

# FINAL REPORT

on  
investigation of an air accident with a motor hang glider delta  
“Lebed I”, owned by Avio-Delta Ltd, town of Kazanlak, occurred on  
20.06.2004



The materials about the aviation occurrence investigation have been classified under state file number 04/20.06.2004.

**Owner:** Avio-Delta Ltd, town of Kazanlak, with main office in Kazanlak, 47A Nineteenth of February Str.

**Aircraft Manufacturer:** Avio-Delta Ltd, town of Kazanlak.

**National and Registration Marks:** The aircraft was not registered.

**Place and Date of the aviation occurrence:** Kazanlak landing ground, 20.06.2004.

**Notified:** Aircraft Accident Investigation Unit, Ministry of Transport and Communications and CAA.

A commission has been appointed for investigation of the aviation occurrence by an order RD-08-417/05.07.2004 of the Minister of Transport and Communications.

**Type of Flight:** repositioning of the aircraft in the landing ground boundaries.

On 20.06.2004 the pilot fulfilled the first flight for the day.

After start and check of the engine the pilot started a take-off for repositioning in the landing ground area.

During the flight at extremely low altitude over the ground the motor hang glider hit the ground and the wing was totally destroyed. The pilot was seriously injured and was hospitalized in Kazanlak Hospital.

In accordance with Para.3 of Additional Provisions of Regulation 13 of the Ministry of Transport of 27.01.1999 about aircraft accident investigation the aviation occurrence has been classified as an air accident.

## **1. Factual Information**

### **1.1 History of Flight**

**1.1.1 Flight Number:** First flight of the day.

#### **1.1.2 Flight Preparation and Description**

The preparation for the flight was performed on ground at the hangar of Avia-Delta Company. Preflight preparation was conducted by the company-manufacturer manager and the aircraft pilot, which suffered the occurrence.

The pilot moved the motor hang glider (MHG) "Lebed I" to the beginning of the landing strip and checked the engine, ignition system and controls, increased the engine speed to maximum and accomplished a take-off in compass course (CC) about 150°.

According to the witnesses' information, the flight over the terrain was performed at about 50...60 cm over the mowed surface of the runway. The MHG turned left to the left end boundary of the runway and entered into wheat field adjoining the landing ground.

The left-hand landing gear fouled into the wheat, which culms were about 90...100 cm high. MHG hit the ground in CC about 140...150°.

General view of the suffered MHG after the air accident is shown on Fig. 1.

The pilot suffered serious injures and after first aid administration he was transported to the Kazanlak hospital.

The flight was observed by a group of parachutists that were preparing for a jump. The parachutist instructor and the physician, who supported the parachute jumps, administered first aid of the suffered and called an ambulance. It arrived in about 10 minutes.



Fig. 1

### 1.1.3 Location of the Occurrence

Kazanlak landing strip is with reference point coordinates (RPC) and air accident point coordinates, respectively:

- RPC: N 42°35'24"; E 025°25'63";
- air accident point coordinates: N 42°35'074"; E 025°25'688".

Elevation: 332 m

### 1.2 Injures to Persons

Injures	Crew	Passengers	Others
Fatal	0	0	0
Serious	1	0	0
Minor/None	0	0	0

### 1.3 Damage to Aircraft

During the inspection of the aircraft the Commission determined: destroyed fin and wing mast, bended main supporting strength elements of the wing, bended left- and right- hand struts of the wing, torn wing cloth, messed ropes, bended control trapeze, cut away fairing of the left-hand landing gear cantilever, destroyed propeller vanes. The wing was destroyed and non-repairable. The damages of the hang glider wing and propeller are shown on Fig. 2 & Fig.3.



Фиг. 2



Фиг. 3

#### **1.4 Other Damages**

No other damages.

#### **1.5 Personnel Information**

##### **1.5.1 Aircraft pilot**

**Type of pilot license:** MHG student pilot in a training flight course on hang glider and para-glider (KULP DMP-89), Part II “Motor Hang Glider Pilot”.

**Medical fitness:** Certificate for medical fitness, issued on 20.05.2004 and valid till 20.05.2006.

#### **1.6. Aircraft information**

##### **1.6.1. Airworthiness information**

Motor hang glider “Lebed I” was manufactured in 1997 by Avio-Delta Ltd. – town of Kazanlak.

The trike “Lebed I” type was manufactured in 1997 by Avio-Delta Ltd. – town of Kazanlak and as to the moment of the air accident it had accrued 295:26 hrs and 3950 cycles since new.

