COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
IG - 083/CENIPA/2019

OCCURRENCE:	**SERIOUS INCIDENT**
AIRCRAFT:	**PR-NIA and PP-PTQ**
MODEL:	**AS 350 B2 and ATR-72-212A**
DATE:	**27MAY2019**

NOTICE

According to 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. Therefore, the report is a technical document reflecting 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, using this report for any purpose other than 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 27MAY2019 serious incident with the AS 350 B2 and ATR-72-212A aircraft models, registrations PR-NIA and PP-PTQ. The serious incident was classified as “[MAC] Separation loss/collision in flight | Air Traffic”.

After the takeoff from runway 18 of the Leite Lopes Aerodrome (SBRP), Ribeirão Preto - SP, the PR-NIA flew over the PP-PTQ with a vertical separation of 400 ft. The latter performed the RNAV approach procedure (GNSS) Z RWY 18.

The aircraft had no damage.

The PR-NIA pilot, the four PP-PTQ crewmembers, and their 57 passengers left unharmed.

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

CONTENTS

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ACC-BS	Area Control Center - Brasilia
ADC	Aerodrome Chart
AIS	Aeronautical Information Service
ANAC	Brazil's National Civil Aviation Agency
APP-YS	Approach Control - Pirassununga
ATC	Air Traffic Control
ATS	Air Traffic Services
BEA	*Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile*
CA	Airworthiness Certificate
CAVOK	Ceiling and Visibility OK
CENIPA	Aeronautical Accident Investigation and Prevention Center
CIV	Pilot`s Flight Logbook
CMA	Aeronautical Medical Certificate
CTR	Control Zone
DAESP	São Paulo Aviation Department
DECEA	Airspace Control Department
HMNT	Single-Engine Turbine Rating - Helicopter
ICA	Command of Aeronautics' Instruction
IFR	Instrument Flight Rules
IFRA	Instrument Flight Rating - Aircraft
IFRH	Instrument Flight Rating - Helicopter
IMC	Instrument Meteorological Conditions
INFRAERO	Brazilian Airport Infrastructure Company
METAR	Meteorological Aerodrome Report
PIC	Pilot in Command
PLA	Airline Pilot License – Airplane
PLH	Airline Pilot License – Helicopter
RADAR	Radio Detection And Ranging
SBRP	ICAO Location Designator - Leite Lopes Aerodrome, Ribeirão Preto - SP
TCAS	Traffic Collision Avoidance System
TPP	Private Air Service Aircraft Registration Category
TPR	Regular Public Air Transport Aircraft Registration Category
TWR-RP	Ribeirão Preto Aerodrome Control Tower - SP
UTC	Universal Time Coordinated
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

1. FACTUAL INFORMATION.

Aircraft	**Model:** AS 350 B2 and ATR-72-212ª **Registration:** PR-NIA and PP-PTQ **Manufacturer:** Eurocopter France e Aerospatiale and Alenia	**Operator:** Private and Passaredo *Transp.Aéreos* S.A
Occurrence	**Date/time:** 27MAY2019 - 1141 UTC **Location:** SBRP Aerodrome **Lat.** 21°08'11" S **Long.** 047°46'36" W **Municipality – State:** Ribeirão Preto - SP	**Type(s):** "[MAC] Separation loss/collision in flight". **Subtype(s):** Air Traffic

1.1 History of the flight.

The aircraft with registration PP-PTQ, an ATR-72-212A, took off from the Santa Genoveva Aerodrome (SBGO), Goiânia - GO, to the Leite Lopes Aerodrome (SBRP), Ribeirão Preto - SP, at 1028 (UTC), to transport personnel, with two pilots, two flight attendants and 57 passengers on board.

The aircraft with registration PR-NIA, an AS 350 B2 (*Esquilo*), took off from runway 18 of the SBRP Aerodrome to the Sítio Santa Chiara Helipad (SIVH), Orlândia - SP, at 1139 (UTC), for a transfer flight, with one pilot on board.

After taking off from runway 18 (183° heading), the PR-NIA turned approximately 175° to the left and took the destination heading 008°.

While maintaining a parallel trajectory to runway 36 and close to it, the PR-NIA conflicted with the traffic of the PP-PTQ, which was performing the RNAV (GNSS) approach procedure Z RWY 18 of SBRP.

After the PP-PTQ alert, by radio, and guidance from the TWR-RP, the PR-NIA moved away from the approach trajectory to SBRP runway 18.

After the traffic conflict and before landing on runway 18, the PP-PTQ informed the TWR-RP that its TCAS had presented an Advisor warning because of the PR-NIA approach.

The aircraft was not damaged.

The PR-NIA pilot, the PP-PTQ crewmembers, and its 57 passengers left unharmed.

1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	5	57	-

1.3 Damage to the aircraft.

None.

1.4 Other damage.

None.

1.5 Personnel information.

1.5.1 Crew's flight experience.

PR-NIA Flight Hours	PIC
Total	1.583:47
Total in the last 30 days	18:15
Total in the last 24 hours	00:00
In this type of aircraft	543:52
In this type in the last 30 days	18:15
In this type in the last 24 hours	00:00

N.B.: The data relating to the hours flown by the PR-NIA pilot were obtained through the CIV`s records.

