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

Reg. No. SKA2013012

FINAL REPORT

on investigation of accident of

sports flying device / SFD

Registration No. **OM-H043**

Date: 16.08.2013

Place: Agro Airport Myjava

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:	Ing. Štefan Sadloň
Type of operation:	general aviation / sport and recreational flying
Type of aircraft:	SFD / powered hang glider ("PHG")
Registration No:	OM-H043 (according to the landing gear)
Take-off site:	Agro Airport Myjava
Flight phase:	take-off climb
Place of accident:	corn field behind the runway 17 of the Agro Airport Myjava
Coordinates of the place of accident:	N 48° 45´41´´ E 17° 31´39´´
Date and time of accident:	16.08.2013, 16:45

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

B. INFORMATIVE SUMMARY

On 16 August 2013 at 16:45 the pilot started with the aircraft to test the new-mounted wing Aeros Profi. In the phase of steep take-off climb the landing gear deflected left from the flight direction and the wing misaligned to the right. In a height of 70-80 m the whole PHG overturned to the right and uncontrollably and steeply rotated down until it hit the ground.

The pilot suffered a fatal injury.

PHG was destroyed.

The following persons were appointed for investigation of the air accident:

Ing. Zdeno Bielik
Marián Turan

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 16 August 2013 the pilot came to the area used for aerial applications in Myjave, Turá Lúka, local area „u Vankov“ (Agro Airport Myjava) with the intent to test-fly the new-mounted wing type Aeros Profi on the landing gear of PHG. At 16:45 the pilot started from the airport to test-fly the said wing with landing gear of own build. After the take-off the pilot put PHG into steep climb. In this phase the landing gear started to deflect to the left in the take-off direction, while the wing misaligned to the right. Subsequently, in a height of 70-80 m, the whole PHG overturned to the right and uncontrollably and steeply rotated down until it hit the ground.

The pilot fell out of the PHG a couple of meters above the ground and suffered a fatal injury. PHG was destroyed when it hit the ground.

Daytime: day
Flight rules: VFR

1.2 Injuries to persons

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

1.3 Damage to PHG

PHG was destroyed in the air accident – completely destroyed landing gear, broken wing leading edge, damaged canvas and bent struts and pipes of the landing gear.

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:

A national of the Slovak Republic, aged of 59 years,

holder of the SFD pilot licence No. 3-033, 2-085, issued by the Light Aircraft Association of the Slovak Republic with marked validity until 01.07.2014.

Medical certificate of 2nd class with marked validity until 01.07.2014.

Flying experience:

Total flight hours of pilot: 635 h since the last prolongation of 36 h.

1.6 **Information about aircraft**

	Wing approved by SFUL	**Wing installed on landing gear OM-H043**	**Landing gear**
Registration No:	ZK-0022	OK-ZZF16	OM-H043
Year of manufacture:	1992	-	2000
Type:	COLIBRI	Aeros Profi	own build
Manufacturer:	-	AEROS Ltd. Ukrajina	-

Engine / serial No: ROTAX 912ULS/S – 73,5KW / 5645031

The certificate of airworthiness for this configuration was not issued.

Third-party insurance: Allianz Slovenská poisťovňa No. 491 100 494.

1.7 **Meteorological situation**

On 16 August 2013 our territory was situated on the front side of an extensive high-pressure area with the centre over Ukraine. The weather was stable, sunny, characterized by overall weak air circulation and good visibility.

On 16 August 2013 in the afternoon the area of the Agro Airport Myjava had low-level clouds (1 to 2/8) of Cirrus type. The sun was shining and set at 18:01. The air temperature achieved 26°C in the afternoon hours and relative air humidity was 30%. A weak variable wind was blowing (wind speed of 1.0 – 1.5 m/s and prevailingly south to east wind direction). Maximum wind gusts achieved the speed of 2.5 to 3.5 m/s. The wind speed gradually decreased with the approaching sunset.

At 16:45 the area of Agro Airport Myjava had low-level clouds (2/8 Ci), air temperature about 23°C and visibility to 30 km. In an altitude of 10 m above ground level a weak south-east wind was blowing with speed of 1.0 m/s and gusts up to 3 m/s. The wind was characterized by pulsations of direction and speed, i. e. wind speed and wind direction were unstable, they fluctuated around the average values (wind speed ±0.5 m/s and wind direction ±90 degrees). The soil surface was dry.

1.8 **Aids to navigation**

N/A.

1.9 **Communication**

N/A.

1.10 **Information about airport**

N/A.

1.11 Flight recorders

N/A.

1.12 Wreckage and impact information

PHG fell to the corn field without significant obstacles.

The area of air accident is described by geographic coordinates:

N 48° 45´41´´
E 17° 31´ 39´´

1.13 Medical and pathological information

The called ambulance doctor stated that the pilot was dead.

All detected injuries were caused by the air accident and occurred at the time of impact of PHG to the ground not far behind the runway 17 of the Agro Airport Myjava.

