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Aircraft Accident Investigation Bureau AAIB

Final Report No. 2009 by the Aircraft Accident Investigation Bureau

concerning the accident

to the aircraft type Opus 3 (experimental), registration OY-CYZ

on 23 August 2005

at Furkapass-Tällistock, above the municipality of Oberwald/VS

approximately 50 km east/north-east of Sion

Aéropôle 1, Route de Morens, CH-1530 Payerne

Ursachen

Der Unfall ist Folge eines Aufpralls auf dem Boden bei einer Notlandung in einem Berggebiet nach einer ungeeigneten Flugtaktik.

General information on this report

This report contains the AAIB's conclusions on the circumstances and causes of the accident which is the subject of the investigation.

In accordance with article 3.1 of the 9th Edition, applicable since 1st November 2001, of the Annex 13 of the Convention on International Civil Aviation of 7 December 1944 and article 24 of the Federal Air Navigation Law, the sole purpose of the investigation of an aircraft accident or serious incident is to prevent future accidents or serious incidents. The legal assessment of accident/incident causes and circumstances is expressly no concern of the accident investigation. It is therefore not the purpose of this investigation to determine blame or clarify questions of liability.

If this report is used for purposes other than accident prevention, due consideration shall be given to this circumstance.

The definitive version of this report is the original in the French language.

Unless otherwise indicated, all times mentioned in this report are indicated in the standard time applicable to the area of Switzerland (local time – LT), corresponding at the time of the accident to Central European Summer Time (CEST). The relationship between LT, CEST and coordinated universal time (UTC) is:
LT = CEST = UTC + 2 h.

Final Report

Owner	Private
Operator	Private
Aircraft type	Opus 3 (experimental)
Country of registration	Denmark
Registration	OY-CYZ
Location	Oberwald/VS Coordinates: 674 416 / 157 245 Elevation: 2265 m (7430 ft AMSL)
Date and time	23 August 2005 at 10:31 LT

Synopsis

Summary

In the course of a flight to Denmark which departed from Rarogne aerodrome (LSTA), the pilot, flying solo onboard the experimental aircraft OY-CYZ, found that on approaching the Furka Pass his flying altitude was insufficient to cross it and his low airspeed was insufficient to perform a 180° turn in the valley. He then took the decision to make an emergency landing on the upward slope in front of him. The aircraft then violently impacted the ground, rebounded and came to a standstill about 15 metres further on. The pilot was seriously injured and the aircraft was destroyed.

Investigation

The accident took place at 10:31 LT. It was notified at about 11:00 LT by the Swiss Air Rescue Service (REGA) to the federal Aircraft Accident Investigation Bureau (AAIB). The investigation was opened on the same day at about 12:00 LT at the location of the accident and was conducted in collaboration with the Valais cantonal police.

The accident was due to impact with the ground during an emergency landing at a mountain location following an inappropriate flying tactic.

1 Factual information

1.1 History of the flight

1.1.1 Preamble

On Friday 19 August 2005, the pilot landed his Opus 3 aircraft at Rarogne aerodrome, having flown from Denmark with the intention of taking part in the meeting of owners of experimental category aircraft which was to take place at the end of the week. A Danish friend who was flying an experimental aircraft of the type Europe accompanied him.

At the end of the event, the two pilots were obliged to defer their return flight twice because of unfavourable meteorological conditions.

1.1.2 Flight preparation

According to his own statements and those of his friend, the pilot intended to return to his country of origin on Tuesday 23 August 2005 in mid-morning.

He presented himself, in the company of his compatriot, at the Aeronautical Reporting Office – ARO of Rarogne aerodrome. Together, they made their preparations for the return flight, destination Bornholm. The meteorological situation was consulted using the terminal AMIE – AIS MET Information Environment and a flight plan was filed via the Internet. It specified the following route:

LSTA-LSPU-EDTZ-DKB-ERF-MAG-TRT-EKRN

The duration of the flight was estimated at 4:30 hours. The aircraft had been refuelled the night before in anticipation of the return flight.

1.1.3 Accident flight

At 10:16 LT, the pilot of the Opus 3 took off from runway 28 at Rarogne aerodrome and flew towards the Conches Valley. A few minutes earlier, his Danish friend had departed from Rarogne to follow an identical route.