PP-PTQ Flight Hours	PIC	SIC
Total	13.164:20	12.815:35
Total in the last 30 days	49:25	52:35
Total in the last 24 hours	02:35	02:35
In this type of aircraft	3.290:00	3.203:00
In this type in the last 30 days	49:25	52:35
In this type in the last 24 hours	02:35	02:35

N.B.: The data relating to the hours flown by the PP-PTQ pilots were obtained through the operator's records**.**

1.5.2 Personnel training.

The PR-NIA`s PIC took the PPH course in 2009.

The PP-PTQ`s PIC took the PPR course in 1982.

The PP-PTQ's SIC took the PPR course in 2011.

1.5.3 Category of licenses and validity of certificates.

The PR-NIA`s PIC had the PLH License and a valid HMNT Rating. He did not have an IFRH Rating and had no experience flying under IFR.

The PP-PTQ`s PIC had the PLA License and valid AT47 type aircraft (which included the ATR-72-212A model) and IFRA Ratings.

The PP-PTQ's SIC had the PLA License and valid AT47 and IFRA Ratings.

1.5.4 Qualification and flight experience.

All crewmembers involved in this occurrence were qualified and had experience in the respective types of flight.

1.5.5 Validity of medical certificate.

All crewmembers involved in this occurrence had valid CMAs.

1.6 Aircraft information.

The PR-NIA aircraft, serial number 7243, model AS 350 B2, was manufactured by Eurocopter France in 2011 and was registered in the TPP Category.

The aircraft had a valid CA.

The airframe and engine logbook records were updated.

The PP-PTQ aircraft, serial number 874, model ATR-72-212A, was manufactured by Aerospatiale and Alenia in 2009 and was registered in the TPR Category.

The aircraft had a valid CA.

The technical maintenance records were updated.

1.7 Meteorological information.

The METAR of the SBRP Aerodrome had the following information:

METAR SBRP 270900Z 11004KT CAVOK 09/10 Q1018=

METAR SBRP 271000Z 15004KT CAVOK 08/09 Q1018=

METAR SBRP 271100Z 10005KT CAVOK 10/12 Q1019=

METAR SBRP 271200Z 12008KT CAVOK 11/16 Q1019=

METAR SBRP 271300Z 14005KT CAVOK 12/19 Q1019=

Weather conditions were favorable for the visual flight.

1.8 Aids to navigation.

All navigation and landing aids operated normally when the two aircraft approached.

1.9 Communications.

According to the communication audio transcripts between the PR-NIA and the PP-PTQ with the control agencies, it was found that the pilots maintained radio contact with the TWR-RP and that there was no technical abnormality of communication equipment during the flight.

In order to support the analysis of the sequence of events that preceded the traffic conflict between the two aircraft, the Investigation Team highlighted some transmissions that could help in understanding the dynamics of the serious incident. To record the times described in this field the UTC was used as a reference.

At 11:34:24, the PR-NIA made initial contact with the TWR-RP.

At 11:34:33, the PR-NIA reported that it was close to the Gold Sky hangar, requested the start of the engine, confirmed that the destination would be SIVH and that it was aware of the ATIS information.

At 11:34:39, the TWR-RP authorized the activation and requested that the PR-NIA be informed when it would be ready for taxi and takeoff.

At 11:37:27, the PR-NIA reported that it was ready for the taxi.

At 11:37:50, TWR-RP asked PR-NIA what their intentions for takeoff would be.

At 11:37:54, the PR-NIA reported that it intended to use the runway.

At 11:37:56, the TWR-RP reported being aware and authorized the taxi to TWY D, keeping the Tower listening.

At 11:38:30, authorized by the TWR-RP, the PR-NIA started the taxi via TWY N and TWY I.

At 11:38:59, PP-PTQ (Passaredo 2267) entered the final approach to SBRP runway 18 and made initial contact with the TWR-RP.

At 11:38:59, the TWR-RP asked the PP-PTQ to wait for land clearance, informed that the runway in use was 18, that the altimeter setting was 1019 and that the wind was 120° with 7 kt.

At 11:39:09, the PP-PTQ reported that it was aware and awaiting clearance for landing.

At 11:39:55, the PR-NIA reported that it was entering the apron.

At 11:40:00h, the TWR-RP informed the PR-NIA that TWY D was authorized to enter the runway, and the take-off from runway 18 was also authorized. Then, it informed the wind.

At 11:40:11, the PR-NIA informed that it would enter the runway via TWY D direction 18.

At 11:40:17, the TWR-RP reported that it was aware and asked the PR-NIA if that crewmember, after taking off would prefer to turn to the left or the right.

At 11:40:21, the PR-NIA replied that it preferred the left.

At 11:40:24, the TWR-RP reported that it was aware and that, after the take-off, the PR-NIA should make a left turn and that the aircraft should clear the runway axis. It also informed that the helicopter should continue along TWY D and, subsequently, along the main runway.

At 11:40:30, the PR-NIA agreed that it should continue along TWY D, subsequently, on the main runway and that it would start the take-off immediately.

At 11:40:55, the PR-NIA reported that it was off the ground.

At 11:40:57, the TWR-RP informed the PR-NIA of the take-off time at 11:39 (UTC) and determined that the PR-NIA should head towards the city of Orlândia and that there would be no interference with the final approach of the Passaredo aircraft. under instrument flight rules.

