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
AND CONSTRUCTION
OF THE SLOVAK REPUBLIC

AVIATION AND MARITIME INVESTIGATION AUTHORITY
Námestie slobody 6, P.O.BOX 100
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F I N A L R E P O R T

on a safety investigation of the accident

of flying sports vehicle
paraglider type **GRADIENT / BiGolden 3 - 39**

with registration mark **OM - L101**

Reg. No.: SKA2017006

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

Operator/Owner:	private person
Operation type:	General Aviation/Sports and Recreational Flying
Type:	flying sports vehicle paraglider Gradient BiGolden 3 - 39 (hereinafter “PG”)
Registration mark:	OM-L101
Place of take-off:	Donovaly – Nová hoľa
Flight phase:	after take-off
Location:	Donovaly
Accident date and time:	30.07.2017, 09:04

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

B. INFORMATIVE SUMMARY

On 30.07.2017 at 09:04, there was an air crash during a tandem flight on the PG, with fatal consequences for both the pilot and the passenger.

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

Ing. Igor BENEK – Chairman of the Safety Investigation Commission
Ing. Róbert GREXA – Member of the Safety Investigation Commission

The report is issued by:

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

C. MAIN PART OF REPORT

1. FACTUAL INFORMATION

2. ANALYSIS

3. CONCLUSIONS

4. SAFETY RECOMMENDATIONS

1. FACTUAL INFORMATION

1.1 History of the flight

The pilot took off at 09:04. From the moment of take-off, it was clear that the flight was not running in a standard way because the pilot evidently hovered only on the left carabiner. The right carabiner was not attached to the tandem bracket. The passenger was properly fastened. After the take-off, the pilot attempted to maintain the PG in forward flight with the help of the brake lines, but due to the need to grab the right side of the PG, the right half of the wing went into a negative turn. In an effort to halt the negative turn, the pilot launched the right brake line, causing the right side of the PG to regroup and accelerate. This acceleration immediately led the PG into a left descending spiral, which the pilot was unable to compensate. The flight lasted 31 seconds and ended with a crash into the field in the left descending spiral. Both crew members suffered fatal injuries.

Fig. 1 View of the first attempt to take-off

Fig. 2 Detailed view of the pilot showing the non-attachment of the carabiner to the tandem bracket

The flight accident was reported to the Aviation and Maritime Investigation Authority of the Ministry of Transport and Construction of the Slovak Republic by a representative of the Light Aircraft Association of the Slovak Republic.

Time period: Day
Flight rules: VFR

1.2 Injuries to persons

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

1.3 Damage to to the PG

The PG wing was not damaged in the flight accident. The saddle harness was damaged due to the crash to the ground and as a result of the execution of the rescue.

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:

citizen of the Slovak Republic, aged 39, holder of a PG-C and PG-T pilot license from 22.07.2004. The pilot license was issued by the Light Aircraft Association of the Slovak Republic. The pilot had long training practice, and in 2017 he was awarded the qualification of PG union inspector. The validity of the pilot's license was until 22.02.2019.

Flight experience: flight 1120:00 hod.

1.6 Information on the PG

Type:	Gradient BiGolden 3-39
Registration mark:	OM – L101
Serial number:	G40391511422
Manufacturer:	Gradient

Certificate of Airworthiness No.16061 with validity period to 08.11.2018.

1.7 Meteorological information

High cloud 1/8, visibility over 10 km, south wind 4 - 6 m/s.

1.8 Aids to navigation

N/A

1.9 Communications

N/A

1.10 Aerodrome information

Starting point: Donovaly – Nová hoľa.

1.11 Flight recorders

N/A

1.12 Wreckage and impact information

The PG fell to a field near the starting point.

Fig. 3 View of the take-off and impact site in Donovaly - Nová hoľa

1.13 Medical and pathological information

In terms of forensics, it was violent death - multiple injuries resulting in death.

1.14 Fire

None.

1.15 Survival aspects

It was not necessary to perform an investigation and rescue by SAR.

