed, and the Investigation Team did not have access to the documentation in which it was possible to identify the performance of the scheduled maintenance, as well as its control, to which the aircraft was submitted.

Several emails were sent to the PIC and the operator, requesting information about the engines installed in the aircraft, including: model and serial number, hours and cycles, as well as in relation to the maintenance performed on them.

The Investigation Team did not receive a response from the operator, and it was not possible to collect maintenance information to support the investigation of the Material Factor.

Still in the search for information about the aircraft that could support the investigation, the ANAC was asked to try to communicate with the operator through the FAA, without success. In addition, the contacts informed, also did not respond to requests for information made by the CENIPA.

This need to obtain information, specifically in the case of engines installed on the aircraft, was also shared with the AAIB and with the engine manufacturer, Rolls Royce.

Rolls-Royce was not contracted by the operator or owner to provide maintenance services for the engines fitted to this aircraft and therefore does not hold records of recent maintenance activity. Without confirmation of the engine serial numbers fitted to the aircraft it was not possible to provide any relevant information. The operator has not contacted Rolls-Royce for troubleshooting advice or regarding replacement parts for this engine.

1.7 Meteorological information.

The METAR of the Marechal Rondon Aerodrome (SBCY), where the landing took place, provided the following information:

METAR SBCY 012200Z 14004KT CAVOK 30/19 Q1010=

METAR SBCY 012300Z 13004KT CAVOK 28/20 Q1011=

Conditions were favorable for the visual flight.

1.8 Aids to navigation.

Nil.

1.9 Communications.

According to the transcripts of the communication audios, it was found that the crewmembers maintained radio contact with the APP-CY and that there was no technical abnormality of communication equipment during the flight.

At 23h10min17s (UTC), the N36DA confirmed that it would land at SBCY due to a total failure in one of the engines and partial failure in the other.

1.10 Aerodrome information.

The occurrence took place out of the Aerodrome.

1.11 Flight recorders.

Nil.

1.12 Wreckage and impact information.

Nil.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

Nil.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

Nil.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

Nil.

1.16 Tests and research.

During the field investigation procedures carried out on 03MAR2020, with the aircraft parked in the SBCY apron, the engines were started and it was found that a yellow warning light of the electrical system remained on all the time - light "L AC Power ".

The pilot explained that it was a discrepancy in some component that would be related to the generation of electric energy. The engines were turned off and the aircraft was closed and parked in the same location.

After this verification, the pilots informed that the operator would be called to repair the aircraft and it was agreed that the CENIPA would monitor all the procedures in order to carry

out the necessary tests on the systems and collect, if necessary, the affected components for further examination.

However, after the pilots returned to their places of origin, none of the operator's contacts, who were provided by them, responded to calls from the Investigation Team. Therefore, it was not possible to obtain any other information about the aircraft or the operator.

1.17 Organizational and management information.

Nil.

1.18 Operational information.

The aircraft was fueled with 27,500 Lbs and took off from MPMG at 18:32 (UTC), to SBKP with two pilots and two passengers on board.

The card prepared for take-off presented by the crewmembers to the Investigation Team stated that the weight was 68,000 Lbs, using the flaps at 20° and with 11° of trim, as shown in Figure 2.

Figure 2 – Take-Off card.

The flight plan submitted to the civil aeronautics authority of Panama, and received by the Brazilian authority, informed that the flight would be carried out at FL 390, that the autonomy was 8 hours of flight and that the time needed to reach the destination was 6 hours and 10 minutes, as can be seen in Figure 3.

Indicativo	: N36DA	Número de aeronaves	: 1	Tipo de voo	: G
Regra de voo	: I	Tipo de aeronave	: GLF3	ADES	: SBKP
Equip. aux.	: SWDFGHIYZ			ADEP	: MPMG
Equip. vig.	: S			Velocidade	: N0450
Data do voo	:	Dia da Semana	: DOM	EOBT	:
Turbulência	: M	Tipo de Plano	: CPL	EET	:
Aeród. alt1.	:	Aeród. alt2.	:	Nível	: F390
Código SSR	: A0252				
Rota	: GERTU CPN				
Observação	: NAV/GPS DOF/200301 EET/SBAZ0202 SBBS0300 RMK/COLOMBIA 010051				

Figure 3 - Extract from the flight plan received by the Brazilian authority.

The printed flight plan, carried out through <https://skyvector.com/>, had the FL 450 as the final level and that was what was being used by the aircraft when entering Brazilian airspace.

According to the crew's report, the first failure during the flight was the lighting of the "L AC Power" light, indicating failure in the conversion of AC to DC power on the left side. Then, several other abnormalities appeared in the sequence, among them pressurization failures and failure of the two engines.

During the field investigation, the crewmembers were asked for the logbook. However, it was not on the aircraft and it was informed that the records were made by the operator based on the flight data that the crew sent.

The operator did not provide, even after successive requests, records of the last maintenance of each cycle, DA/AD control map, engine part number and serial number, component control map, nor what was reported in the logbook on the technical status of the aircraft.

1.19 Additional information.

On the day after the end of the field investigation procedures, 04MAR2020, in contact with the ATC unit of Cuiabá, the CENIPA became aware that the aircraft was trying to obtain authorization to takeoff.