At 11:41:10, the PR-NIA responded that it was aware of the information, that it would take the Orlândia heading, and that it would not interfere with the Passaredo traffic.

At 11:41:15, the TWR-RP requested that the PR-NIA keep listening to the Tower and report in the fifth mile.

At 11:41:18, the PR-NIA stated that it would keep listening to the Tower and that it would report in the fifth mile.

At 11:41:36, the TWR-RP authorized the PP-PTQ landing (Passaredo 2267) and reported a 130° wind with 7 kt.

At 11:41:41, the PP-PTQ (Passaredo 2267) checked the clearance to land on runway 18 and reported that it had traffic information in TCAS.

At 11:41:49, the TWR-RP stated to the PP-PTQ (Passaredo 2267) that the PR-NIA had been instructed not to interfere with the approach of the PP-PTQ (Passaredo 2267) and, immediately, called the PR-NIA.

At 11:41:55, the PP-PTQ informed the Tower that the PR-NIA was ahead of it.

At 11:41:57, the PR-NIA reported that it was aware of the situation.

At 11:42:01, the TWR-RP reprimanded the PR-NIA, saying that the instruction not to interfere with PP-PTQ traffic should have been carried out. The controller told the PR-NIA that he had instructed him to proceed to sector “E” without interfering with traffic from the ATR that was making an instrument approach. He also stated that the PR-NIA was flying very close to the PP-PTQ.

At 11:42:13, the PR-NIA stated that it was aware and that it was already heading toward Jurucê.

At 11:43:06, after the PP-PTQ landed, the TWR-RP informed the landing time at 11:42 (UTC) and ordered it to clear the runway on the right, through TWY E and TWY B, and take the taxi to apron 1 listening to the Control Tower.

At 11:43:32, the TWR-RP told the PP-PTQ that it had informed the PP-NIA about the approach of the PP-PTQ. The Tower instructed it that, after the take-off, the PR-NIA should have kept the “E” sector without interfering with the PP-PTQ traffic. But, even so, the PR-NIA had proceeded in parallel with the runway, very close to the Passaredo ATR. The controller also stated that the PR-NIA only turned right and moved away from the approach after being called attention by the Control Tower.

At 11:43:51, the PP-PTQ informed the TWR-RP that the PR-NIA had crossed with it exactly on the twelve o'clock position, precisely on the displacement axis.

At 11:43:55, the TWR-RP informed the PP-PTQ that it was aware of the situation.

At 11:43:58, the PR-NIA reported that it was 5 miles away and it was vertical to Jardinópolis.

At 11:44:02, the TWR-RP asked the PR-NIA to call the Air Force Academy Control on frequency 119.75 MHz.

1.10 Aerodrome information.

The SBRP Aerodrome was public, managed by the DAESP, and operated under VFR and by IFR, day and night.

The runway was made of asphalt, with 18/36 thresholds, dimensions of 2,100 x 45 m, with an elevation of 1,804 ft.

For a better understanding of this occurrence, Figure 1, below, shows the SBRP ADC.

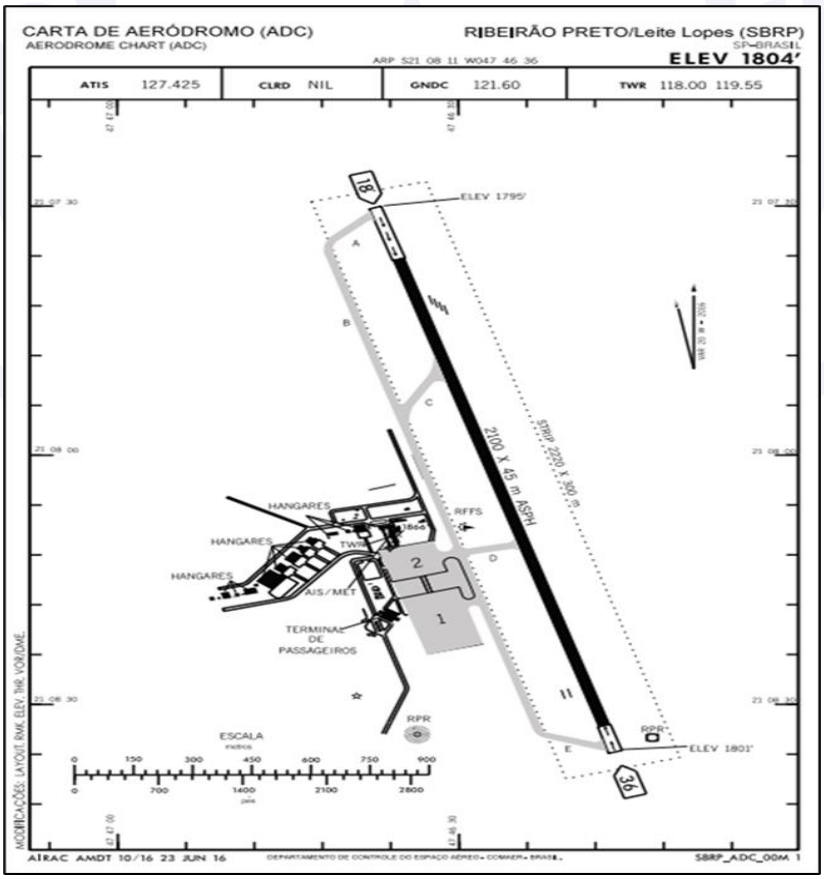


Figure 1 - SBRP Aerodrome Chart.

