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

FINAL REPORT

on the safety investigation of an air accident
of a glider type **ASTIR CS 77**
registration mark **OM - 7686**

Reg. No: **SKA2019003**

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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

Glider type:	ASTIR CS 77
Registration mark:	OM-7686
Operator/owner:	Aeroklub Bratislava o.z., Letisko Boleráz 719, 919 08 Boleráz
Operation type:	general aviation/sports and recreational flying
Take-off site:	Partizánske airport / LZPT
Flight phase:	aerotow
Take-off site of the glider:	N 48°37'16", E 018°20'13"
Impact site of the glider:	N 48°37'02", E 018°19'12"
Incident date and time:	30 June 2019, 13:26

Note: All time data in this Report is reported in UTC time.



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B. INFORMATIVE SUMMARY

On 30 June 2019 at 13:22 a pilot with a glider type ASTIR CS 77, registration mark OM-7686 (hereinafter referred to as the "glider") was taking off behind a Eurofox tow plane from a grass take-off and landing runway (hereinafter referred to as "RWY") 07 for a short familiarization flight with the LZPT area.

After the take-off the pilot discovered that her elevator was not working so she decided to release off the aerotow. After making a 180° turn she performed an emergency landing on RWY25. The approach and landing were performed at a higher speed and under a large angle of descent, as a result of what the glider first touched the ground with the front part of its fuselage and the tip of its left wing, causing sharp rotation to the left. The glider was destroyed during the landing and the pilot suffered serious injuries.

Medical assistance was called and the pilot was transported by a helicopter of the medical rescue service to the Faculty Hospital in Trenčín.

The accident was reported to the Aviation and Maritime Investigation Authority by a member of the Aeroclub Bratislava performing aerotows at LZPT.

A committee was set up to investigate the causes of the accident:

Ing. Ladislav Dospiva
Ing. Dominik Jančík

Chairman of the Safety Investigation Committee
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.

MAIN PART OF THE REPORT

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

1. FACTUAL INFORMATION

1.1 History of the flight

On 29 June 2019 the pilot took over the glider at Boleráz/LZTR airport and after its disassembly she transported it to LZPT airport in a transport vehicle. When taking over the glider she was informed by the chief engineer of the Aeroclub Bratislava that the glider needed to be hangared every night or disassembled and loaded onto a transport vehicle. Since the glider could not be hangared on the arrival date to LZPT; it was assembled only on 30 June 2019.

Before performing the flight itself the pilot made a familiarization flight in the Eurofox tow plane in order to become familiar with the LZPT area.

Members of the Aeroclub Bratislava who were participating in the Alexander Makarenko Memorial 2019 (AMM 2019) competition helped the pilot assemble the glider. Having assembled all glider parts, she evaluated all connections as correct, taped all transitions and then checked the glider and connection of individual components. After participating in a briefing for AMM 2019 competitors, she performed a pre-flight check of the glider with one member of the Aeroclub Bratislava present. During the check they inspected all connections with the exception of connection of the elevator rod.

Before the take-off she put on a parachute and performed all mandatory pre-flight actions in the cabin.

