



Summary Report

A summary investigation, in accordance with article 45 of the Ordinance on the Safety Investigation of Transport Incidents from 17 December 2014 (OSITI), as of 1 February 2015 (SR 742.161), was carried out with regards to the following serious incident. This report was prepared to ensure that lessons can be learned from the incident in question.

Aircraft type	Bombardier BD700 1A10 GLEX		9H-CIO	
Operator	Comlux Malta Limited, Villa Margherita, Ta Xbiex Malta			
Owner	Valion Investment Ltd, c/o Trident Trust Company BVI LTD, Tortola, British Virgin Islands			
Commander	French citizen, born 1974			
Licence	EASA (European Aviation Safety Agency) Airline Transport Pilot Licence Aeroplane (ATPL (A)), issued by the Federal Office of Civil Aviation (FOCA)			
Flight hours	Total	3900 h	During the last 90 days	63 h
	On the incident type	2900 h	During the last 90 days	63 h
Co-Pilot	Kazakh citizen, born 1986			
Licence	EASA ATPL(A), issued by the Maltese Civil Aviation Directorate			
Flight hours	Total	6400 h	During the last 90 days	130 h
	On the incident type	1200 h	During the last 90 days	130 h
Location	Above the city of Bern			
Coordinates	-		Altitude	4000 ft
Date and time	2 June 2018, 13:38 (LT = UTC + 2 h)			
	All of the times mentioned in this report are given in local time			
Type of operation	Commercial			
Flight rules	Instrument Flight Rules (IFR)			
Point of departure	Bern-Belp Airport (LSZB)			
Destination	Antalya Airport (LTAI)			
Flight phase	Take-off and climb			
Type of serious incident	Airprox involving a drone			
Injuries to persons	Crew members	Passengers	Third persons	
Minor	0	0	0	
None	2	0	0	
Damage to aircraft	Not damaged			
Other damage	None			

Factual information

Course of events

The Bombardier BD700 business jet, registered as 9H-CIO, took off from runway 32 at Bern-Belp Regional Airport (LSZB) under flight number MLM007 shortly after 13:30 on 2 June 2018. At 13:38, when the aircraft was at an altitude of approximately 4000 ft/QNH above the city of Bern, it was involved in an airprox with a drone (Remotely Piloted Aircraft System - RPAS), as observed by the crew. The BD700 had already retracted its landing gear at this time and was climbing at 160-170 KIAS (Knots Indicated Airspeed). The autopilot was switched on, the co-pilot was the Pilot Flying (PF) while the commander acted as Pilot Monitoring (PM).

The RPAS was flying an estimated 150 metres to the right of the flight path of the BD700 and was approximately 30 metres below the business jet. The crew described the RPAS as rectangular and grey in colour. White lights were also visible.

The crew immediately reported this encounter to the air traffic controller at Bern's aerodrome control tower and continued the flight without further known incident.

Findings

On its website, the Federal Office of Civil Aviation (FOCA) has published binding regulations for the operation of drones or RPASes in public space. These regulations include, among others, the following information:

- The legislation applicable in Switzerland is the Ordinance on Special Category Aircraft (OSCA) 748.941. Drones, like model aircraft, are categorized as unmanned aircraft.
- Prior authorization is required to operate a RPAS within 5 km of airports. For further information, see the FOCA drone map.
- Various airports have what is known as a control zone, depicted in blue on the drone map. RPAS may be flown in control zones without authorization only up to a maximum height of 150 m above ground.