The last annual control check of the trike was certified by the manager of the manufacturing company on 07.05.2004, when the number of hours flown was 254:50 since new.

The wing of the motor hang glider “Lebed I” was Ghost 14.9 type and was manufactured in 1997 by Avio-Delta Ltd – town of Kazanlak and as to the moment of the air accident it had accrued 295:26 hrs and 3950 cycles since new.

There were no identification labels with serial numbers on the trike and wing.

The last annual control check was certified on the 07.05.2004 with a total of 254:50 hrs flown (according to the trike logbook).

A Rotax 503 engine was installed on the motor hang glider. A six-blade propeller was installed on the engine.

Before the flight of the 20.06.2004 a pre-flight preparation of the MHG was performed by the pilot and manufacturing company manager. The controls and the engine were tested. No failures have been established.

### **1.6.2. Aircraft performance**

Maximum take-off weight of the motor hang glider “Lebed I” is 420 kg according to the Technical Logbook of the motor trike. The empty weight of the glider is 195 kg. At the moment of the air accident the glider had about 40 liters of fuel onboard and the flight was fulfilled by one pilot and the flight weight was about 300 kg.

Maximum speed = 110 km/h.

Cruising speed = 90 km/h.

Minimum speed = 60 km/h.

Rotax 503 engine is a two-cylinder two-stroke, air-cooling, working volume of  $496.7\text{cm}^3$  and take-off power of 47.6 hp. Maximum rotational speed of the crankshaft is  $6800\text{min}^{-1}$ .

### **1.6.3. Fuel**

Motor hang glider “Lebed I” use a mixture of fuel and oil in a ratio of 50 volume parts of fuel and 1 volume part of oil.

Before the flight the glider was fueled with automotive unleaded fuel A-95H, which is in compliance with the engine manufacturer requirements. There was no record about the quantity of fuel refueled and during the inspection of the aircraft the Commission established about 30 liters of fuel in the tank.

During the inspection of the fuel system it was found out, that the fuel filter was clean, without any mechanical dirt.

A fuel sample was taken from the fuel tank of MHG and it was investigated in the Chemical Laboratory at Sofia Airport EAD. A report of fuel investigation is attached to the investigation materials.

### **1.7. Meteorological information**

Visual meteorological conditions, CAVOK, calm.

### **1.8. Aids to navigation**

Standard aids for this class of aircraft.

### **1.9. Communications**

Not required.

### **1.10. Airport**

Kazanlak landing ground with reference point coordinates: N 42°35'24"; E 025°25'63";

### **1.11. Flight data recorders**

Not required for the class of aircraft.

### **1.12. Wreckage and impact information**

The wreckage of the aircraft were moved into a hangar and sealed under an order of Territorial Investigation Service of Kazanlak.

The information about the wreckage and impact is based on the witnesses' testimony on the place of aviation occurrence, on the photo materials from the scene of the occurrence, taken by the Territorial Investigation Service - town of Kazanlak, as well on the data, received during the scene of the occurrence inspection on the next day.

After the inspection of the traces of the glider on the ground it was determined that the first touch of the glider with the ground was with the left-hand wheel and landing gear, followed by an impact of the wing into the ground and overturn of the glider.

The wing of the glider was torn from the trike as a result of the impact and turned upside down, the six blades of the propeller were destroyed entirely, and the trike was overturned and rested on the left-hand main landing gear. The nose landing gear and right-hand main landing gear were in the air, the control trapeze was destroyed. There were residues of grass and dirt, the wing cloth was torn.

The first trace of touch of the glider with the grass was at about 30 m from the place of the fall and it was a wheel track left by the left-hand main landing gear. The first trace from the propeller was at 3 m from the place of fall.

### **1.13. Medical and pathological information**

According to a protocol by the Air Medicine Certification Commission (AMCC) the pilot had flight fitness till 20.05.2006.

The pilot suffered serious injures as a result of the air accident.

An alcohol test was made after the air accident and it was negative (Protocol No .../....., issued by the Specialized Chemical Laboratory at the Regional Police Department of Stara Zagora).

#### **1.14. Fire**

After the inspection of the MHG and the scene of the accident the Commission determined that there was no fire emerged.

#### **1.15. Survival aspects**

It is possible to point out as main survival aspects:

- use of safety helmet by the pilot;
- timely rendered first aid on the scene of accident and timely convey of the pilot to the hospital.

It is necessary to point out that as a result of the strong impact into the ground the safety belt was torn along the seam as it is shown on Fig. 4.



