MINISTRY
OF TRANSPORT
AND CONSTRUCTION
OF THE SLOVAK REPUBLIC

AVIATION AND MARITIME INVESTIGATION AUTHORITY
Námestie slobody 6, P.O.BOX 100
810 05 Bratislava

FINAL REPORT

on safety investigation of a serious incident

of aircraft type **DA 40D**
registration marks **OM-KLT**

Reg. No: SKO2020003

The investigation of occurrence has been conducted pursuant to Art. 18 of the Act No. 143/1998 on Civil Aviation (Civil Aviation Act) and on Amendment of Certain Acts and in accordance with the Regulation (EU) No. 996/2010 of the European Parliament and of the Council on investigation and prevention of civil aviation accidents and incidents, governing the investigation of civil aviation accidents and incidents.

The final report is issued in accordance with the Regulation L 13 that is the application of the provisions of ANNEX 13 Aircraft Accident and Incident Investigation to the Convention on International Civil Aviation.

The exclusive aim of investigation is to establish causes of accident, incident and to prevent their occurrence, but not to refer to any fault or liability of persons.

This final report, its individual parts or other documents related to the investigation of occurrence in question have an informative character and can only be used as recommendation for the implementation of measures to prevent occurrence of other accidents and incidents with similar causes.

List of acronyms

AMSL	Above Mean Sea Level
AGL	Above Ground Level
ATC	Air Traffic Control (general)
ATIS	Automatic Terminal Information System
ATP(L)	Airline Transport Pilot Licence
FAP	Final Approach Point
FI	Flight Instructor
FIR	Flight Information Region
FL	Flight Level
FPL	Flight Plan
ft	Feet (unit of length)
GAMET	Area forecast for low level flights
GA	Go Around (missed approach procedure)
GP	Glide Path, glide slope
IFR	Instrument Flight Rules
ILS	Instrument Landing System
kt	Knots
LKAA	ICAO code for Flight Information Region Prague
LKMT	ICAO code for airport Ostrava – Mošnov
LKTB	ICAO code for airport Brno – Tuřany
LZPP	ICAO code for airport Piešťany
LZTN	ICAO code for airport Trenčín
METAR	Regular aeronautical weather report
NOTAM	Notice transmitted by telecommunication technology, containing information about equipment, status or change of aeronautical equipment, services, procedures or danger the timely knowledge of which is important for employees ensuring air traffic.
NM	Nautical Mile
OVC	Overcast (8/8 cloud cover)
PIC	Pilot In Command
PPL(A)	Private Pilot License (Aircraft)
RWY	Runway used for take-offs and landings
SEP(L)	Class rating for single-engine piston aeroplanes (land)
SID	Standard Instrument Departure
SIGMET	Information about meteorological and other phenomena in the atmosphere which may affect the safety of flights en route
TAF	Airport forecast (meteorological)
TMA	Terminal Manoeuvring Area
UTC	Coordinated Universal Time

A. INTRODUCTION

Aircraft type:	DA 40D
Registration marks:	OM-KLT
Operator/owner:	SEAGLE AIR-FTO, s.r.o.
Type of operation:	training flight
Take-off:	LZPP
Flight phase:	approach
Place of occurence:	LKTB
Date and time of occurence:	24 January 2020, 09:53 a.m.

Note: *All time data in this report are stated in UTC time.*

B. INFORMATION SUMMARY

On 24 January 2020 the crew of an aircraft type Diamond DA 40D, registration marks OM-KLT (hereinafter referred to as "OM-KLT") was performing a training IFR flight en route LZPP – LKTB – LKMT – LZTN, at 6600 ft AMSL, to train approaches to LKTB and LKMT.

At 09:43 the crew of OM-KLT started descending from 6600 ft AMSL for direct approach to RWY27 LKTB.
At 09:48, at 3500 ft AMSL and with the speed of 115 kt, the crew of OM-KLT flew into clouds.

At 09:53, at 1200 ft AMSL and with speed of 105 kt, the crew of OM-KLT made a GA due to ice accretion on the wing. ATC LKTB cleared the crew of OM-KLT to climb to 4000 ft AMSL and subsequently to 5000 ft AMSL.

Intensive icing and ice built-up on the surface of OM-KLT caused that OM-KLT was unable to climb to the assigned altitude due to a loss of performance and increase in its weight, and to continue with the flight according to FPL. The crew of OM-KLT asked for short vectoring for ILS27 and then reported a state of emergency.

At 10:07 OM-KLT landed on RWY27 LKTB without damage.
The crew of OM-KLT did not have any injuries after landing.

The OM-KLT operator reported the serious incident to the Aviation and Maritime Investigation Authority of the Ministry of Transport and Construction of the Slovak Republic.