1.11 Flight recorders.

All communications established between the Control Tower and the PR-NIA, and between the Control Tower and the PP-PTQ were recorded on the SBRP Control Tower's audio recorder.

1.12 Wreckage and impact information.

Nil.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

According to the Investigation Team's findings, the PR-NIA pilot was performing the first takeoff of the day. He had taken the regulatory rest period and was in condition to carry out the flight.

Regarding the crewmembers of the PP-PTQ aircraft, as informed by the airline, the crew was performing the first landing of the day and had completed the regulatory rest period.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

The PR-NIA pilot had been flying at SBRP for several years and was very familiar with the operations at that Aerodrome.

The crewmembers of the PP-PTQ aircraft were considered experienced and were able to perform the flight.

The TWR-RP air traffic controller, who operated the radio equipment, and the assistant controller were career INFRAERO employees, had considerable professional experience, and were familiar with SBRP operations.

The occurrence took place early in the morning, when air traffic, in the vicinity of the Ribeirão Preto Aerodrome, was considered to be of low intensity, according to the ATS agencies.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

Nil.

1.16 Tests and research.

Nil.

1.17 Organizational and management information.

The PP-PTQ aircraft was registered as a TPR, regulated by the RBAC No. 121, and operated by a commercial airline, which met all the operational requirements established by the ANAC.

The PR-NIA aircraft was registered as a TPP, not operated by an airline. The entire operation of the PR-NIA was conducted by the PIC, according to the requirements established in the RBAC No. 91.

The SBRP Control Tower was operated by the INFRAERO and was within the operation area of the APP-YS and the ACC-BS.

In SBRP, there was a RADAR for air traffic control. On the date of the occurrence, the images generated by this equipment were not available to the Control Tower but were viewed by the APP-YS, in Pirassununga - SP.

1.18 Operational information.

On the date of the occurrence, an Operational Agreement was in force, whose objective was to standardize, discipline, define and guide operational norms, coordination procedures, means of communication, attributions, and responsibilities of the APP-YS, the TWR-RP, the AIS-YS, and the AIS-RP.

Regarding the responsibilities of the TWR-RP, the Operating Agreement provided the following information:

> 2.2. SPECIFIC PROCEDURES FOR AIRCRAFT LEAVING SBRP:
>
> 2.2.1.1. Transfer traffic to the APP-YS immediately after take-off and, if necessary, keep it on the TWR-RP frequency for separation and/or traffic information with aircraft evolving in the airspace under its jurisdiction, in this case, the APP-YS must be informed immediately.
>
> 2.2.2. Authorize aircraft taking off under VFR to comply with the following exit procedures:
>
> a) RWY 18: after take-off, they must keep heading towards the reference cities, Serrana (if for the E/SE/NE sector) or Dumont (if for the W/SW/NW sector) with a restriction of 3,500 ft, being able, through coordination, fly towards another city and ascend to another flight level established by the APP-YS.

At the time of the occurrence, the PP-PTQ was performing the final approach of the RNAV(GNSS) Z RWY 18 procedure (Figures 2 and 3).

