

FINAL REPORT

ACCIDENT 2020/2397



State Commission on Aircraft Accidents Investigation (PKBWL)

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FINAL REPORT

ACCIDENT

OCCURRENCE NO – 2020/2397

AIRCRAFT – Airplane, Bristell NG-5, SP-SLES

DATE AND PLACE OF OCCURENCE – 15 August 2020, EPKI



The Report is a document presenting the position of the State Commission on Aircraft Accidents Investigation concerning circumstances of the air occurrence, its causes and safety recommendations. The Report was drawn up on the basis of information available on the date of its completion.

The investigation may be reopened if new information becomes available or new investigation techniques are applied, which may affect the wording related to the causes, circumstances and safety recommendations contained in the Report.

Investigation into air the occurrence was carried out in accordance with the applicable international, European Union and domestic legal provisions for prevention purposes only. The investigation was carried out without application of the legal evidential procedure, applicable for proceedings of other authorities required to take action in connection with an air occurrence.

The Commission does not apportion blame or liability.

In accordance with Article 5 paragraph 6 of the Regulation (EU) No 996/2010 of the European Parliament and of the Council on the investigation and prevention of accidents and incidents in civil aviation [...] and Article 134 of the Act – Aviation Law, the wording used in this Report may not be considered as an indication of the guilty or responsible for the occurrence.

For the above reasons, any use of this Report for any purpose other than air accidents and incidents prevention can lead to wrong conclusions and interpretations.

This Report was drawn up in the Polish language. Other language versions may be drawn up for information purposes only.

WARSAW 2022

Table of contents

Abbreviations	3
General Information	4
Synopsis	5
1. FACTUAL INFORMATION	6
1.1. History of the flight.....	6
1.2. Injuries to persons	7
1.3. Damage to aircraft.....	7
1.4. Other damage	8
1.5. Personnel information (crew data).....	8
1.6. Aircraft information	8
1.7. Meteorological information	10
1.8. Aids to navigation	11
1.9. Communications	11
1.10. Aerodrome information.....	11
1.11. Flight recorders	14
1.12. Wreckage and impact information	14
1.13. Medical and pathological information	16
1.14. Fire	16
1.15. Survival aspects	16
1.16. Tests and research.....	16
1.17. Organizational and management information.....	16
1.18. Additional information.....	16
1.19. Useful or effective investigation techniques	16
2. ANALYSIS.....	17
3. CONCLUSIONS.....	18
3.1. Findings.....	18
3.2. Causes of the accident.....	18
4. SAFETY RECOMMENDATIONS	19
5. ANNEXES	19

Abbreviations

AGL	Above Ground Level
BRS	Ballistic recovery system
DDP	Declaration of Design and Performance
FIS	Flight Information Service
ft	foot – unit of altitude
FCOM	Flight Crew Operation Manual
kt	knot – unit of speed
METAR	Format for reporting weather information
PPL(A)	Private Pilot License (Aeroplane)
RWY	Runway
TAF	Terminal Area Forecast
ULC	Polish Civil Aviation Authority
UTC	Universal Time Coordinated
VDL	VHF Digital Link (means of sending information)
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

General Information

Occurrence reference number:	2020/2397			
Type of occurrence:	ACCIDENT			
Date of occurrence:	15 August 2020			
Place of occurrence:	EPKI			
Type and model of aircraft:	Airplane, Bristell NG-5			
Aircraft registration marks:	SP-SLES			
Aircraft user/operator:	Private			
Aircraft Commander:	PPL(A)			
Number of victims/injuries:	Fatal	Serious	Minor	None
	2	-	-	-
Domestic and international authorities informed about the occurrence:	ULC, EASA, UE, UZPLN			
Investigator-in-charge:	Krzysztof Miłkowski			
Investigating authority:	State Commission of Aircraft Accidents Investigation (PKBWL)			
Accredited Representatives and their advisers:	Not appointed			
Document containing results:	FINAL REPORT			
Safety recommendations:	YES			
Addressees of the recommendations:	ULC			
Date of completion of the investigation:	4 October 2022			