The pilot of the Opus 3, which is capable of higher speeds than the Europe aircraft, caught up with and overtook the latter in the Münster region. At this location and according to his statements, when he was at an altitude of approximately 6500 ft, the pilot of the Europe aircraft noted that his friend was flying at a higher altitude. Visual contact was maintained until they passed Oberwald. Throughout this first phase of the flight, the two friends maintained regular radio contact. When he was in the region of the Grimsel Pass, the pilot of the Opus 3 aircraft reported to his compatriot that he was encountering strong downdrafts. He therefore advised the pilot of the Europe to gain sufficient altitude in the valley.

This was the last communication between the two pilots. Further attempts to make contact were unsuccessful.

According to the Opus pilot's statements, his aircraft was at an altitude of 7500 ft on approaching the Furka Pass, which peaks at 2431 m (7976 ft). The GPS data, however, indicated that at the foot of the pass the aircraft's altitude was close to 7000 ft, i.e. almost 1000 ft below the route over the pass.

Realising that his aircraft's performance was no longer sufficient to gain the necessary altitude to cross the pass, he envisaged turning back. At this moment, again according to his statements, his indicated airspeed was 60 kt and the pilot judged it insufficient to make a turn requiring a high bank angle. He then opted for an emergency landing, continuing his flight towards the slope in front of him. He chose to climb up the valley at full power and low speed. Contact with the terrain took place at a shallow angle. The Opus 3 touched the ground once before rebounding and coming to a standstill about fifteen metres further on (Annex 1).

Seriously injured and trapped inside the wreck, the pilot managed to use his mobile telephone to raise the alarm.

During this time, the pilot of the Europe aircraft noticed some minor turbulence without noting any downdrafts across the Grimsel Pass. Initially, he did not worry about the loss of communication with his friend, which he attributed to the topography. So he decided to continue his flight beyond the Furka Pass.

When approaching the Andermatt area, and still being unable to establish radio contact with his compatriot, he decided to turn back. This is when he caught sight of the wreckage of the Opus 3 on the western spurs of the Furka Pass. He tried to establish contact with the crashed aircraft on the 124.7 MHz frequency (Zurich Information) and then on the 121.5 MHz emergency frequency, whilst circling above the wreckage. He made several distress calls on this frequency without success.

He then decided to fly to Münster aerodrome and land there. As the runway was occupied by an event, he decided not to land there, continued his flight and returned to Rarogne aerodrome.

In the meantime, a helicopter had flown to the accident site and the injured pilot was transported to hospital.

1.2 Injuries to persons

Injuries	Crew	Passengers	Total number of persons on board	Others
Fatal	---	---	---	---
Serious	1	---	1	---
Minor	---	---	---	---
None	---	---	---	---
Total	1	---	1	

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

The fuel leaked from the tanks caused minor ground pollution.

1.5 Information on persons

1.5.1 Pilot

Person	Danish citizen, born 1945
Licence	Private pilot's licence, aircraft, first issued by the Danish Directorate of Civil Aviation on 18.07.1969
Ratings to be extended	Single-engined piston (SEP) valid till 31.05.2007
Medical certificate	Class 2, with mention VNL (shall have available corrective lenses) issued on 14.04.2005 and valid till 19.03.2006

1.5.1.1 Flying experience

Total hours	1953:30 hours
on the type involved in the accident	934:00 hours
during the last 90 days	26:30 hours
of which on the type involved in the accident	26:30 hours

1.6 Aircraft information

Registration	OY-CYZ
Aircraft type	Opus 3 (experimental)
Characteristics	Three-seater single-engine, Canard type with low wing, composite material with retractable nose wheel
Manufacturer	Private
Year of construction	1991
Serial number	0188-001
Owner	Private
Operator	Private
Engine	Rolls Royce Continental Type: 0-240A, pistons, 4 cylinders Power: 130 HP Serial number: 40 R 013 Year of construction: 1991
Propeller	Bruce Tifft, B & T 62/66
Operating hours	Airframe and engine: 934:00 hours