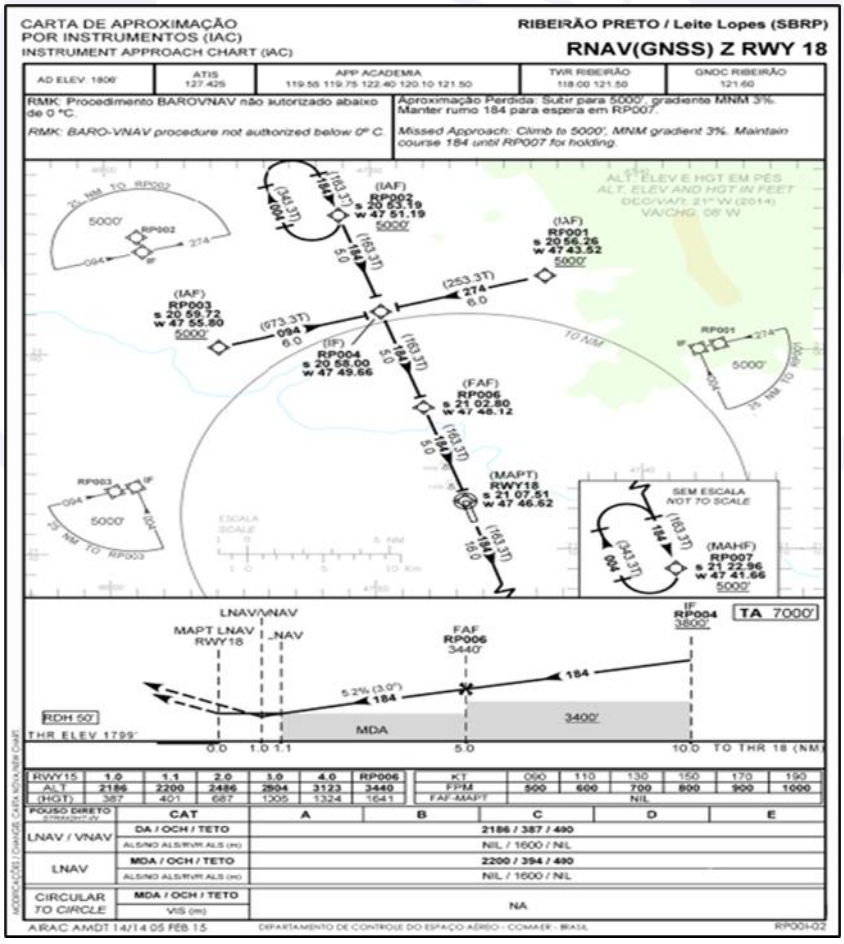


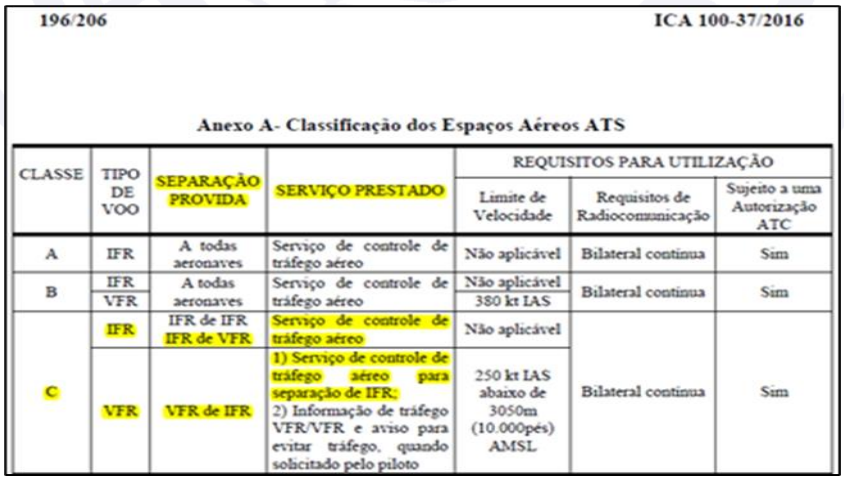
Figure 2 – RNAV (GNSS) Z RWY 18 Approach Chart.

Figure 3 - Sketch showing the trajectory of both aircraft.

Regarding collision avoidance between aircraft in flight, the ICA 100-12, Rules of the Air, described the following:

> 4.2 COLLISION AVOIDANCE
>
> 4.2.1 The rules described below do not relieve the pilot-in-command of the responsibility to take the best action to avoid a collision, including maneuvers based on resolution advisories provided by ACAS equipment.
>
> NOTE 1: To prevent possible collisions, it is important that vigilance is exercised on board the aircraft, regardless of the flight rules or the class of airspace in which the aircraft is operating, and also when operating in the movement area of an aerodrome.
>
> 5.2 PILOT RESPONSIBILITY
>
> It is the responsibility of the pilot in command of an aircraft in VFR flight to provide his own separation from obstacles and other aircraft through the use of vision, except in Class B airspace, where the separation between aircraft is the responsibility of ATC, but the provisions of 4.2.1 must be observed.

About the classification of Airspaces, the ICA 100-37/2016 stated the following (Figure 4):



196/206 ICA 100-37/2016

Anexo A- Classificação dos Espaços Aéreos ATS

CLASSE	TIPO DE VOO	SEPARAÇÃO PROVIDA	SERVIÇO PRESTADO	REQUISITOS PARA UTILIZAÇÃO		
				Limite de Velocidade	Requisitos de Radiocomunicação	Sujeito a uma Autorização ATC
A	IFR	A todas aeronaves	Serviço de controle de tráfego aéreo	Não aplicável	Bilateral continua	Sim
B	IFR	A todas aeronaves	Serviço de controle de tráfego aéreo	Não aplicável	Bilateral continua	Sim
	VFR			380 kt IAS		
C	IFR	IFR de IFR IFR de VFR	Serviço de controle de tráfego aéreo	Não aplicável	Bilateral continua	Sim
	VFR	VFR de IFR	1) Serviço de controle de tráfego aéreo para separação de IFR; 2) Informação de tráfego VFR/VFR e aviso para evitar tráfego, quando solicitado pelo piloto	250 kt IAS abaixo de 3050m (10.000pés) AMSL		

Figure 4 - Classification of the ATS Airspace provided for in ICA 100-37.

The area under the responsibility of the TWR-RP was the CTR Ribeirão and on the date of the occurrence, it was classified as Class C Airspace. As it is possible to notice, for traffic flying under IFR rules, the TWR-RP should provide separation from traffic flying

under VFR and IFR rules. For traffic flying under VFR rules, the TWR-RP should provide separation only for traffic flying under IFR rules.

For an aircraft to fly from SBRP directly to SIVH, it was necessary to fly over the urban area of Orlândia since Sítio Santa Chiara was located precisely in the Northern sector of that city.