The commission composed of the following members was appointed for investigation of the serious incident:

Ing. Ladislav Dospiva	Chairman of the Safety Investigation Committee
Ing. Juraj Gyenes	Member of the Safety Investigation Committee

The Report has been issued by:

Aviation and Maritime Investigation Authority
of the Ministry of Transport and Construction of the Slovak Republic.

C. MAIN PART OF THE REPORT

1. FACTUAL INFORMATION
2. ANALYSIS
3. CONCLUSIONS
4. SAFETY RECOMMENDATIONS

1. FACTUAL INFORMATION

1.1 History of the flight:

On 24 January 2020 the crew of OM-KLT (FI with a student) performed pre-flight preparation before the flight in the premises of SEAGLE AIR-FTO, s.r.o. flying school regarding performance of a training navigation IFR flight en route LZPP – LKTB – LKMT – LZTN, aimed at training approaches to LKTB and LKMT. The pre-flight preparation included also a weather check (GAMET, SIGMET, NOTAM) on the route and at individual airports.

The flight was smooth until the aircraft approached to LKTB.

Before entering TMA III Brno, the crew of OM-KLT received ATIS November LKTB.

After arriving to TMA II LKTB, the crew of OM-KLT confirmed their intended activity to ATC LKTB on frequency 127.350 MHz - ILS approach to RWY27 and subsequent departure on route SID ULPAV 1A.

Five minutes before reaching BUKAP, the crew of OM-KLT was informed by ATC LKTB that the crew of DA-40 landing before them on RWY27 had reported "moderate icing". The crew of OM-KLT acknowledged receiving the information. FI decided to continue with the approach and due to the potential risk of icing he coordinated a descent from 6600 ft AMSL to 3000 ft AMSL with ATC LKTB, and subsequent descent on GP ILS RWY27 as late as possible so that the approach to LKTB is outside the clouds as long as possible.

At 09:43 the crew of OM-KLT started descending in TMA II Brno and continued with the ILS approach RWY27.

At 09:48 when descending, the crew of OM-KLT flew into clouds at 3500 ft AMSL and continued descending to 1200 ft AMSL.

At 09:52, at 1200 ft AMSL and with the speed of 105 kt, the crew of OM-KLT started a missed approach procedure due to icing on the wing.

At 09:53 ATC LKTB cleared the crew of OM-KLT to climb to 4000 ft AMSL and subsequently to 5000 ft AMSL.

The ice accretion on OM-KLT was so intensive and quick that the crew of OM-KLT was not able to climb above the clouds or to reach the assigned flight altitude due to a decrease in performance and increase in weight.

At 09:57 the crew of OM-KLT reported to ATC LKTB that it was not able to climb to the assigned altitude due to icing and asked for short radar vectoring for ILS RWY27. ATC LKTB acknowledged receiving the information and vectored the crew of OM-KLT to FAP ILS RWY27 with right circuit to 3000 ft AMSL. However, the crew of OM-KLT was not able to reach 3000 ft AMSL during the climb.
At 10:00 the crew of OM-KLT climbed to 2900 ft AMSL for a short time.

At 09:59 the crew of OM-KLT reported to ATC LKTB that it was not able to maintain 3000 ft AMSL and again requested a descent and short vectoring. ATC LKTB reported to the crew of OM-KLT that the minimum altitude for radar vectoring was 3000 ft AMSL.

Due to deteriorated flight characteristics and loss of aircraft performance, at 10:03 the crew declared a "MAY DAY" (altitude 2400 ft AMSL, speed 83 kt). Then the crew of OM-KLT was vectored by ATC LKTB to 5 NM ILS RWY27.

OM-KLT was then continuously descending (speed 100 kt) and landed on RWY27 LKTB.
After landing the crew of OM-KLT reported "SEVERE ICING" in the approach area up to 3000 ft AMSL to ATC LKTB.

Day time: Day
Flight rules: IFR

1.2 **Injuries of persons:**

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
No injuries	2	-	

1.3 **Damage to the aircraft:**

OM-KLT was not damaged during the serious incident.

1.4 **Other damage:**

No circumstances have been reported to the Aviation and Maritime Investigation Authority which might lead to any other claims for compensation of damage against a third party.

1.5 **Personnel information:**

Pilot - FI:

citizen of the Czech Republic, aged 36;
holder of ATPL(A) issued by the Transport Authority on 27 February 2019.

Certificate of medical competence:

class 1	valid until 03/08/2020
class 2	valid until 03/08/2024
LAPL	valid until 30/08/2024

Qualifications:

SEP(L)	valid until 30/04/2021
FI(A)	valid until 30/08/2021
Beech,400/MU, 300/IR	valid until 31/01/2021
Night flights	no limit

General Radiotelephone Operator License for aeronautical mobile service issued by the Telecommunication Authority of CR on 29 November 2018.