Synopsis

On 15 August 2020, the pilot of the Bristell NG-5 airplane (with a passenger on-board) took off at about 20:40 hrs from the Kikity aerodrome (EPKI) for a recreational flight on the route: Mrągowo, Mikołajki, Giżycko, Kikity. The flight was performed at an altitude of about 1,200 ft. During approach to EPKI, the pilot reported to FIS Olsztyn switching to aerodrome frequency and began descending to 1,000 ft. Witnesses who were at the aerodrome stated that around 19:30 hrs UTC they observed the aircraft position lights around the third turn of the aerodrome traffic circuit, which suddenly disappeared. Bystanders by the lake reported to the aerodrome operator and emergency services that an accident had probably occurred. Rescue services undertook a search operation and found the wreckage of the plane in the forest. The plane was destroyed and the pilot and passenger were killed on the spot.

The investigation was conducted by the PKBWL Investigation Team in the following composition:

- | | |
|---------------------|---------------------------|
| Krzysztof Miłkowski | - Investigator-in-charge; |
| Krzysztof Błasiak | - Team Member. |

Cause of the occurrence:

Probable uncontrolled loss of height during the third turn of the aerodrome traffic circuit.

PKBWL has proposed two safety recommendations after the investigation.

1. FACTUAL INFORMATION

1.1. History of the flight

On August 15, 2020, in the afternoon, the pilot of the airplane with a passenger on-board landed on the Kikity aerodrome (EPKI). The plane arrived from the Ostrów Wielkopolski aerodrome (EPOM). In the evening, the pilot decided to perform a recreational flight on the route: Kikity, Mikołajki, Mrągowo, Giżycko, Kikity. He filed a flight plan, performed a pre-flight inspection and together with a passenger they took their seats. After starting and warming up the engine around 20:40, he took off. The flight was performed along the planned route about 1200 ft AGL. During the flight, the pilot maintained radio communication with FIS Olsztyn. On the return route, about four minutes before reaching EPKI, the pilot reported to FIS Olsztyn a frequency change to Kikity Radio (EPKI aerodrome frequency). The radar record shows that the pilot started descending to an altitude of 1000 ft and entered the third turn of the aerodrome circuit with the intention of landing on RWY 11. Persons at the aerodrome observed the aircraft position lights around the third turn, which suddenly disappeared. A few minutes later, the aerodrome operator received information from persons at a nearby lake that an accident had probably occurred. The owner of the landing field contacted FIS Olsztyn to confirm whether the SP-SLES plane was being observed on the radar. After receiving information that the aircraft had been in radar contact and reported switching to Kikity Radio, but later was not being observed on the radar, a decision was made to launch an emergency rescue operation. Search and rescue services found the wreckage of the plane and bodies of two persons. The plane was completely destroyed as a result of the collision with trees and the ground as well as a fire that occurred later.



Fig. 1 Final portion of the flight path based on a radar screenshot [source: PKBWL¹]

¹ Unless otherwise indicated the source is PKBWL.

1.2. Injuries to persons

Injuries	Crew	Passengers	Others	Total
Fatal	1	1	-	2
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3. Damage to aircraft

After colliding with the ground, the plane broke into many parts, and the spilled fuel was ignited, causing a fire at the scene of the accident. For this reason, it was not possible to determine the type and amount of fuel on board the aircraft, however, when assessing the area covered by the fire, it may be assumed that at the time of the accident the quantity of fuel in the aircraft tanks was sufficient to continue the flight towards the aerodrome and land. The elements of the plane were scattered over a large area, some were hung on nearby trees, which may indicate that the destruction of the plane began at the moment of its contact with trees. When the plane crashed into the ground, a fire occurred, but went out by itself, because the plane fell in a swampy area with high humidity (Fig. 2).



Fig. 2 Accident site and wreckage

During the examination of the wreckage, PKBWL did not find any evidence of the accident aircraft failure, however, due to its destruction, it was not possible to completely rule out the possibility of such a case.

The airplane was equipped with a Ballistic Recovery Systems (BRS) which was not used during the flight. The system was activated automatically when the fire started after the airplane collision with the ground.