Area of use	VFR day/night
Mass and centre of gravity	The mass and centre of gravity were within the prescribed limits, both on take-off and at the time of the accident.
Airworthiness certificate	Issued on 29.06.1992 by the Danish Civil Aviation Administration and valid till 30.06.2007
Maintenance	Carried out by the operator
Fuel capacity	The Opus 3 was fitted with two tanks each with a capacity of 118 litres, giving a total of 236 litres. On take-off, the total quantity onboard was approximately 150 litres. The accident flight lasted 15 minutes. Average consumption is approximately 25 litres/hour.
Fuel type	AVGAS 100 LL
Performance Reference speeds	V_S : 60 KIAS V_X : 80 KIAS at MTOM and at 4000 ft V_Y : 86 KIAS at MTOM and at 7500 ft, ~450 ft/min ROC

1.7 Meteorological information

1.7.1 General

The information contained in sections 1.7.2 and 1.7.3 was supplied by Météo-Suisse.

1.7.2 General weather situation

Das Tiefdruckgebiet über der nördlichen Adria verlagerte sich weiter nordostwärts und schwächte sich ab. Damit liess die Zufuhr sehr feuchter Meeresluft aus Norden weiter nach. Im Westen der Schweiz machte sich schwacher Hochdruckeinfluss bemerkbar.

Translation:

The low-pressure area above the northern part of the Adriatic was moving further northeast and weakening. Consequently, the influx of very humid maritime air from the north continued to diminish. In the western part of Switzerland, the influence of a weak high-pressure area was perceivable

1.7.3 Meteorological conditions at the time and location of the accident

The following information on local weather conditions at the time of the accident is based on a spatial and temporal interpolation of the observations made by several weather stations.

Wolken	*2-4/8 um 6500 ft AMSL, ca. 7/8 um 8000 ft AMSL*
Wetter	*Feuchter Dunst*
Sicht	*Um 3-5 km*
Wind	*Nordnordwest mit 6-10 kt, Windspitzen um 20 kt*
Temperatur/Taupunkt	*4 °C / 4 °C*
Luftdruck	*QNH LSGS 1016 hPa, LSZH 1016 hPa LSZA 1009 hPa*
Sonnenstand	*Azimut 118°, Höhe 34°*
Gefahren	*Alpenübergänge zum Teil in Wolken*

Translation:

Cloud	2-4/8 at 6500 ft AMSL, approx. 7/8 at 8000 ft AMSL
Weather	damp mist
Visibility	about 3-5 km
Wind	North north-west at 6-10 kt, gusting to 20 kt
Temperature/dewpoint	4 °C / 4 °C
Atmospheric pressure	QNH LSGS 1016 hPa, LSZH 1016 hPa LSZA 1009 hPa
Position of the sun	Azimuth 118°, elevation 34°
Hazards	Some Alpine crossings in cloud

1.7.4 Meteorological observations by witnesses

The first investigators to arrive at the site of the accident an hour and a half later encountered good meteorological conditions characterised by a clear sky, little or no wind and very good visibility.

1.8 Aids to navigation

The aircraft involved in the accident was equipped with a GPS (Global Positioning System) receiver which was switched on during the accident flight. Among other things, the Jeppesen VFR+GPS 1:500,000 chart for Switzerland was found at the site of the accident.

1.9 Communications

During the first phase of the flight, the pilots of the two aircraft were in radio-telephone contact.

The friend of the pilot involved in the accident stated that he had got no reply on the 124.7 MHz (Zurich Information) and 121.5 MHz frequencies when he tried to contact the ATC services, while he was circling above the site of the accident.

No radiotelephone communication was recorded.

1.10 Information concerning the accident location

The accident occurred in a mountainous environment, on the spurs of a slope, the type of terrain being pasture and rocks (Annex 1).

1.11 Flight recorders

Neither installed nor prescribed.

It was possible to extract the parameters of the accident flight from the GPS receiver (Annex 2).

These revealed that the pilot first of all climbed steadily up to an altitude of 5777 ft (1761 m), which he reached just before flying over the town of Fiesch. This corresponds to the desired profile for the route over the Furka Pass. He continued his flight, alternately losing and gaining altitude, for a distance of approximately 12 NM, to remain clear of the cloud base. In fact, when over Ulrichen aerodrome, his altitude was only 5586 ft (1703 m), i.e. 191 ft below the altitude he had reached 12 NM earlier. From this location onwards, a regular climb is observed, but with a climb angle insufficient to cross the pass, together with a progressive reduction in his speed. Consequently, he arrived at the foot of the pass with a major altitude deficit.