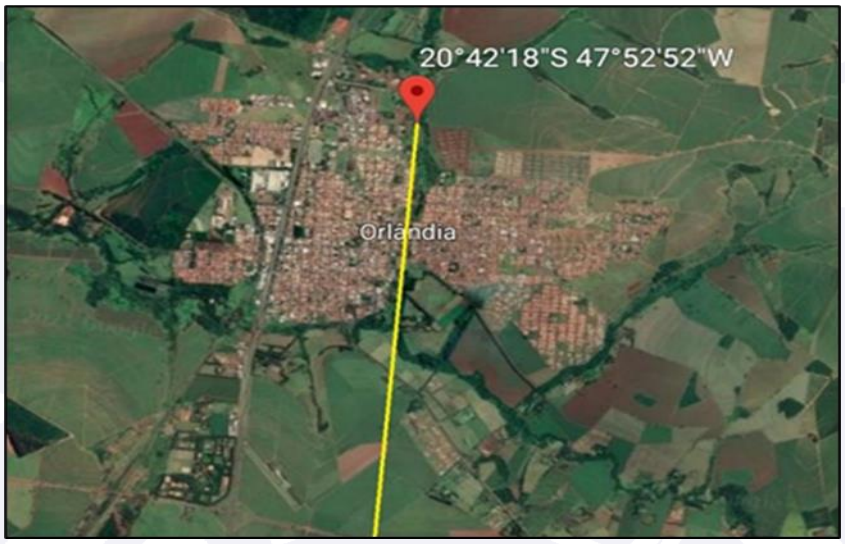


Figure 5 - The yellow line represents the final leg of the route between SBRP and SIVH.

The RADAR equipment installed at SBRP recorded the flight trajectories of the PR-NIA and the PP-PTQ.

Note that the PR-NIA, after takeoff, turned left with a small turn radius and headed toward the destination using a route that coincided with the final approach to runway 18 of SBRP.

In Figures 6 and 7, it is possible to see a small white line located between the white target (PR-NIA) and the inscription “A2000”. This line represents the aircraft heading of displacement. These Figures present the turn on the left performed by the PR-NIA.

Due to the images, it was also noticed that the turn after takeoff was carried out a few meters from the ground and that, due to the small radius, it practically did not provide separation from the main SBRP runway.

Figure 6 - RADAR image of the PR-NIA during the left turn.

Figure 7 - RADAR image of the PR-NIA a few seconds before the end of the left turn.

Figures 8, 9, 10, and 11 show the sequence of the occurrence dynamics until the intersection between the PR-NIA and PP-PTQ aircraft.

Figure 8 - RADAR image showing the aircraft on the same axis and at the same level.

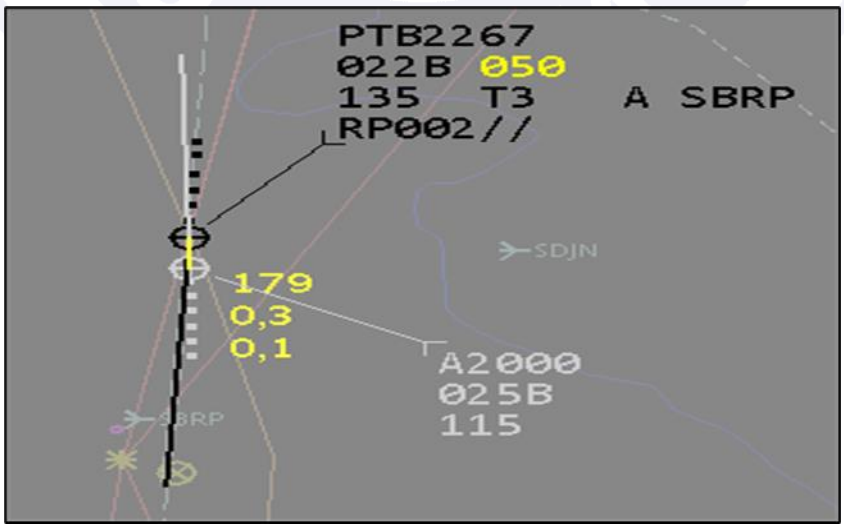


Figure 9 - Image of the aircraft on the same axis (PR-NIA 300 ft above the PP-PTQ).

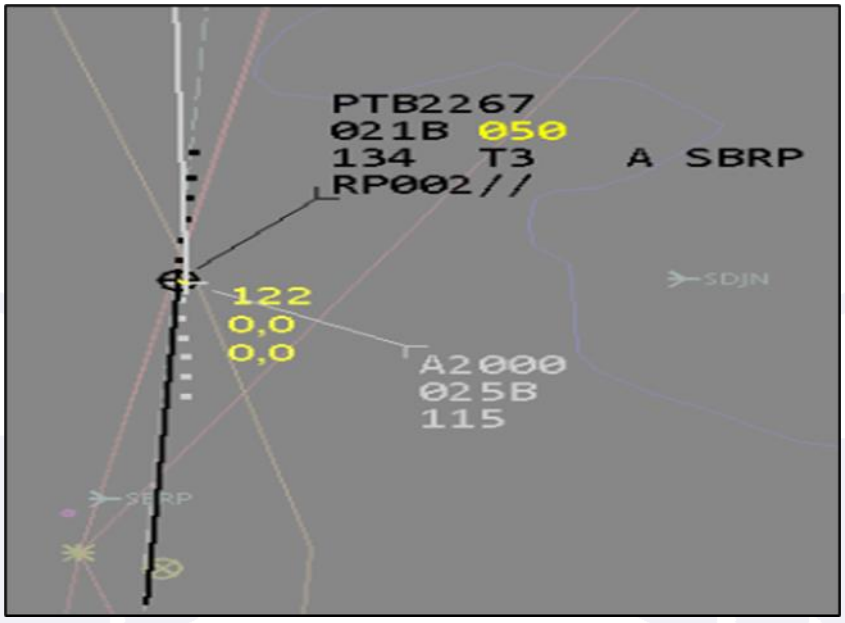


Figure 10 - Moment of the intersection. PR-NIA 400 ft above PP-PTQ.