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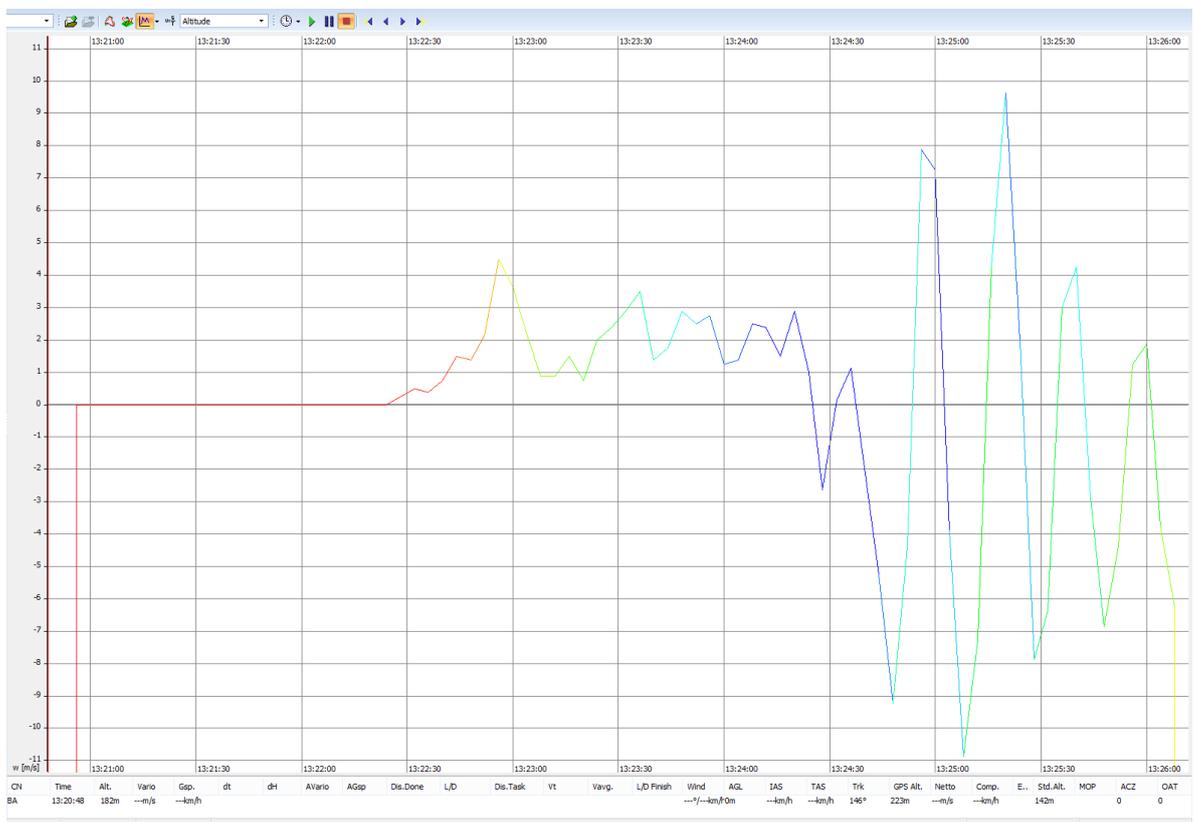
During the take-off, after the first cast-off, the glider soared up to 5 m and then touched the ground. Another oscillation was smaller; the glider did not touch the ground and the oscillations disappeared gradually. The pilot assessed such unusual situation as excessive use of the control stick during the flight.

When adjusting the flight altitude during the next course of the flight she discovered that the glider was not responding to movements of the control stick and she realized that it was not a piloting mistake but that her elevator was not working. She tried to adjust the flight altitude with pitch trim control but she did not realize that such glider type did not have "aerodynamic" trim tab. Flight altitude could not be changed by moving the pitch trim control. She reported the situation to the pilot of the tow plane and she released off the aerotow. She was controlling the glider only with a rudder, ailerons and flaps.