1.4. Other damage

As a result of the collision, tree tops were cut off and their trunks broken. As a result of the fire the trees at the accident site were sooty and burnt. The soil was also contaminated with operating fluids and spilled fuel on an area of several square meters.

1.5. Personnel information (crew data)

Pilot, aged 72, PPL(A) with following ratings:

- SEP(L) valid until 31.10.2021;
- VFR night;

Total Flight Time: 600 FH;

Accident Type Flight Time: ca. 130 FH;

Medical Certificate Class 2 - valid until 29.07.2021 with VDL limitation.

The pilot obtained the license in April 1988 and maintained its validity until July 2001. After that date, PKBWL has no information about the pilot's activity and the flights performed.

On 22 August 2019, the pilot performed 4 verification flights on the AT-3 aircraft during 38 min and on the same day he began the theoretical knowledge instruction for the renewal of the license, which ended on August 30, 2019. From 25 September to 18 October 2019, he completed flight training according to the Individual Training Program. As part of the renewal training, he acquired a flight time of 10 hours 49 minutes, including 1 hour of a solo flight. After completing the renewal training, the pilot passed a flight exam and got PPL(A), which was issued on 3 December 2019.

On 11 October 2019, the pilot verified the VFR Night rating during 1 h 10 min flight and on 13 July 2020 he made several night flights with an instructor at EPMO. The EPKI operator stated that the pilot had landed at the aerodrome several times under night conditions since the renewal of the license.

1.6. Aircraft information

BRISTELL S-LSA is an ultralight airplane produced by the Czech company BRM Aero, s.r.o. The aircraft was designed in a low wing configuration, with two seats next to each other and one piston engine with a pull propeller. The landing gear is a three-point, fixed, with a nose wheel.



Fig. 3 Bristell S-LSA aircraft, SP-SLES [source: Aircraft Maintenance Manual of SP-SLES]

Table 1. Aircraft information

Manufacturer	BRM AERO s.r.o.
Aircraft type	BRISTELL S-LSA
Serial number	483/2020
Year of manufacture	2020
State of registration	Poland
Registration marks	SP-SLES
Registration number	1666
Registration date	16.03.2020
Manufacturer and type of engine	Rotax 912 ULS
Type and model of propeller	MTV-34-1-A/175-200, three-blade, variable-pitch, hydraulically adjustable
MTOW	600 kg

During the accident, the aircraft documents were burnt, which made it impossible to reconstruct the exact data on its operation and maintenance. The obtained information shows that the aircraft had a total flight time of approximately 130 hours. The airframe was also overhauled and maintained after the first 100 hours of operation. The review was performed on 16 July 2020.

On 7 August 2020, the manufacturer of the BRM AERO aircraft issued the Safety Bulletin number ALL-SA-0-0-0-0001-2020 concerning changes to the FCOM related to the calculation of the centre of gravity on all versions of the aircraft. The information contained in the Bulletin was known to the pilot. The airplane mass and balance were within the limits specified in the FCOM.

The aircraft was registered by the Polish Civil Aviation Authority in the K6E category (experimental). The Register Certificate No 1666 was issued.

In accordance with the Regulation of the Minister of Transport, Construction and Maritime Economy of 7 August 2013 on aircraft classification, the K6E category airplane is defined as an "*aircraft especially designed or modified for research,*

experimental or scientific purposes, built as a single unit" (Table 2 "the division of aircraft in the flying device class by category, taking into account the weight and conditions for inclusion in the category").

The information obtained from the Civil Aviation Authority shows that the accident aircraft had been entered on the list of types approved as an aircraft built as a single unit, intended for experimental and research flights, in accordance with the Declaration of Design and Performance (DDP). The modification concerned the change of the powerplant control system in order to adapt it for use by a disabled person.