1.12 Wreckage and impact information

1.12.1 Wreckage information

The following points were noted at the site of the accident:

- The right wing was torn off during the second impact and was found behind the left wing.
- The left wing was still attached to the airframe.
- The cockpit did not suffer major deformation.
- Part of the landing gear was torn off during the initial impact.
- The two wooden propeller blades were severed identically at half their length.
- The altimeter was set at 1015 hPa.
- The contents of the fuel tanks had emptied.
- The windscreen was broken.
- The safety belts had been used and withstood the deceleration forces.
- A visual examination of the wreckage provided no indication of a pre-existing defect.

1.12.2 Impact information

The aircraft came to a standstill after two impacts about 15 metres apart. The traces left by the initial impact indicate that contact with the ground was violent, which is confirmed by the components torn off the aircraft.

1.12.3 Information concerning the site of the accident

Accident location	Furkapass-Tällistock, Oberwald municipality/VS
Swiss coordinates	674 416 / 157 245
Latitude	N 46° 33’ 44’’
Longitude	E 008° 24’ 33’’
Elevation	2265 m (7430 ft AMSL)
Position	Mountain pasture strewn with rocks
Topographical map of Switzerland	Sheet No. 1251, Val Bedretto Scale 1:25 000

1.13 Medical information

The pilot suffered fractures to one leg.

The alcohol test proved negative.

1.14 Fire

Fire did not break out.

1.15 Survival aspects

1.15.1 General

The strength of the airframe, confirmed by the relatively good condition of the cockpit after the accident, as well as the four-point safety belt system, certainly contributed to limiting the severity of the injuries.

The distress call was made by the injured pilot, using his mobile telephone. Using the data from his GPS, he was able to transmit the location of the accident, and this enabled rapid intervention.

1.15.2 Emergency beacon

The aircraft was not equipped with an emergency location beacon aircraft (ELBA).

1.16 Tests and research

Not applicable.

1.17 Organisational and management information

The aircraft was operated and maintained by its owner.

1.18 Additional information

Not applicable.

1.19 Useful or effective investigation techniques

Not applicable.

2 Analysis

2.1 Technical aspects

According to the pilot's statement, the accident was not the result of an engine fault or a technical problem. No technical defect was found in the course of the various visual examinations of the wreckage.

The quantity of fuel onboard was sufficient to complete the flight.

2.2 Operational aspects

On approaching the Furka region, the pilot realised that his altitude would not enable him to cross the pass. If he had continued his climb at the rate adopted in his initial flight phase, he would have been able to cross the Furka Pass safely.

The accident is due to an inappropriate flight technique in the Alpine environment, as his altitude was insufficient and his position and airspeed of approximately 60 kt did not allow him to turn back. Furthermore, the flight profile adopted, involving successive climbs and descents, was not appropriate for the local meteorological conditions observed by the pilot himself. We recall that he had in fact noted the presence of downdrafts across the Grimsel Pass and that he had warned his friend, advising him to gain altitude in the valley.

In order to avoid a loss of control, the pilot wisely opted for an emergency landing on the mountainous slope in front of him. This choice made a major contribution to his chances of survival. Indeed, by facing the slope and applying full power whilst maintaining a nose-up attitude, the impact occurred at low speed.

3 Conclusions

3.1 Findings

- The documents supplied indicate that the pilot was in possession of a valid licence.
- The investigation found no indication of a medical cause of the accident.
- The aircraft was rated for VFR day and night flying in non-commercial operation.
- The investigation did not find any defect which might have played a part in this accident.
- The mass and centre of gravity were within the prescribed limits.
- The quantity of fuel onboard was sufficient to make the flight.
- The aircraft was not equipped with an emergency location beacon.

3.2 Causes

The accident was due to impact with the ground during an emergency landing at a mountain location following an inappropriate flying tactic.

