The original of the Final Report was issued in the Slovak language.
In case of inconsistency original version in Slovak language is applicable.

MINISTRY OF TRANSPORT, CONSTRUCTION
AND REGIONAL DEVELOPMENT
OF THE SLOVAK REPUBLIC

Aviation and Maritime Investigation Authority
Námestie slobody 6, P.O.BOX 100
810 05 Bratislava 15

F I N A L R E P O R T

on investigation of accident

of aircraft DA-20-A1 Katana

Registration No OK-CLO

Reg. No.: SKA2014004

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.

A. INTRODUCTION

Owner:	EQUITY GROUP s.r.o. Bratislava
Operator:	Opera Jet, a.s.
Type of operation:	general aviation / sport and recreational flying
Aircraft type:	DA-20-A1 Katana
Registration No:	OK-CLO

Take-off site:	Airport Bratislava / LZIB
Site of planned landing:	LZIB
Flight phase:	ongoing flight
Place of accident:	2,5 km SZ Myjava N 48° 45´ 28,0´´ E 17° 31´ 52,2´´
Date and time of accident:	04.08.2014, 17:20

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

B. INFORMATIVE SUMMARY

On 04.08.2014 the pilot with aircraft type DA-20-A1 Katana, reg. No. OK-CLO, was making a navigation flight on the route LZIB–Modra–LZTR–Bradlo–Myjava–Bradlo–Vrbové–Leopoldov–Trnava–Cífer–Modra-LZIB.

At unspecified time and on unspecified place the cockpit canopy fell off and the pilot decided to make a ground landing. During the landing manoeuvre vertical to the slanting slope the aircraft wing touched the ground and went into a skid, in which the right front landing gear leg broke. Due to the subsequent movement on a drenched ground the aircraft suffered further damages.

The following person was appointed for investigation of the air accident:

Ing. Zdenko BIELIK

The report is issued by:

Aviation and Maritime Investigation Authority
of the Ministry of Transport, Construction and Regional Development
of the Slovak Republic

C. MAIN PART OF REPORT

1. FACTUAL INFORMATION

1.1 History of the flight

On 04.08.2014 the pilot was conducting a navigation flight with a passenger. The flight proceeded without problems until the aircraft reached the area of community Stará Myjava, where the passenger, according to his statement, noticed the slightly opened cockpit (of 5 cm) and warned the pilot.

Before the pilot could react the cockpit canopy became unlocked and under the influence of airflow ram it broke off from the aircraft. When the canopy flew away the air current started to fill the cockpit and ripped the communication sets off from the pilot´s and the passenger´s heads. It prevented the pilot from reporting the situation to FIC (Fligt Information Centre) and made difficult the communication between the pilot and the passenger.

The pilot decided to react to the situation by accelerated landing, becaused he feared the potential damage to the tail surfaces of the aircraft. His initial intention was to make a landing on a surface used for aerial farming, local area “u Vankov“ (Agro airport Myjava).

During the approach manoeuvre the pilot noticed people on the landing surface, so he interrupted the landing manouvre and started to look for other suitable surface for ground landing, although the people present on the initially chosed surface (two aeromodellers) left it as soon as they had realized the pilot´s intention to land there.

Once the pilot had found a suitable surface he hade a ground landing (on a drenched field) with a course of 030˚ in the proximity of the said airport.

As the chosen surface was slant and the ground was rising from right to the left in relation to the landing direction, the aircraft first touched the ground by its left wing, which caused it to turn left by about 70-80˚ and continue to drift on the ground some 30-35 m until its stopped. During this ground movement the aircraft suffered further damage.

After completing the required operations, the pilot and the passenger left the aircraft uninjured.

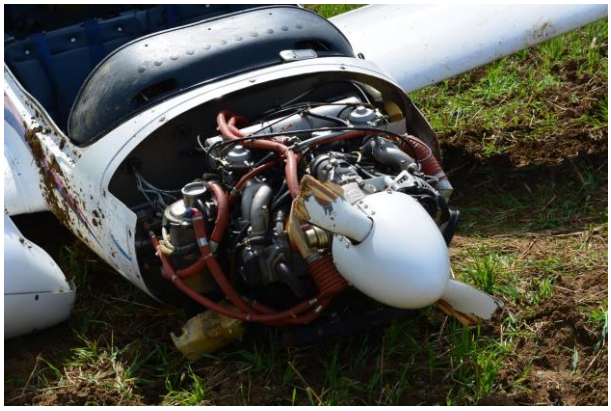
Daytime: day
Flight rules: VFR

1.2 Injuries to persons

Injury	Crew	Passengers	Other persons
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	1	1	

1.3 Damage to aircraft

The aircraft was destroyed in the accident.



1.4 Other damage

No circumstances with potential claims for compensation of other damage toward a third party were notified to the Aviation and Maritime Investigation Authority.

1.5 Personnel information

Pilot in command:

A national of the Slovak Republic, male, aged of 24 years
Holder of the private aircraft pilot PPL(A) licence issues by the Transport Office of SR on 30.07.2014.