1.16 **Tests and research**

An expert review of the PG has been performed with the following conclusions:

- at the time of flight prior to the accident the PG was in suitable condition for flight. According to the gathered data, the take-off weight was not exceeded and corresponded to the authorized take-off weight range specified by the manufacturer,

- the seat of the pilot and passenger seat were damaged after the accident, but were operational during the flight, as evidenced by the video capturing the course of the flight accident. The carabiners of both seats as well as the carabiners of the brackets were functional after the accident. The self-locking locks of the carabiners worked without any deficiencies. According to the gathered data, the maximum weight recommended by the manufacturer was not exceeded,

- the rescue parachute was properly packed and attached to the main bracket carabiners. It was operational at the time of the accident. Its opening was very difficult due to the flight course. From a video record of the flight made by a witness to the flight accident, it is clear that, if a back-up parachute had been used, its inflating would have been questionable. The main adverse factors were, in particular, the proximity of the ground and the speed of the PG's reaction after the pilot releasing the right brake line, followed by a sharp transition into a left spiral.

1.17 **Organizational and management information**

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

1.18 **Additional information**

N/A

1.19 **Useful or effective investigation techniques**

Standard investigation methods were used.

2. ANALYSIS

Pilot Activity

The pilot made preparations for take-off with a tandem PG and at about 9:00 he made the first attempt at take-off. Due to the course of the take-off, when the passenger, probably as a result of the unexpected jerking in the direction of the inflation of the PG, she was unable to keep her feet and fell to the ground, the pilot disrupting the take-off by symmetrically pulling the brake lines. Based on the video shot by the flight accident witness, it is obvious that the pilot had not been clamped with the right carabiner to the tandem bracket at the time of the first takeoff attempt. The pilot, but neither the people who were by the place of takeoff, did not notice this.

Afterwards the pilot again put the PG in a position suitable for the take-off.

The pilot took off at 09:04. From the moment of takeoff, it was clear that the flight was not normal because the pilot hung attached to the PG only on the left carabiner attached to the tandem bracket. The right carabiner was not attached. The passenger was properly fastened. PG was deformed in the middle after the take-off.

Fig. 4 Deformation of the PG support surface due to uneven load

The deformation was caused by the uneven weight distribution of the crew. The greater part of the weight was on the left half of the PG and therefore the parachute was trying to spontaneously turn to the left side. The pilot compensated that for the braking of right half of the wing by the brake line, which is visible in Fig. 4, where the outtake edge on the right side of the PG is significantly impeded.

From the moment of takeoff, the pilot attempted to maintain the PG under control, but due to the need to brake the right side slightly, the right half of the wing went into a negative turn.

Fig. 5 The moment of transition of the right half of the PG into a negative turn

Due to the fact that in this mode the pressure inside the wing is very low, there was also a deformation of the support surface, which was clearly split into half and the PG went into a negative turn. After two seconds of dropping in a negative turn, the pilot released the right brake line as a result of which the right side of the PG restored and accelerated. One second after the release of the right brake line, the PK turned 90° to the left and went into a left descending spiral. At this point the pilot was unable to steer the PG because he did not have the brake line in his hand. Because he was hung only on the left carabiner, he could not reach the right brake line. In the next 5 seconds, the rotation of an approximately 180° under continuous fall occurred and subsequently the PG impacted on the ground.

Fig. 6 Falling spiral

Both crew members suffered fatal injuries. The pilot did not use a rescue parachute, but it cannot be ruled out that he did try. Since the pilot had the rescue parachute handgrip on the right side of the seat, it was not possible to use it until the right brake line was released. But at the moment the pilot released the brake line, the PG gathered dynamics so dynamically that feeling the release system of the rescue parachute was almost impossible. Another adverse factor was the proximity of the ground, which greatly reduced the time of possible use of the rescue parachute. Even at the highest point of the flight, the use of a rescue parachute would have been questionable and would have depended on many factors.

3. C O N C L U S I O N S / Cause of air accident

3.1 **Findings**

- the pilot had a valid qualification to perform a tandem flight on a PG,
- PG was registered and had a valid airworthiness license,
- PG, the pilot's harness, the passenger's harness, brackets and rescue parachute were in good technical condition, suitable for a tandem flight,
- all the PG carabiners were operational after the accident, and their lock did not allow the accidental unfastening the carabiners.

3.2 **Causes of air accident**

The pilot did not attach the right carabiner into the tandem bracket.

Insufficient performance of five-point pre-flight check by the pilot.

4. SAFETY RECOMMENDATIONS

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

In Bratislava, 20.11.2017