Payerne, 25 March 2009 Aircraft Accident Investigation Bureau

Annex 1

Views of the wreckage at the site of the accident

Annex 2

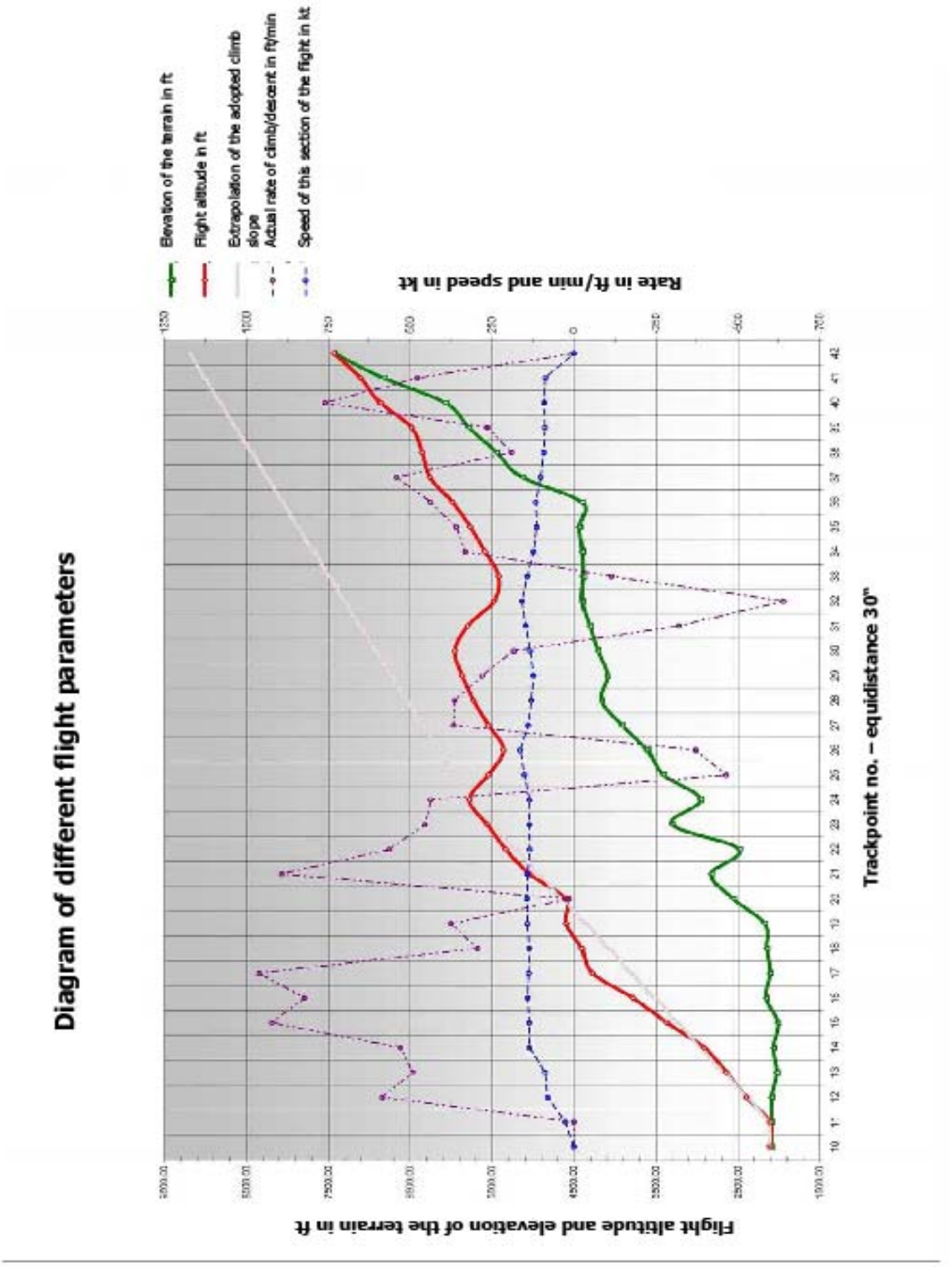
Diagram of different flight parameters
Elevation of the terrain in ft
Flight altitude in ft
Extrapolation of the adopted climb slope
Actual rate of climb/descent in ft/min
Speed of this section of the flight in kt
Rate in ft/min and speed in kt
Flight altitude and elevation of the terrain in ft
Trackpoint no. – equidistance 30"