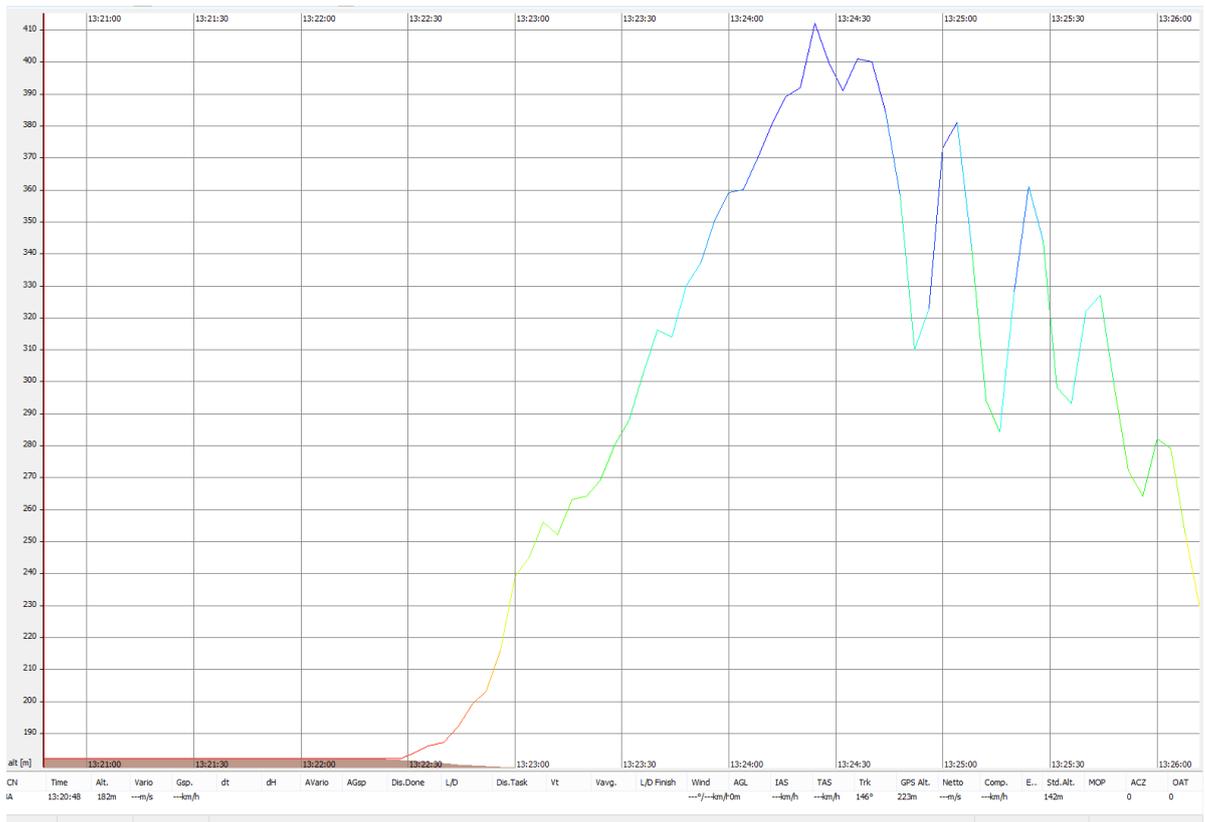
Picture 1 Glider flight trajectory

After making a 180° turn she performed an emergency landing on RWY25 at LZPT. The approach for landing was unstable with a higher rate of descent (up to 10 m.s⁻¹).



Picture 2 Graphical display of the vertical speed of the flight

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Picture 3 Flight altitude

Landing was performed without levelling out and with a large angle of descent, as a result of what the front part of the fuselage and the tip of the left wing touched the ground first. This caused a sharp rotation to the left during which the right wing broke off and the aileron and the rudder ripped off. After stopping the glider remained turned by 180° in the landing direction on RWY25.

The glider was damaged during the landing and the pilot suffered serious injuries.



Picture 4 Glider after landing

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Picture 5 Glider after landing

Time of day: Day
Flight rules: VFR

1.2 Injuries of persons

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

1.3 Damage to the glider

The glider was destroyed in the accident. The inspection showed extensive damage to the right wing and the rudder, extensive delamination of the bottom part of the fuselage in the area of the cabin and the keel, broken undercarriage and broken cabin cover.

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

Glider pilot:

citizen of the Slovak Republic, aged 39;

holder of a valid SPL glider pilot license issued by the Transport Authority of SR on 31 May 2019;

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holder of a valid restricted radio telephone operator certificate of the aeronautical service II issued by the Regulatory Authority for Electronic Communications and Postal Services of SR on 20 February 2017.

Flight experience:

total flight hours	47 hours 31 min
total flight hours on the type ASTIR CS 77	3 hours 23 min
total flight hours for the last 90 days	1 hour 27 min
total flight hours on the type ASTIR CS for the last 30 days	19 min

Class of medical certificate:

class 2 with marked validity until 22/04/2021

LAPL (Light Aircraft Pilot Licence) with marked validity until 22/04/2021.

1.6 Information about the glider

Type:	ASTIR CS 77
Registration mark:	OM-7686
Serial number:	1760
Year of manufacture:	1978
Manufacturer:	GROB Werke GmbH & Co KG, Germany
Total flight hours:	3,297 hours

Airworthiness Certificate No. 1287/01 issued by the Transport Authority on 27 April 2019.

Airworthiness Verification Certificate No. 1287/01-053/19 issued by the Slovak National Aeroclub of Gen. M.R. Štefánik on 28 April 2019 valid until 28 April 2020. As of the airworthiness verification date, the glider had flown 3,289 hours.

The maximum take-off mass of the glider - 380 kg - was not exceeded during the take-off.