In that context, and on the same day, the CENIPA informed the ANAC about the aforementioned attempt without any proof that the proper maintenance procedures had been carried out to resolve the discrepancy in the electrical system that had been noted the previous day.

Subsequently, when researching the movement of the aircraft, it was found that it did not take off from Cuiabá that day and that it remained parked in the airport apron until 01JUN2021.

By means of Official Letter no. 7/CH/884 dated 14JUL2020, ANAC was consulted, among other things, about what actions were necessary, whether maintenance or authorizations, for the aircraft to be able to fly again after the emergency landing at Marechal Rondon Aerodrome (SBCY), Cuiabá - MT.

The ANAC responded to the questioning, through Official Letter No. 117/2020/ASSOP-ANAC, of 05AUG2020, informing that in case of any serious event of failure, malfunction or defect, according to the RBAC 145 (145,221), the Organization of Maintenance (OM) that would provide the service should report what happened to the ANAC and to the type design holder.

The Agency's response did not make it clear whether, in addition to the report, there would be additional actions to be carried out, such as the presentation of some supporting documentation or even an on-site verification of the aircraft condition.

However, considering the current regulations on maintenance services for aeronautical products, it was necessary to approve the return to service of an article after maintenance.

In contact with the administration of the Cuiabá Airport, it was found that the aircraft N36DA took off from SBCY on 01JUN2021 to SGES, using the ANAC Flight Authorization (AVANAC) nº 204.

However, the aircraft landed back at SBCY about 10 minutes later due to technical problems.

It is also said that the aircraft took off from SBCY on 25JUN2021 to MPTO using another AVANAC, No. 1393.

On 30SEPT2021, it was asked what records the ANAC had on the departure of the aircraft after being involved in the occurrence, considering that it had presented a failure which resulted in an aeronautical occurrence that was under investigation, as well as the

communication made, on 04MAR2020, about the breakdown in the electrical system, making it clear that it was not airworthy.

The response received, on 15OCT2021, did not report on the records that the ANAC had and directed the competence on airworthiness to the Civil Aviation Authority of the aircraft registration, which in the specific case was the FAA.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

The aircraft took off from the Albrook International Airport "Marcos A. Gelabert" (MPMG) - Panama, to the Viracopos Aerodrome (SBKP), Campinas - SP, in order to perform a private flight, with two pilots and two passengers on board.

During the cruise flight, at FL 450, according to information from the crewmembers, the "L AC Power" light came on, indicating failure in the conversion of AC to DC energy on the left side.

Then, several other abnormalities appeared in the sequence, among them cabin pressurization failure and flameout of both engines or un-commanded shut-down of both engines.

During the descent, when crossing FL 280, the pilots reported having re-ignited both engines and the destination was switched to the Marechal Rondon (SBCY) Airport, Cuiabá - MT.

Still on the day of the field action, with the aircraft parked in the SBCY apron, the aircraft's engines were started and it was verified that a yellow warning light of the electrical system, "L AC Power" remained on all the time, the same as lit up during the flight that ended with the emergency landing in Cuiabá.

It was not possible to continue the research to understand the event, since the operator did not provide the necessary information to proceed with the investigation.

Several paths were tried by the Investigation Team: contact with the crewmembers, with the operator and even with the FAA, through the ANAC. However, the answers obtained were not enough.

On the issue of the aircraft's non-airworthiness status and whether there were procedures to be adopted by the Agency, since it should grant an AVANAC for the take-off of the aircraft from Cuiabá, the response received from the ANAC was not sufficient to clarify the matter, since the competence regarding the airworthiness was directed to the Aircraft Registration Authority, which in the specific case was the FAA, despite the knowledge about the discrepant condition of the aircraft by the Brazilian Civil Aviation Authority.

Considering the information obtained, the event denoted fragility in the ANAC's control mechanisms, since the N36DA aircraft took off from Brazilian territory without any proof of repair to the regulatory agency or even of its airworthiness condition.

3. CONCLUSIONS.

3.1 Facts.

a) the pilots had valid Medical Information;

b) the PIC had valid G-1159 and Instrument Flight ratings;

c) the SIC had a valid G-1159 aircraft type rating;

d) the pilots were qualified and had experience in the type of flight;

e) the aircraft had a valid Standard Airworthiness Certificate issued by the FAA;

f) the airframe and engine logbook records were not presented;

g) the weather conditions were favorable for the flight;

h) the aircraft was not damaged; and

i) the occupants left unharmed.

3.2 Contributing factors.

- **Other – undetermined.**

There was no cooperation from the operator regarding the provision of documentation that attested to the performance of scheduled and unscheduled maintenance.

It was not possible to verify if the discrepancies that resulted in the emergency landing were related to the non-performance of maintenance services in a consistent manner, which could provide an expectation of adequate functioning of the aircraft systems.

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:

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

IG-033/CENIPA/2020 - 01 **Issued on 03/23/2023**

Reassess its internal inspection and control mechanisms in order to certify that foreign-registered aircraft, when performing take-offs and landings in Brazilian territory, are in compliance with the conditions of continued airworthiness, notably upon prior notice, among other conditions, that these aircraft had malfunctions that resulted in an emergency landing, as well as when attempting to take off without having proven the due return to service.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On March 23th, 2023.