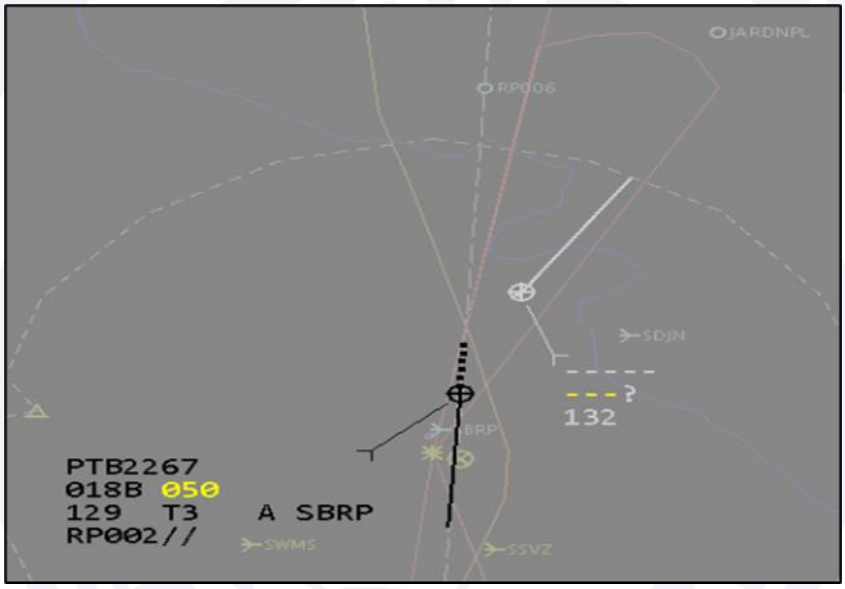


Figure 11 - PR-NIA moving away from the approach of runway 18, heading toward Jardinópolis.

1.19 Additional information.

Nil.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

The aircraft with registration PP-PTQ, an ATR-72-212A, Passaredo Call Code 2267, took off from SBGO to SBRP, at 1028 (UTC), to transport personnel, with two pilots, two flight attendants, and 57 passengers on board. The PP-PTQ flight proceeded smoothly until entering the final approach to land on runway 18 at SBRP.

While the PP-PTQ was landing on SBRP under IFR rules, the PR-NIA was preparing for takeoff under VFR rules. The destination of the PR-NIA was Helipad SIVH, and the magnetic heading between SBRP and SIVH was 008°.

Analyzing the audio recorded by the TWR-RP equipment, it was found that the dialogs between the aircraft flying around Ribeirão Preto and the SBRP Control Tower were calm, mainly because pilots and controllers were familiar with the operations, the weather was favorable for the visual flight and there was low traffic intensity in the region.

Moments before the occurrence, the controller operating the TWR-RP radio equipment showed good situational awareness regarding the traffic under his responsibility. Asking the PR-NIA crewmember whether he preferred a left or right turn demonstrated that the controller had realized that after takeoff from runway 18, the PR-NIA would need to turn approximately 180° to be able to fly to its destination.

The controller knew that this maneuver could cause the PR-NIA to conflict with traffic from the PP-PTQ, which was approaching from the Northern sector of the Aerodrome for landing, also on runway 18.

Thus, the controller informed the PR-NIA that the takeoff with a subsequent left turn was authorized but directed the PR-NIA to "clear" the axis of the runway. In other words, the controller required the PR-NIA, despite the helicopter's ability to make turns with minimal radius, to move away from the runway.

In a second moment, 33 seconds after the first warning, the controller authorized the Orlândia heading and decided that the PR-NIA should not interfere with the final approach of the PP-PTQ, which was flying under IFR rules. The PR-NIA pilot demonstrated that he understood all messages and collated the main information.

Analyzing the communications between the TWR-RP and the aircraft, it could be observed that the controller did not determine a precise heading for the PR-NIA after take-off, since the Operational Agreement that was in force at the time of the occurrence did not establish specific headings for aircraft taking off.

This agreement stated that aircraft under VFR rules should be allowed to maintain, after take-off from RWY 18, the heading of the reference cities: Serrana, Dumont, or some other, through coordination with the APP-YS.

Thus, the Tower operator authorized the PR-NIA to fly right to Orlândia. In this case, the clearance for the PR-NIA to fly toward Orlândia was equivalent to flying directly to the destination, SIVH, since, for an aircraft to fly from SBRP directly to SIVH, it would be necessary to fly over the urban area of Orlândia, once Sítio Santa Chiara was located in the Northern sector of that city.

Aware that the crews were familiar with the operations in SBRP and that the weather was favorable for the visual flight, the Tower controller left it up to the PR-NIA pilot to decide the appropriate distance between the helicopter and the PP-PTQ.

The PR-NIA then took off from SBRP, making a short run over the runway, heading toward runway 18. After a few meters away from the ground, the aircraft turned to the left and took the Orlândia heading.