Flight experience:

Total flight hours as of 31/01/2020:	2 646 h
Total flight hours as instructor:	1 185 h
Total flight hours clocked for the last 90 days:	41 h 59 min
Total flight hours with this type of aircraft clocked for the last 90 days:	1 h 05 min
Total flight hours clocked for the last 30 days:	1 h 05 min
Total flight hours with this type of aircraft clocked for the last 30 days:	1 h 05 min

Student pilot:

citizen of the Slovak Republic, aged 22;
holder of PPL(A) issued by the Transport Authority on 20 August 2018.

Certificate of medical competence:

class 2	valid until 04/06/2020
LAPL	valid until 04/06/2020

Qualifications:

SEP(L)	valid until 31/07/2020

Restricted Radiotelephone Operator License for aeronautical mobile service II issued by the Telecommunication Authority of SR on 2 July 2015.

Flight experience:

Total flight hours:	160 h
Total flight hours with this type of aircraft:	160 h
Total flight hours clocked for the last 90 days:	112 h 15 min
Total flight hours with this type of aircraft clocked for the last 90 days:	112 h 15 min
Total flight hours clocked for the last 30 days:	12 h 15 min
Total flight hours with this type of aircraft clocked recently:	12 h 15 min

1.6 **Aircraft information:**

Type:	DA 40D
Registration No:	OM-KLT
Serial number:	D4.090
Year of manufacture:	2004
Manufacturer:	Diamond Aircraft Industries GmbH, Austria
Total flight hours:	4 202 h 15 min

Airworthiness Certificate No. 1389/01 issued by the Transport Authority on 13/08/2019.

Airworthiness Verification Certificate was issued by SEAGLE AIR-FTO, s.r.o. as a continuing airworthiness management organisation on 20 December 2019 valid until December 2020.

As of the airworthiness verification day, the aircraft had flown 4 217 h 37 min

Engine:

Type:	Thielert 125-02-99 (Technify Motors GmBH)
Serial number:	02-02-03335
Year of manufacture:	2013
Total engine operation hours:	1 423 h 15 min

1.7 **Meteorological information:**

METAR LKTB reports:
METAR LKTB 240700Z 16005KT 130V190 7000 OVC008 M02 / M03 Q1026 NOSIG=
METAR LKTB 240800Z 17007KT 140V200 4300 BR OVC004 M02 / M03 Q1026 NOSIG=
METAR LKTB 240830Z 18006KT 3300 BR OVC004 M02 / M03 Q1026 BECMG 2900 BR=
METAR LKTB 240900Z 17007KT 3100 –FZDZ BR OVC003 M02 / M03 Q1026 NOSIG=

GAMET for FIR Prague:
FACZ51 LKPW 240300
LKAA GAMET VALID 240400/241000 LKPW
LKAA PRAHA FIR BLW FL100

SECN I

SFC VIS:	AT FIRST LCA 2000-5000M BR, ISOL 0200-2000M FZFG BR
MT OBSC:	LCA MT INC UP 2700-4000FT AMSL
SIG CLD:	LCA BKN/OVC ST 0100-0900FT AGL/2000-3000FT AMSL
ICE:	LCA MOD INC
TURB:	NE PART SFC/6000FT AMSL

SECN II

PSYS:	06 RIDGE OF HIGH PRESSURE AREA FM SE	
WIND/T:	W LKAA	E LKAA
2000 FT:	190 08KT/MS02	190 16KT/MS03
5000 FT:	250 12KT/PS05	220 22KT/PS04
10000 FT:	250 18KT/MS01	250 16KT/MS00
CLD:	LCA SCT/BKN ISOL OVC SC 2000-3000/2700-4000FT AMSL	
FZLVL:	NEAR SFC, 3000-4000/8000-9000 AMSL AREA PS TEMPER	
MNM QNH:	1022HPA	
VA:	NIL	

TAF LKTB airport forecast

TAF LKTB 240500Z 2406/2512 18006kt 9999 BKN022
TEMPO 2406/2414 6000–DZ BKN012
BECMG 2414/2416 CAVOK
BECMG 2419/2421 VRB02KT 3000 BR BKN014
BECMG 2421/2500 1200 BR OVC06
TEMPO 2500/2507 0400 FZFG VV002
BECMG 2507/2509 2500 BR BKN012 =)

ATIS NOVEMBER for LKTB from 08:57:

GOOD MORNING TURANY ATIS INFORMATION
NOVEMBER
0857
ILS APPROACH
RUNWAY IN USE 27
TRANSITION LEVEL 60
FOR STARTUP AND TAXI CONTACT TURANY TWR
METAR TURANY ISSUED AT 09,00
WIND 170 DEGREES 8 KNOTS
VISIBILITY 3 THOUSAND 1 HUNDRED METRES
LIGHT FREEZING DRIZZLE MIST
OVERCAST 3 HUNDRED FEET
TEMPERATURE MINUS 2
DEWPOINT MINUS 3
QNH 1026 HECTOPASCALS
NOSIG
YOU HAVE RECEIVED ATIS INFORMATION NOVEMBER

1.8 **Aids to navigation:**

OM-KLT was equipped for IFR flights.