The manufacturer stated that the aircraft involved in the accident was a mass-produced one, and the modification introduced was a minor change that did not affect the operational characteristics or other properties of the aircraft. According to the manufacturer, the statement that the aircraft was produced as a single unit only means that such a modification would not be implemented on other aircraft and was just custom made. The manufacturer did not provide information on the reasons for making such a modification, and it is worth to note that the plane was ordered by a person who was not a disabled person. The replies of the aircraft manufacturer show, that no restrictions on use, including private use, have been established. In addition, the response from the manufacturer shows that the aircraft was not intended for experimental or research flights exclusively. The use of the aircraft did not require the consent of the manufacturer referred to in point 12 of the DDP declaration, which was attached by the owner's representative to the application for entry in the ULC Register, which was a condition for qualifying the aircraft to the K6E category.

Based on the analysis of the above-described modification of the aircraft, PKBWL concluded that it did not provide grounds for recognizing it as an experimental design and including it in the in the K6E experimental category. However, including the aircraft in K6E category allowed it to be covered by national regulations only and was a breach of EU rules set out in Regulation 2018/1139.

The collected information shows, that the accident aircraft was used by a natural person for private purposes and it was not used for the purposes that justified its inclusion in category K6E.

Based on the analysis of the records and the process of operation of the aircraft, PKBWL concluded that the entries in the DDP declaration did not reflect the actual and true status, but were made solely for the purpose of qualifying the aircraft as an experimental design.

1.7. Meteorological information

The accident flight was performed at night in VMC conditions.

Based on the analysis of meteorological information, PKBWL concluded that at the time of the occurrence, the weather conditions were as follows: visibility above 10 km, alternating wind around 3 kt, cloudless sky, crescent moon, moon visibility 16.19%.

TAF and METAR meteorological data for the Szymany aerodrome (EPSY), located approximately 65 km south of the EPKI:

TAF EPSY 151730Z 1518/1603 VRB03KT CAVOK=

METAR EPSY 151930Z 00000KT CAVOK 17/12 Q1017=

METAR EPSY 152000Z 00000KT CAVOK 16/11 Q1018=

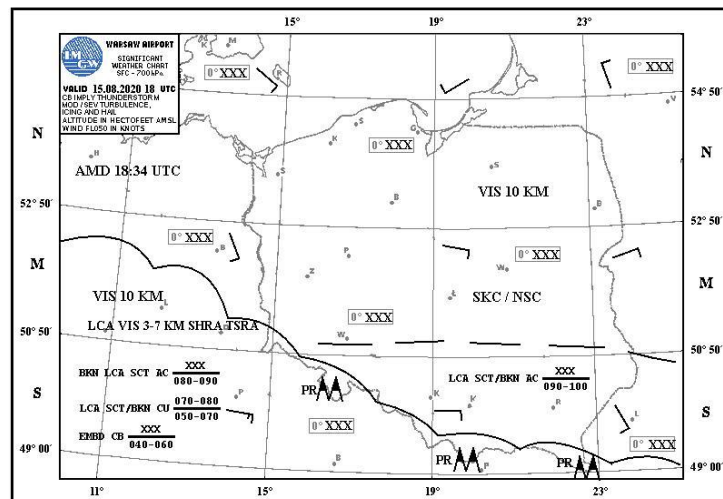


Fig. 4 Significant for Poland at 18:00 hrs UTC.
[source: Institute of Meteorology and Water Management]

1.8. Aids to navigation

Not used.

1.9. Communications

The plane was equipped with standard radio navigation equipment. During the flight, the pilot maintained communication with FIS Olsztyn. PKBWL analysed the recordings of the pilot's communication with FIS Olsztyn and did not find any irregularities, the pilot maintained communication in a standard manner and did not report any hazards. About 4 minutes before reaching the aerodrome, he said goodbye to FIS Olsztyn and switched to the EPKI radio frequency. It was his last message.

1.10. Aerodrome information

EPKI, Kikity (north-east from Olsztyn, n. Jeziorany)

Status – Registered landing field

ULC Register number – 107

Coordinates – N53°58'58.2" E20°52'36.8"

Radio – Kikity Radio 119.4,

Elevation – 564 ft

RWY – 112/292 (11/29), 850 x 35 m, N53°58'58.2" E20°52'36.8"

Note: The marked grass strip rises from RWY threshold 11 to 29 by 16 m. Landing in 11 RWY direction is recommended.

Day and night VFR air traffic permitted in VMC.