Medical certificate of 1st class with marked validity until 26.03.2015 and medical certificate of 2nd class with marked validity until 26.03.2016.

Flying experience:

Total flight hours:	64 h 25 min	204 flights by 24.06.2014
In it with type PS-28:	59 h 30 min	177 flights
In it with type DA-40:	1 h 25 min	5 flights
In it with type DA-20:	3 h 30 min	22 flights
For last 90 days:	3 h 30 min	22 flights
For last 30 days:	0 h 0 min	

Qualifications:

SEP(L) with marked validity until 30.06.2016.

1.6 Aircraft information

Type:	DA 20-A1 Katana
Registration No:	OK-CLO
Serial number:	10228
Year of manufacture:	1996
Manufacturer:	Diamond Aircraft Industries Inc.

The certificate of airworthiness No. 4926/2 issued by the Civil Aviation Authority of CR on 15.08.2008.

The certificate of maintenance and putting into operation No. 25 issued by PTS Hosín s.r.o. on 30.05.2014.

Total operating hours since manufacture: 3319 h 35 min.

Third-party insurance: Allianz Slovenská poisťovňa, insurance certificate No.: 411019289.

1.7 Meteorological situation

Variable wind up to 1 m/s, 3-7/8 cloud cover with the lower base of 800 m, temperature 24°C, QNH 1015 hPa.

1.8 Aids to navigation

N/A.

1.9 Communications

The aircraft was equipped by onboard radio station allowing the two-way radio communication with all air stations at any moment of the flight, but after the separation of the cockpit food the airflow ram ripped the communication headsets off from the pilot´s and the passenger´s heads which made the radio communication impossible.

1.10 Aerodrome information

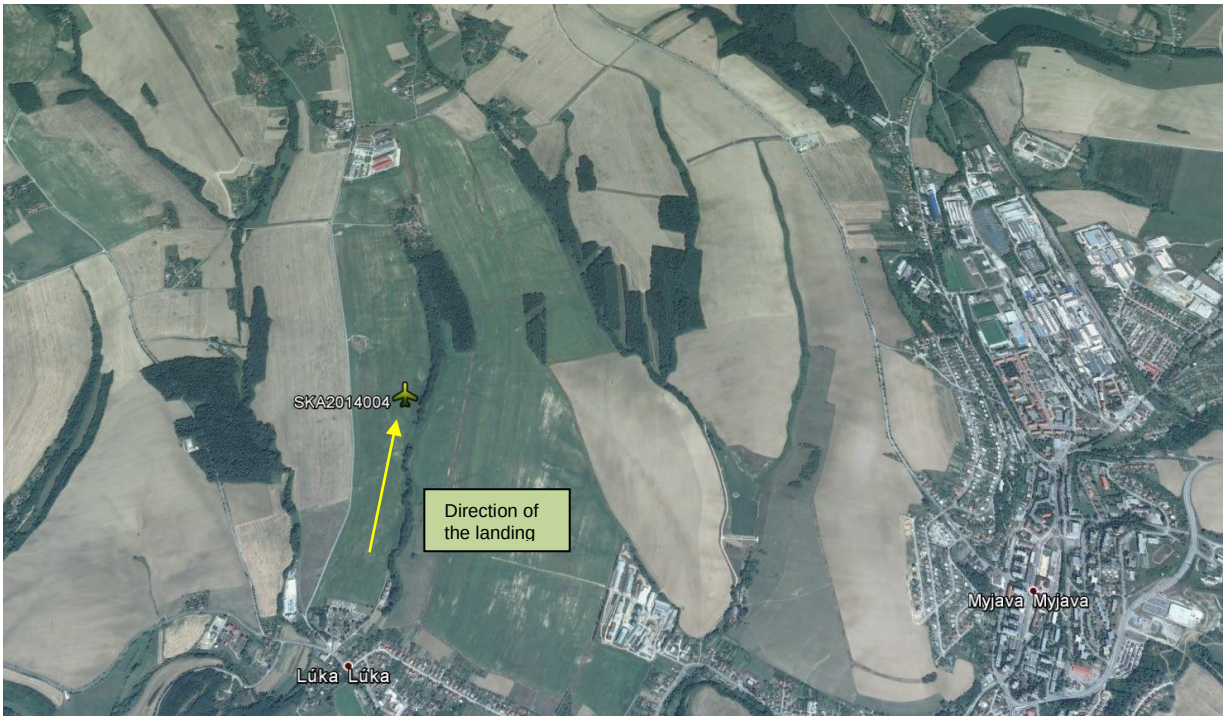
N/A.

1.11 Flight recorders

N/A.

1.12 Wreckage and impact information

The aircraft was destroyed after it had landed on a drenched field and continued the drift movement with gradual disintegration of its body until the full stoppage.



1.13 Medical and pathological information

N/A.

1.14 Fire

No fire broke out.