1.9 **Communications:**

OM-KLT was equipped with an on-board radio station enabling two-way radio contact of the flight with all aeronautical stations at all times.

1.10 **Aerodrome Information:**

LKTB is a public international airport situated 7.5 km to the south-east of Brno.
Size of RWY 09/27: 2650 x 60 m.

1.11 **Flight recorders:**

OM-KLT was not equipped with on-board flight data recorder or any other recording devices.

1.12 **Wreckage and impact information:**

N/A

1.13 **Medical and pathological information:**

N/A

1.14 **Fire:**

N/A

1.15 **Survival aspects:**

N/A

1.16 **Tests and research:**

N/A

1.15 **Organizational and management information:**

N/A

1.17 **Additional information:**

OM-KLT was not equipped with any de-icing system.

1.16 **Useful or effective investigation techniques:**

Standard investigation methods were used.

2 ANALYSIS

2.1. **Meteorological situation:**

Easterly wind with the speed of 6-7 kt was blowing at LKTB at the time of the aviation incident. As a result of inversion, the sky was covered with a layer of low clouds with base at approximately 100 m (33 ft) AGL where icing was formed. Visibility was 8 to 15 km and the zero-degree isotherm was up to 2000 ft from the ground.

TAF LKTB forecast light temporary drizzle from 06:00 to 14:00 (DZ BKN012), but not freezing drizzle (FZDZ).

METAR LKTB at 07:00 stated air temperature and dew point in minus values with a continuous layer of clouds at 800 ft AGL (OVC008 M02 / M03). Subsequent METAR LKTB reports stated lowering cloud base, later with freezing drizzle (FZDZ).

GAMET LKAA stated mild local icing in clouds; that meant that based on the cloud information contained in METAR LKTB and GAMET, mild local icing could have been expected with regard to the zero-degree isotherm near the ground.

Radar images at the time of pre-flight preparation did not provide any information related to potential icing. No reflections were visible in the images with regard to the fact that there were no precipitations in the above-mentioned period of time.

Satellite images where low clouds could have been identified were not available at the time of pre-flight preparation.

ATIS NOVEMBER from 08:57 which the crew heard when approaching to RWY27 LKTB mentioned freezing drizzle.

2.2. **Crew activity:**

The crew of OM-KLT performed sufficient pre-flight preparation where they also evaluated the meteorological conditions on the route and at individual airports (according to FPL).
It results from the information they had when preparing for the flight that they could have expected mild icing in the area of LKTB at the time of their approach. They received first information about moderate icing from ATC LKTB five minutes before BUKAP when they were approaching to RWY27 LKTB, but in spite of that FI decided to continue with the flight according to FPL and descended to an area where icing was formed in clouds, what was in contradiction to the Flight Manual for the particular type of aircraft.

All subsequent activities of the crew resulted from flying into adverse weather conditions with severe icing and ice accretion on the surface of OM-KLT (loss of performance and increase in weight).

As a result, OM-KLT was not able to reach the assigned flight altitude and to continue on the route or to reach minimum radar vectoring altitude. Based on the above-stated facts, the crew decided to declare a "MAY-DAY" and to make a forced landing on RWY27 LKTB.

3 CONCLUSIONS / Cause of the serious incident

3.1 **List of findings:**

- the crew had valid qualifications to perform flights with the particular aircraft category;
- OM-KLT met airworthiness conditions before the critical flight according to the available documentation;
- before the flight itself the crew made pre-flight preparation which also included familiarization with weather conditions on the route of the flight and at individual airports;
- in spite of sufficient information about adverse weather conditions for such type of aircraft, the crew of OM-KLT decided to fly into icing conditions, thus jeopardizing the safety of the flight.

3.2 **Causes and contributing factors:**

- FI underestimated the weather conditions and the crew flew into icing conditions;
- extremely quick and intensive icing.

4 SAFETY RECOMMENDATIONS

In the course of internal investigation of the serious incident of OM-KLT,
SEAGLE AIR-FTO, s.r.o. as the operator adopted the following measures:

- when preparing for their flights, FIs performing training (particularly IR) with DA 40 must pay special attention to weather forecast with regard to potential icing occurrence during the flight;

- warn PICs renting aircraft of potential icing and of icing conditions;

- analyse the serious incident in question at regular annual FI training.

In Bratislava, on 25 June 2020