The runway is illuminated by solar lamps placed on rubber bollards spaced every several dozen meters on both sides of the runway (Fig. 6) and solar lamps at the end of the runway, which are directed towards the landing approach (Fig. 7). The regulations do not specify the requirements for lighting the landing field for night flights. The decision as to whether to perform night flights at the landing field is made by the pilot on his own responsibility.

The general view of the aerodrome is shown in Fig. 5.



Fig. 5 EPKI Aerodrome [source: aerodrome operator]



Fig. 6 Solar lamps on the runway edges



Fig. 7 Solar lamps at the end of runway

1.11. Flight recorders

The airplane was not equipped with flight recorders.

1.12. Wreckage and impact information

The occurrence site was located approximately 2,400 meters from the threshold near the third turn to RWY 11. On the basis of the inspection of the accident site, PKBWL established that the plane entered a tall forest at a little angle of descent. When the plane collided with trees, several tree tops were cut at a height of about 15 meters and the destruction of the plane began. Some elements of the plane remained in the trees (Fig. 8 and 9). Then the partially destroyed plane collided with the ground, the fuel ignited and a fire broke out. The wreckage of the plane was scattered over a fairly large area.

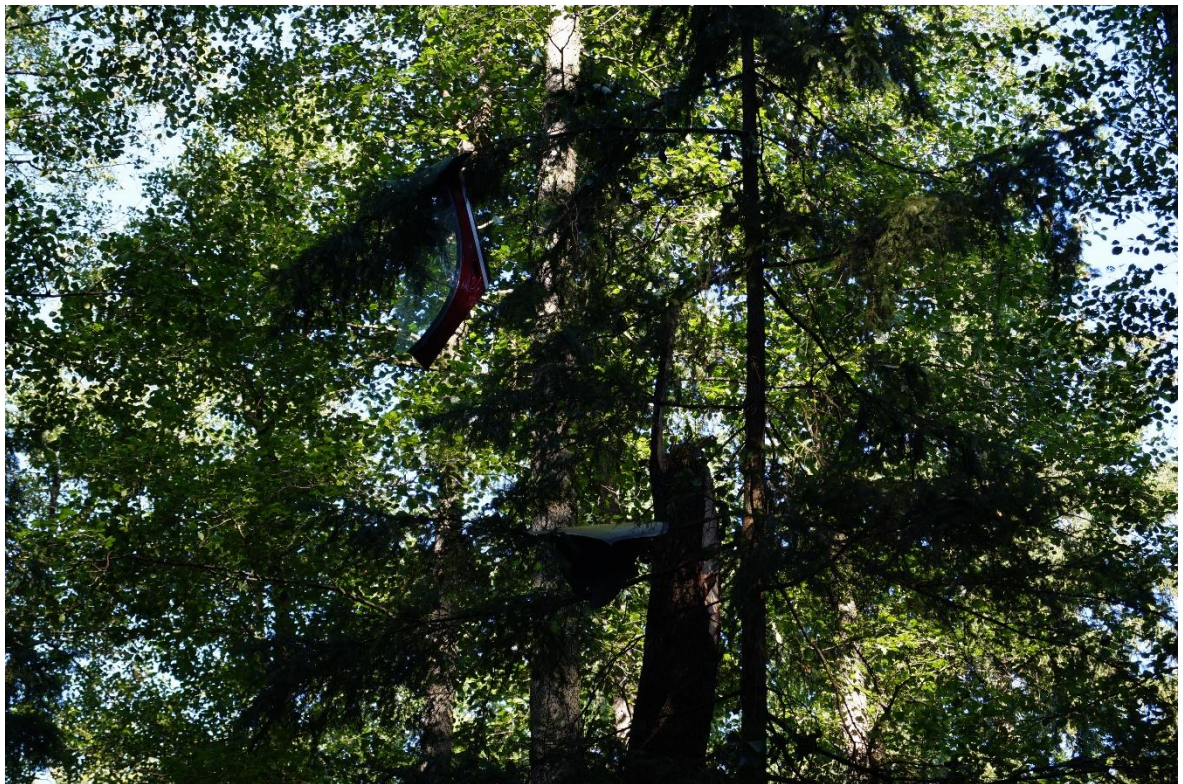


Fig. 8 Detached aircraft elements that remained on trees after the accident



Fig. 9 The area of the occurrence site - treetops cut by the airplane during the collision

During the examination of the wreckage, PKBWL did not find any signs of the aircraft malfunction prior to the accident. However, due to the destruction of the wreckage, it was not possible to completely exclude such a case.