1.15 Survival aspects

The search and rescue operations using SAR means were not required.

1.16 Tests and research

The commission thoroughly studied the mechanism of closing and opening of the cockpit and warning signalling of its opening, including the physical verification of the light LED activation in different positions of the cockpit lock handle. Moreover, it consulted the risk of cockpit self-opening with experts (experienced pilots and engineers) with long-year flying experience with given aircraft type and its maintenance.

From the aforesaid study and consultation it followed that a brief activation of the left or right cockpit lock handle would activate the canopy opening light control. On the other hand, the pilot would have to shift the cockpit lock handle 10 cm backwards to fully unlock the cockpit lock.

Fig.1 Detail of disengaged locking wedge in the closed position

Fig.2 Detail of engaged locking wedge in the opened position

Fig.3 Activation of the LED lamp in the cockpit

1.17 **Organizational and management information**

N/A.

1.18 **Additional information**

1. The flight logbook of the pilot contains a record on a solo flight made with aircraft type DA-40, Registration No. OK-IMC, on 16.11.2013 without previous “take-up“ flight (the pilot was under training before gaining the pilot licence). Further verifications revealed that it had actually been a flight with instructor who had noted it as an instructor flight, while the student pilot had noted it in its book as a solo flight.
2. The pilot was flying the aircraft PS-28 Cruiser during his whole training, which he completed on 07.03.2014.
3. On 10.05.2014 the pilot attended retraining for aircraft type DA-20-A1 Katana (14 take-offs and landings, total number of flight hours 1:30 before the verification flight).
4. On 24.06.2014 the pilot made a verification flight required to obtain the pilot licence (7 take-offs and landings, total number of flight hours 1:40), which were his lasts flight preceding the air accident.

The flight logbook of the pilot is kept in a non-transparent manner with many corrections, and the entries are not given in a chronological order.

During the critical flight the passenger made an entry in his mobile phone, on which four witnesses clearly saw that the LED signal lamp “CANOPY“ was lit after the accident. However, the passenger did not provide the investigation commission with this entry, which could have clarify some circumstances related to the separation of the cockpit canopy.

1.19 **Useful or effective investigation techniques**

Standard investigation methods were used.

2. ANALYSIS

2.1. **Activity of pilot**

From the total number of flight hours of the pilot, especially for the last period it is clear that the accident involved an inexperienced pilot who was making a flight with a passenger on board.

The commission was unable to unambiguously prove the cause of separation of the cockpit canopy.

From the design of the cockpit lock, which was subject to function tests on several aircrafts Katana DA-20, it is clear that the mechanism cannot unlock spontaneously without intervention of the persons onboard during the flight, which allows an assumption that the lock was probably unlocked by an unintentional movement of one of the persons on board.

Fig.3 documents a slight motion of the cockpit lock handle (as prerequisite of the opening of the cockpit), which causes the activation of the red LED lamp “CANOPY“ situated in the view field of both the pilot and the passenger.

This signal lamp went on also in this case, which is obvious from the entry in the mobile phone, which was not provided to the investigation commission by the passenger, but which was seen immediately after the accident by the witnesses, who indicated this fact in their statements.

It means that neither the pilot nor the passenger noticed the activation of the warning LED and therefore they did not react to this occurrence, which again proves the lack of the pilot´s experience, as regards the “division of attention“ when monitoring instruments on the control

panel. If the crew registered this signal they would have been probably able to prevent the loss of the canopy.

The pilot´s activity following the separation of the cockpit canopy was clearly hasty, because he obviously tried to land as soon as possible in spite of the fact that all systems of the aircraft worked well. Consequently, save the discomfort caused by the air flow, cold and unavailability of communication, the pilot was able to steer the aircraft without problems and for a smooth landing had at his disposal not only the agro airport Myjava, but also a few nearby airports (Senica 22 km, Piešťany 25 km, Holíč 33 km).

The aeromodellers, who were present at the agro airport Myjava at the time of the aircraft´s arrival, cleared the surface as soon as they noticed the aircraft to allow its use by the pilot for landing. In spite of these facts the pilot decided to land on a drenched ground slant to the direction of landing (first assumption for the contact of the wing with the ground), so the inexperienced pilot in a stress situation had very small chance for a successful landing without causing an extensive damage to the aircraft.

3. C O N C L U S I O N S / CAUSE OF ACCIDENT

3.1 **Findings**

- The pilot had valid qualifications for the critical flight.
- The pilot had limited flying experience with aircraft DA-20.
- Considering his experience, the pilot had a relatively long break in flying.

3.2 **Cause of air accident**

Poor mastering of the landing manoeuvre in the phase of emergency ground landing.

Contributing factors

- Unsuitable surface chosen for the ground landing;
- Separation of the cockpit canopy during flight;
- Mishandling of the critical situation after the separation of the cockpit cover.

4. SAFETY RECOMMENDATIONS

The final report on investigation of the air accident does not contain any recommendations.

Bratislava, 26.08.2014