The external and internal examination and additional laboratory tests of biological materials sampled during autopsy did not identify any acute or chronic pathological changes which could have negatively influenced the pilot´s attention and conduct at the time of air accident or which could have caused his death.

The result of toxicological test could not be unambiguously evaluated due to the postmortem decomposition of sampled biological material.

From results of toxicological analysis it was possible to state that the pilot of PHG was not under the influence of alcohol at the time of air accident.

1.14 Fire

No fire broke out.

1.15 Aspects of survival

The search and rescue using SAR means was not necessary.

1.16 Tests and research

Complete inspection of wreckage of PHG was implemented.

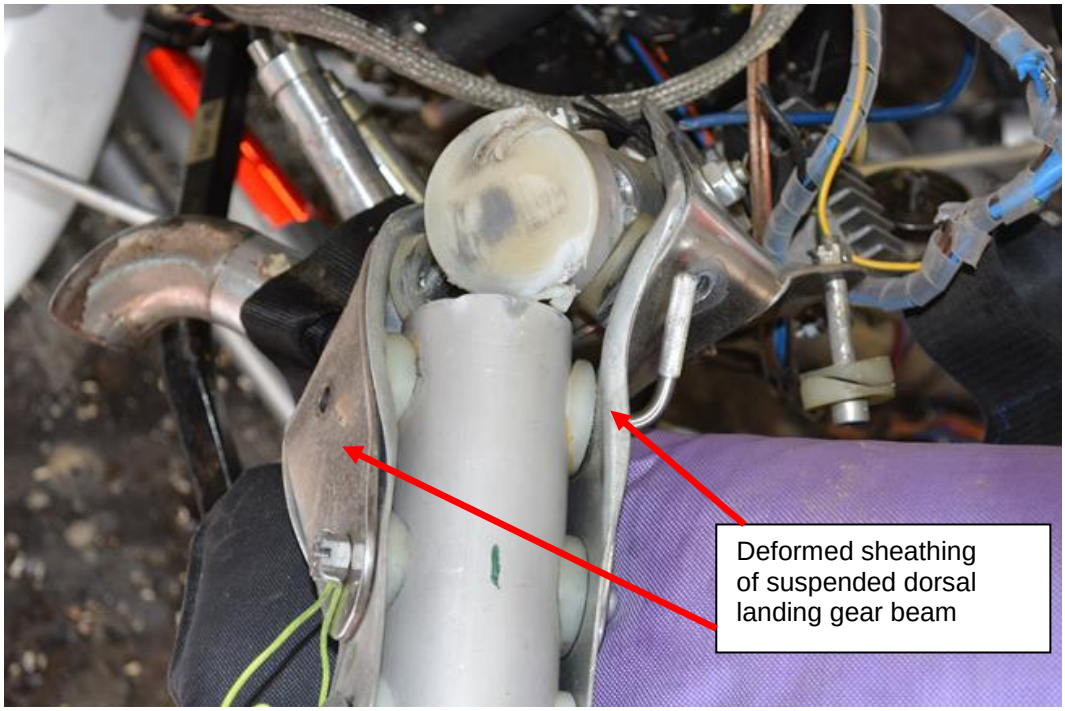
1.17 Organizational and management information

N/A.

1.18 Additional information

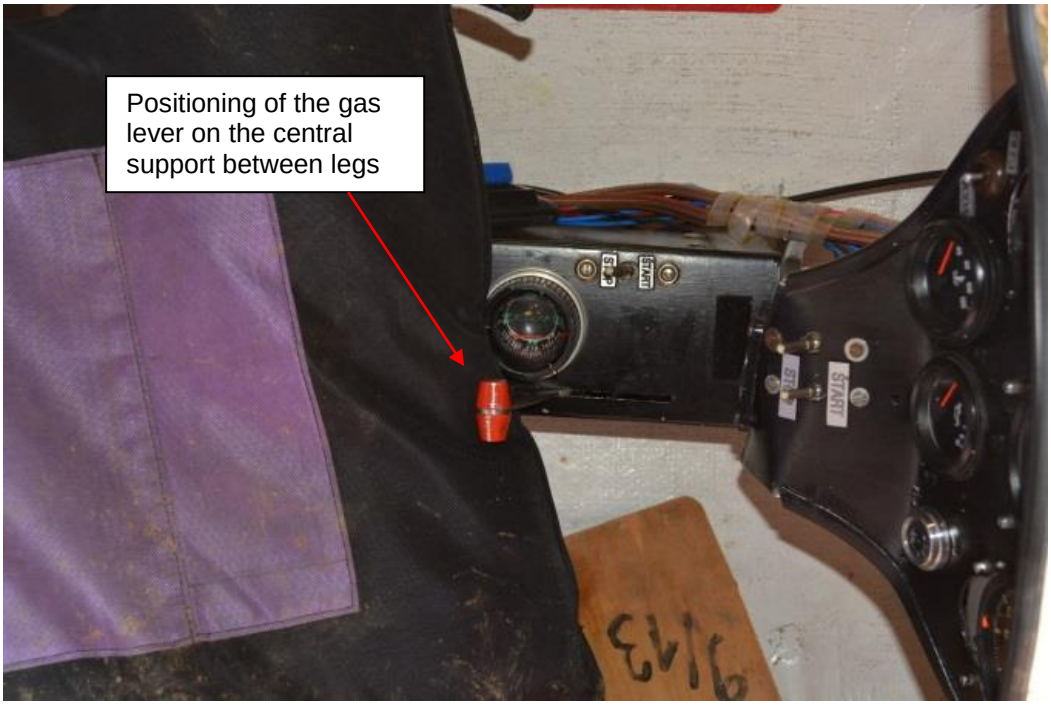
From the design aspect several deficiencies of PHG were detected which contributed to occurrence of the air accident.