It could be seen from the RADAR visualization images that the turn radius performed by the helicopter was significantly less than a turning radius that would normally be performed by a fixed-wing aircraft.

So, when stabilized on the Orlândia heading, the PR-NIA was still flying practically above the runway. As the helicopter gained height, the heading (approximately 008°) and the relatively small distance to the runway were being maintained. As the PR-NIA reached 2500 ft altitude, it crossed over the PP-PTQ, which was at that point crossing 2100 ft altitude and descending to land.

As noted on the RADAR images, at the time of the intersection, the PP-PTQ was at 300 ft altitude, and the PR-NIA was at 700 ft altitude. Therefore, a vertical separation of 400 ft.

Only after the intersection with the PP-PTQ, and after being warned by the SBRP Tower, the PR-NIA turned right and took the Jardinópolis heading.

Due to the TWR-RP warnings about approaching traffic in the opposite direction, and because there were no visibility restrictions in the moments before the occurrence, the PR-NIA pilot established visual contact with the PP-PTQ soon after stabilizing the aircraft on the Orlândia heading.

Even being in visual contact with the PP-PTQ and being instructed by the TWR-RP not to interfere in the aircraft approach for landing, the crewmember operating the PR-NIA did not establish an adequate separation between the two traffics.

Analyzing the aspects of this occurrence, in the PR-NIA pilot's understanding, even without any horizontal separation, 400 ft of vertical separation would be sufficient to provide the necessary flight safety. However, due to a lapse in judgment, the separation that was established by the AS 350 B2 crew was not enough to inhibit the TCAS equipment alarms of the PP-PTQ, which was affected by the proximity of the PR-NIA and triggered the Advisor warning.

Additionally, it was observed that the TWR-RP operator, despite having directed two warnings to the PR-NIA pilot: one to clear the runway axis, and the other to not interfere with the final approach of the Passaredo aircraft, did not make it clear which heading or course the helicopter should take in order to establish an adequate separation. The TWR-RP air traffic controller left it up to the PR-NIA pilot to decide how to provide separation and how far apart the traffic should be.

The fact that the PR-NIA pilot does not have IFRH clearance and has no experience flying under IFR rules may have contributed to that crewmember allowing an approach by the PP-PTQ that caused its TCAS equipment to issue the Advisor alarm.

3. CONCLUSIONS.

3.1 Facts.

a) all crewmembers had valid CMAs;

b) the PR-NIA pilot had a valid HMNT Rating;

c) the PP-PTQ pilots had valid AT47 and IFRA type aircraft Ratings;

d) the pilots of both aircraft were qualified and had experience in the respective types of flight;

e) the aircraft had a valid CA;

f) the weather conditions were favorable for the flight;

g) the air traffic controllers who worked at the TWR-RP at the time of the occurrence had their Medical Certificates and all valid qualifications;

h) the PP-PTQ was on approach for landing, performing SBRP RNAV 18 procedure and the PR-NIA was performing a takeoff from SBRP runway 18 under visual flight rules;

i) the TWR-RP authorized the aircraft with registration PR-NIA to take off from runway 18, turn left, and head toward the destination, Orlândia but determined that the helicopter, after the takeoff, release the runway axis;

j) the TWR-RP also determined to the PR-NIA that there would be no interference with the final approach of the Passaredo aircraft that was approaching under IFR;

k) the TWR-RP controller did not establish to the PR-NIA, a specific heading that would guarantee the separation between the traffics;

l) the TWR-RP controller left it up to the PR-NIA crew to define the separation between the helicopter and the ATR-72;

m) after the take-off from runway 18 of SBRP, the PR-NIA turned left and headed toward its destination, Orlândia, without providing the proper clearance with the runway;

n) after the takeoff of the PR-NIA and before the landing of the PP-PTQ, an intersection took place between the two aircraft with a vertical separation of 400 ft and without any horizontal separation;

o) after the intersection, there were no other complications in the flights of both aircraft;

p) the two aircraft were not damaged; and

q) all crewmembers of both aircraft and passengers left unharmed.

3.2 Contributing factors.

- **Piloting judgment – a contributor.**

As a result of an inadequate assessment, the separation that the PR-NIA pilot established in relation to the PP-PTQ proved to be insufficient.

- **Air Traffic planning (ATS) – a contributor.**

Despite having followed what was recommended in the Operating Agreement in force on the date of the occurrence, the clearance transmitted by the controller that operated the TWR-RP to the PR-NIA did not establish a heading or a course that would guarantee the due separation from the PP- PTQ.

- **Decision-making process – a contributor.**

Even though he was aware that he should move away from the final approach of runway 18 and that there was other traffic preparing for the landing, the PR-NIA PIC decided to keep the ideal course to his destination. The pilot showed difficulty in realizing that the distance he established was inadequate and that it did not guarantee the minimum level of safety required for operations at the Ribeirão CTR.

Additionally, it was observed that the decision of the TWR-RP controller to leave it to the PR-NIA pilot to establish the separation from the PP-PTQ was also inappropriate.

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 Airspace Control Department (DECEA)

IG-083/CENIPA/2019 - 01 Issued on 03/23/2023

Work with the INFRAERO so that that organization alerts the air traffic controllers that work in the TWR-RP, aiming to improve the mechanisms and procedures that provide the separation between the air traffic that operates in the Ribeirao Preto CTR.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On March 23th, 2023.