Fig. 10 Engine control system elements found at the occurrence site

1.13. Medical and pathological information

As a result of the accident, the occupants of the plane died on the spot. Based on the autopsy, it was found that the cause of death of the pilot and the passenger were extensive multi-organ injuries. No ethyl alcohol was found in the body of the pilot.

PKBWL did not obtain any information about any physiological or medical factors that could have influenced the occurrence.

1.14. Fire

The plane broke into many pieces during the accident, and the spilled fuel ignited, causing a fire at the accident site. For the above reason, it was not possible to determine the type and amount of fuel on board the aircraft, however, when assessing the area covered by the fire, it can be assumed that at the time of the accident the fuel quantity on board was sufficient to continue the flight and land. The fire extinguished by itself because the incident took place in a swampy area with high humidity.

1.15. Survival aspects

Fastened metal seatbelt buckles were found at the site. The belts were burned. The dynamics of the occurrence and the following fire did not give the occupants any chance of survival after the collision with the ground.

1.16. Tests and research

During the investigation, PKBWL made a photographic documentation of the site and the wreckage. The wreckage and the engine were secured and tested by the Institute of Aviation. The engine' testing showed that the engine was operational prior to the accident and that the damage found was caused by the accident.

1.17. Organizational and management information

The plane was owned by the pilot. It was purchased in March 2020 as brand new. The pilot used the plane for private, tourist flights. Since the purchase, according to the witness statement, the plane had flown approximately 130 hours and had been used only by the owner. During the flights preceding the accident the pilot did not report any failures. According to the information collected by the Commission the accident aircraft was operated only by a natural person for his personal needs and was not used for experimental purposes.

1.18. Additional information

None.

1.19. Useful or effective investigation techniques

Standard investigation techniques were applied.

2. ANALYSIS

The Commission does not have an exact time of the engine start up and take off time because the aerodrome does not keep records of the flights performed. Based on the radar screenshot, the approximate time of take-off time was assessed. The marker on the radar screen appeared at 18:40:50 hrs. The pilot performed the flight along the planned route at an altitude of 1350-950 ft at a speed of 80-90 kt, maintaining radio contact with FIS Olsztyn. During the return flight, at 19:25:31 hrs, the pilot informed FIS Olsztyn *"Four minutes to land in EPKI, therefore I will switch to Kikity Radio and after landing I will close the flight plan, SES"*. The FIS Officer confirmed that it was the pilot's last message. The Commission has no information whether the pilot has contacted Kikity Radio or not. According to the information obtained from the aerodrome operator, there was nobody near the radio station at that time. All persons were outside the building in which the radio station was located. Based on the analysis of the radar screenshot, at 19:27:49 hrs the pilot started descending from 1200 ft and at 19:28:18 hrs he stopped descending at 1000ft. At 19:30:53 hrs a descent marker appeared on the airplane tag label. At 19:31:03 hrs the airplane marker tag disappeared and after approximately 40 seconds the airplane marker disappeared completely. Witnesses from the aerodrome reported that they saw the aircraft navigation lights near the third turn at around 19:30 hrs UTC, which suddenly disappeared and the witnesses heard a bang and saw a glow on the other side of the lake. The aerodrome operator contacted FIS to confirm whether it was a SP-SLES aircraft. After confirmation, the rescue operation began. At that time, the police received information from a witness who saw the plane and heard the noise. After a dozen or so minutes, the rescue services found the plane wreckage and confirmed the finding of the body of the pilot and passenger.

The analysis of the last minutes of the flight, shows that probably the pilot, after reaching the aerodrome, started descending to the recommended circuit height (1000ft) and started a turn in the area of the third turn to runway 11. From the analysis of the radar screenshot as well as the statements of witnesses, it is assumed that the pilot was flying with a little descent and probably in this configuration collided with tall trees and later with the ground.