The picture clearly shows deformation of sheathing of suspended dorsal landing gear beam which probably lacked the required strength for this type of configuration.



The large front hood without use of stabilizing aerodynamic elements behind the center of gravity.

The positioning of gas lever was unsuitable for engine control in crisis situations, because in case of change of the engine mode the pilot had to move his hand from the control trapeze to the area of the central landing gear support.



The front landing gear unit was raised against the rear landing gear by more than 10 cm.

The position of the centre of gravity of the landing gear was changed by the replacement of the original engine for a heavier and more efficient one.

The position of the PHG control trapeze did not allow the reduction of the climb angle after the take-off.

The pilot conducted the test flight of PHG without approval and previous inspection on the part of the authorized employees of LAA SR.

1.19 **Useful or effective investigation techniques**

Standard investigation techniques were used.

2. ANALYSIS

The test flight with replaced wing on the original landing gear with a strong 73.5 KW engine requires increased attention and special approach to this flight. Special attention must be paid to the attachment of the wing, position of the centre of gravity, position of the wing trapeze in front of the sitting pilot, inspection of ropes, all this in the presence of a technician of LAA SR.

The inspection by a technician of LLA SR was not conducted before the critical flight and the pilot was not authorized by the flight instructor for the test flight of PHG.

By adjustment of the attachment to a position corresponding to trimming for the speed of 100 km/h the take-off run was conducted at a high speed, which caused a steep climb at full engine power after the lift-off, where the reaction moment and gyroscopic effect started to deflect the PHG landing gear to the left during the abrupt transition to the climb (so-called „hoick"). The pilot concentrated on the transfer of the centre of gravity to the left. By pulling himself to the left wing trapeze he caused another misalignment of the PHG landing gear to the left, supported by the lateral resistance of its large front hood. Subsequently, it caused the twist of stainless plates of the split dorsal beam. The impossibility to pull the trapeze closer, the impossibility to reduce throttles due to the positioning of the gas lever in the central landing gear support and the steady full engine power with misaligned thrust vector from the wing flight direction caused lateral movement (slip) of the wing to the left. Due to this movement the aerodynamic lift on the left side of the wing increased, while its right side was subject to skewed flow-over, which caused the drop of the lift. Under the influence of these factors, PHG went into a wing stall, followed by rotation of PHG around its lateral axis, partial rupture of the leading edge tip and impact to the ground. Before the impact the pilot fell out of PHG in a height of 10 m.

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

3.1 **Findings**

Pilot:

- according to submitted documentation the pilot had valid qualifications for making of flights with given category of SFD,
- the pilot did not obtain the approval to the test flight after replacement of the wing,
- at the time of air accident the pilot was not under the influence of alcohol, drugs or common medicines, which could have decreased his attention during the flight,
- the pilot had sufficient flight experiences.

PHG:

- it did not have the airworthiness certificate for given landing gear/wing configuration,
- it was not inspected by authorized technician of LAA SR after the replacement of wing before the test flight,
- the front landing gear unit was raised against the rear landing gear by more than 10cm.

3.2 **Causes of air accident**

- the wing stall was caused by misalignment of the landing gear and the wing, which resulted in uneven wing flow-around from the left and right side,
- insufficient strength of suspended dorsal landing gear beam sheathing for given configuration,
- large front hood without use of stabilizing aerodynamic elements behind the centre of gravity,
- The position of the centre of gravity of the landing gear was changed due to the replacement of the original engine for a heavier and more efficient engine.

Secondary causes

- the position of the gas lever did not allow the control of engine power in crisis situations,
- the position of the PHG control trapeze did not allow the reduction of the air incidence angle after the take-off.

4. SAFETY RECOMMENDATIONS

On the basis of investigation of the causes of accident of PHG

Registration No **OM-H043**
Date of accident **16.08.2013**

We recommend **the Light Aircraft Association of the Slovak Republic (Chief Engineer Department)** to take the following measures**:**

- to conduct the following modifications on all PHGs through authorized technicians with their entry into SFD recorders:
  - to place the engine actuators (gas lever) control on the control trapeze or front landing gear pedal,
  - to check the suspension of the landing gear – its position,
  - split dorsal beam – to use material with higher torsion strength for the joint.

Bratislava, 10.12.2013