1.7 Meteorological information

The sky was clear and without atmospheric precipitation on 30 June 2019 from 12:00 to 14:00 in the area of Partizánske, part Malé Belice. The air temperature ranged from 31.5 to 32.5°C and relative humidity was approximately 30%. The horizontal visibility was around 60 km. Southerly to south-easterly wind was blowing with the speed of 3-6 m/s. During the period of time in question the weather was stable and without any major changes.

The sky was clear and without atmospheric precipitation on 30 June 2019 at 13:26 in the area of Partizánske, part Malé Bielice. The air temperature was 32.5°C, the relative humidity was approximately 30% and the horizontal visibility was about 60 km. Southerly to south-easterly wind was blowing with the speed of 4-5 m/s.

The meteorological conditions had no impact on the occurrence of the accident.

1.8 Aids to navigation

The glider was equipped for VFR flights.

1.9 Communications

The glider was equipped with an on-board radio station enabling bidirectional radio connection at every moment of the flight with all aeronautical stations.

1.10 Aerodrome information

LZPT is a public national aerodrome located near the town of Partizánske (3.5 km to the west of Partizánske). Size of RWY 07L/25R: 1100×50 m.

1.11 Flight recorders

The glider was equipped with a flight recorder and Flarm 7 anti-collision system. The record from the flight was saved and downloaded for the purposes of investigating the air accident.

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The record was evaluated using the "SeeYou" programme. The record evaluation confirmed an unstable flight of the glider with frequent changes of altitude and vertical speed.

1.12 Wreckage and impact information

Coordinates of the accident site: 48°37'02" N - 18°19'12" E



Picture 6 LZPT airport

1.13 Medical and pathological information

The pilot had several injuries on her head, chest, spine and legs; she was conscious and transported with a helicopter medical rescue service to the Faculty Hospital in Trenčín.

1.14 Fire

None.

1.15 Survival aspects

It was not necessary to perform any search or rescue with SAR equipment.

1.16 Tests and research

N/A

1.17 Organizational and management information

Flight activities were performed in accordance with aviation regulations valid in the territory of the Slovak Republic and with local rules.

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1.18 Additional information

The member of the investigation committee inspected control elements of the glider immediately at the accident site at LZPT where he discovered that the elevator rod was not connected.



Picture 7 Unconnected elevator rod

When further examining the accident, the investigation committee checked the process of assembling and disassembling the stabilizer with elevator on a glider of the same type at Boleráz/LZTR airport. It was discovered during such check that when the elevator rod was not connected, the elevator remained in the position for descending flight. When the elevator rod was connected, the elevator remained in a horizontal position.

When checking the force in the pitch control, the force was proportionate to setting of the pitch trim control and it was equal regardless of the fact if the elevator rod was connected or not. The position of the elevator could only be checked visually.

1.19 Useful or effective investigation techniques

Common investigation methods were applied.

2. ANALYSIS

Pilot activity

When assembling the glider and during her pre-flight preparation the pilot did not carefully check connection of all glider control elements (Flight Manual G102, ASTIR CS11).

Immediately after the take-off the pilot wrongly assessed the reason of the bounce of the glider and its subsequent altitude changes behind the tow plane as wrong piloting (excessive use of the control stick).

The pilot wrongly used the pitch trim control to change the flight altitude after discovering that her elevator was not working (the glider had no aerodynamic trim tab).

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3. CONCLUSIONS / Cause of the air accident

3.1 Findings

Pilot

- According to the submitted documentation, the pilot had valid qualifications for performing flights with the particular category of gliders;
- The pilot had flown few flight hours on the particular glider type;
- At the time of the air accident the pilot was not under the influence of alcohol which could have affected her attention during the flight.

Glider

- The glider had valid documentation and did not demonstrate any malfunction before the air accident;
- It complied with the airworthiness conditions;
- Records of the operator in the aircraft book and in the aircraft/glider logbook were not kept in accordance with instructions of the Transport Authority (the above-stated had no impact on occurrence of the accident);
- The glider operator did not report the air accident in accordance with the Article 4 of the Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014.

3.2 Causes of the air accident

Inconsistent glider assembly (failure to connect the elevator rod) and pre-flight preparation.

4. SAFETY RECOMMENDATIONS

The Final Report on safety investigation of the air accident does not contain any recommendations.

In Bratislava, on 21 October 2019