The pilot had the qualifications and experience in performing night flights, but he did not perform them at EPKI. The EPKI aerodrome site is located in a less urbanized area, there are large forest areas and lakes, which at night do not provide a contrast between the forest and the lake, as well as only a few characteristic illuminated objects are detectable. Two weeks earlier, the pilot was at EPKI and participated in the competition, so it can be assumed that he knew the topography of the aerodrome and its vicinity, but at that time he was flying in daylight. Night flights differ from daytime flights - terrain characteristics change, and objects that are a reference points during the day become less visible at night time. Also, the specificity of the runway lighting could be difficult for the pilot who did not fly at this aerodrome.

The pilot had experience in such operations at his base aerodrome, but it can be assumed that in the course of the accident flight he focused on the correct entry into the aerodrome traffic circuit and did not fully control the flight parameters.

Flights at night require the pilot to devote much more attention to instrument control and closer control of flight parameters. Also, the height of the aerodrome circuit in relation to the terrain characteristics could have had an impact on the occurrence. The recommended circuit altitude according to the Operations Manual should be 1000ft, the average elevation of the landing site is 590ft and the elevation of the accident site is approximately 570ft, plus a tree height of approximately 100ft, so there was approximately 300ft safety margin. A descent marker appeared in the radar screenshot of the final phase of the flight, and the descent is also confirmed by witnesses who observed the last phase of the flight and, according to their statements, the plane was below standard altitude, which is specified in the aerodrome Operations Manual. Therefore, it may be assumed that the pilot focused his attention on the observation of the runway and did not fully control the flight parameters, which led to descent below safe height and collision with trees and the ground.

3. CONCLUSIONS

3.1. Findings

- 1) The aircraft was fit for flight prior to the accident.
- 2) The aircraft was registered by the Polish Civil Aviation Authority.
- 3) The category of the aircraft entered in the certificate of registration was incompatible with its design, purpose and character of flights.
- 4) The aircraft had a correct Actual Take-Off Mass, the centre of gravity was within permissible range.
- 5) The aircraft was purchased brand new and was used for flights only by the owner.
- 6) The airplane was destroyed due to the forces acting during the collision and by the fire.
- 7) The pilot had valid license and valid aero-medical certificate.
- 8) After the renewal of the license, the pilot performed night flights.
- 9) The pilot did not perform night flights on the EPKI aerodrome.
- 10) The pilot was not under the influence of alcohol.
- 11) Weather conditions did not affect the course of the occurrence.
- 12) The time of day could have influenced the occurrence.

3.2. Cause of the accident

Probable uncontrolled loss of height during the third turn of the aerodrome traffic circuit.

4. SAFETY RECOMMENDATIONS

Recommendation 2022/2397/1 - for the President of the Civil Aviation Authority:

An important element of an investigation is checking the correct maintenance of the aircraft prior to an occurrence. In the course of the investigation into the accident No 2020/2397 SCAAI had no access to records of maintenance effected on the aircraft after 100 FH because the documents were probably on board of the accident aircraft the and were burned.

Therefore, the SCAAI recommends that the President of the Civil Aviation Authority amends applicable regulations so that the documents required on board during flight are not integrated with the airworthiness documents, the latter should be kept on the ground. It will prevent airworthiness documents from being destroyed during an accident.

Recommendation 2022/2397/2 - for the President of the Civil Aviation Authority:

In the course of the 2020/2397 accident investigation, the SCAAI found that the accident aircraft was entered in the Aircraft Register in the K6-E category as an experimental aircraft, and therefore it should only be used for research, experimental or scientific purposes. However, the accident aircraft was used by a private owner for private flights.

In order to prevent such cases in the future, SCAAI recommends that the President of the Civil Aviation Authority, as part of inspections carried out in accordance with Art. 27 of the Aviation Law Act, will verify whether the aircraft entered in the register in the K6E (experimental) category are operated in accordance with their intended use and applicable restrictions.

5. ANNEXES

None.

THE END

Investigator-in-Charge

Signature on original

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