Fig. 4

#### **1.16. Tests and research**

For the purpose of the technical investigation the following tests and research were conducted:

- inspection of the scene of the air accident;
- visual inspection of the wreckages of the motor hang glider, condition and positions of the valves and switches on the control panel;
- written explanations were taken from the witnesses and a comparative analysis between them;
- laboratory analysis of the fuel.

Materials and results of the tests and research are enclosed to the deed.

## **2. Analysis**

The information about the pre-flight preparation, explanations of direct witnesses of the glider flight, inspection of the scene of air accident and wreckages of the aircraft gave the ground to do the following analysis of the motor hang glider flight till the ground touch.

At about 08:00 on the 20.06.2004 the weather conditions at Kazanlak landing strip was favorable for flight activities – day, visual flight conditions, calm, visibility more than 10 km.

On the Kazanlak landing strip in front of the hangar there was a group of parachutists, preparing for jumps.

Preflight preparation of the glider was performed by the pilot and the manager of the company-manufacturer of the aircraft on the ground in front of the company's hangar, which is adjacent vicinity to the unpaved runway of the Kazanlak landing strip.

The pilot of the glider, which suffered the accident, fulfilled the necessary check of the wing controls. The engine was warmed-up and the ignition system was checked.

The take-off was performed in  $CC=150^\circ$ .

According to the witnesses' statements, the glider's flight was performed in  $CC=150^\circ$  at a height of about 50...60 cm over the mowed grassy runway at a speed of about 90 km/h and this altitude and speed were kept during the whole flight, observed by the witnesses. According to the witness, there were no engine irregularities and the engine speed was constant till the moment of the glider's touch-down into the ground.

The flight trajectory was close to the left-hand side of the landing runway.

The traces on the scene of the accident permitted to establish that in the last stage of the flight the glider deviated to the left at  $10^\circ...15^\circ$  from the initial flight direction, coincident with the compass course of the runway ( $CC=150^\circ$ ), possibly because of a deviation of the pilot's attention.

The visual inspection of the scene of accident leded to entering into a field of wheat to the north of the runway with height of stalks about 90 to 100 cm.

The inspection of the scene of accident showed that the glider touched the wheat with the left-hand main landing gear first, which led to a sharply and fast increasing of the drag and rising of side moment, which rotated and banked the glider to the left and a moment about the transverse axis, which led to the impact of the nose into the ground.

The trace left by the left-hand main landing gear showed that with a speed of about 90 km/h and the distance of about 30 m from the first touch to the place of impact, the situation developed from dangerous to accidental in no more than 1...1.2 s.

The fact that the wheat ears at the right-hand side of the track to the runway were almost intact showed that the trike was probably with left-hand bank during the last 30 m as a result of the increased drag because of fouling of wheat ears into the landing gear.

The next trace showed that the first touch of the MHG with the ground was with the left-hand main landing gear with the next impact of the nose part of the wing and turnover of the glider. The damages after the hit into the ground were described in Para.1.12.

As a result of the strong dynamic impact the pilot's safety belt was torn along the seam. The pilot suffered serious injuries.

### **3. Conclusions**

The technical investigation and results of the tests and analysis conducted gives to the Commission the grounds for the conclusion, that the serious incident was a result of the following

#### **Main cause**

Conducting of a flight at unregulated low altitude and inadvertent deviation from the flight course leading to an exit from the runway boundaries and collision into an obstacle

#### **Immediate cause:**

MHG impact into the ground

#### **Contributing factors:**

1. Non-observance of the flight safety requirements by the pilot.
2. Possible deviation of attention of the pilot.

During the investigation the commission revealed also the following

#### **IRREGULARITIES:**

1. Avio-Delta Ltd doesn't possess an Air Operator Certificate.
2. The aircraft doesn't possess Certificate of Registration and Certificate of Airworthiness.
3. There were no identification labels with serial numbers of the trike and the wing.
4. There were no methodical developments for pilot training in accordance with the training programs.

5. Conducting of flights without registration marks on the aircraft.

**Safety recommendations:**

1. When submitting documents for permission for Air Training Center (ATC) and in accordance with the represented new training programs the candidate must submit methods of conduction of training and solo flights with motor hang gliders.
2. The aircraft manufacturer must install identification labels with serial number on the wing and trike.
3. The fitness and condition of the safety belts of the motor hang gliders should be checked.
4. The 100 hrs or annual checks of the motor hang gliders should be performed by certified persons.