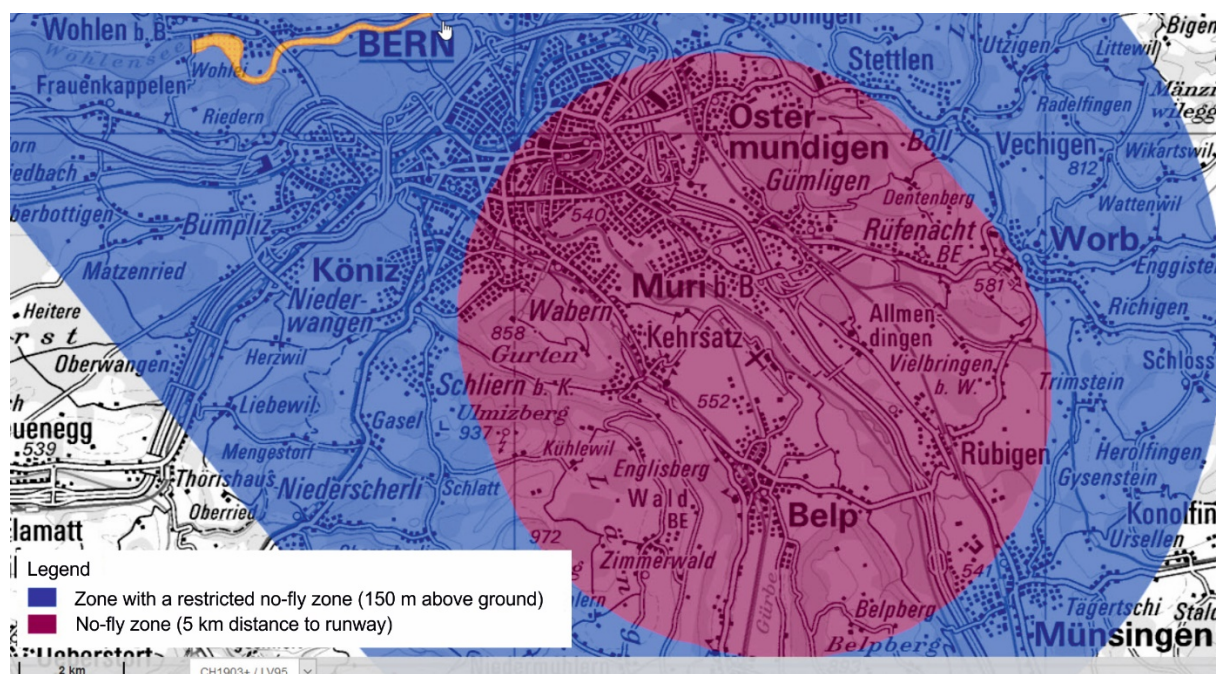


Illustration 1: A section of the RPAS map published by FOCA showing the area around Bern-Belp (LSZB).

On 2 June 2018, the Notice to Airmen (NOTAM) number W1119/18 applied to an area in the north of Bern's university hospital. This NOTAM informed the aviation community about flight activities involving RPASes. These activities took place in airspace between three coordinates

to the north of Bern's university hospital. The upper limit of this airspace was 500 ft (150 m) above ground.

The activities mentioned in this NOTAM included test flights, which had been declared with FOCA, involving a drone on behalf of Swiss Post AG. These flights were also visualized using a second drone. Flight recordings from the two drones and from 9H-CIO were available for the investigation.

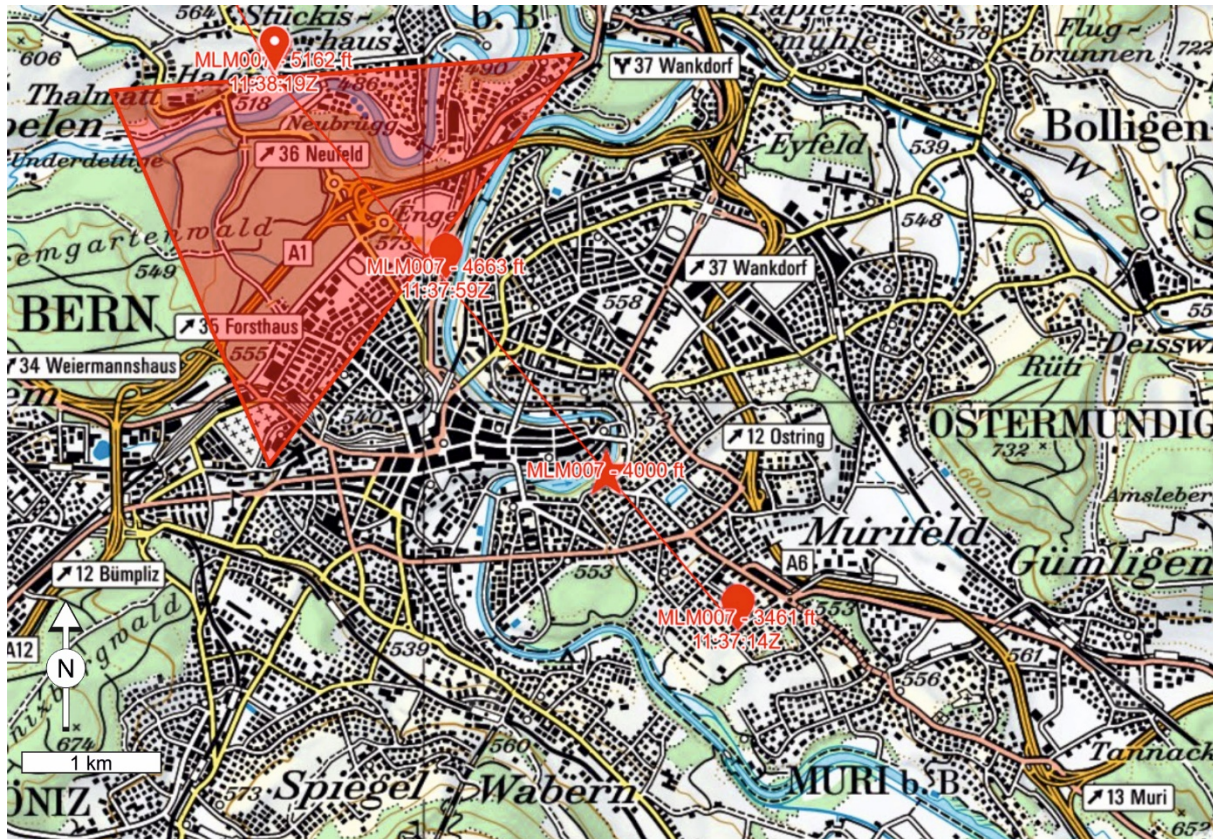


Illustration 2: Map showing the airspace marked in NOTAM W1119/18 (red triangle) and the flight path of 9H-CIO under flight number MLM007 (red line). The three red markers show the first data points from 9H-CIO's radar recordings. The red star shows where the aircraft reached 4000 ft. Source of map: Swiss Federal Office of Topography.

Analysis

The analysis of 9H-CIO's flight data showed that the aircraft was at 4000 ft shortly before reaching the knee of the Aare river. The crew estimated the sighted RPAS approximately 150 metres to the right of the aircraft's flight path, marked with the yellow dot in illustration 3.

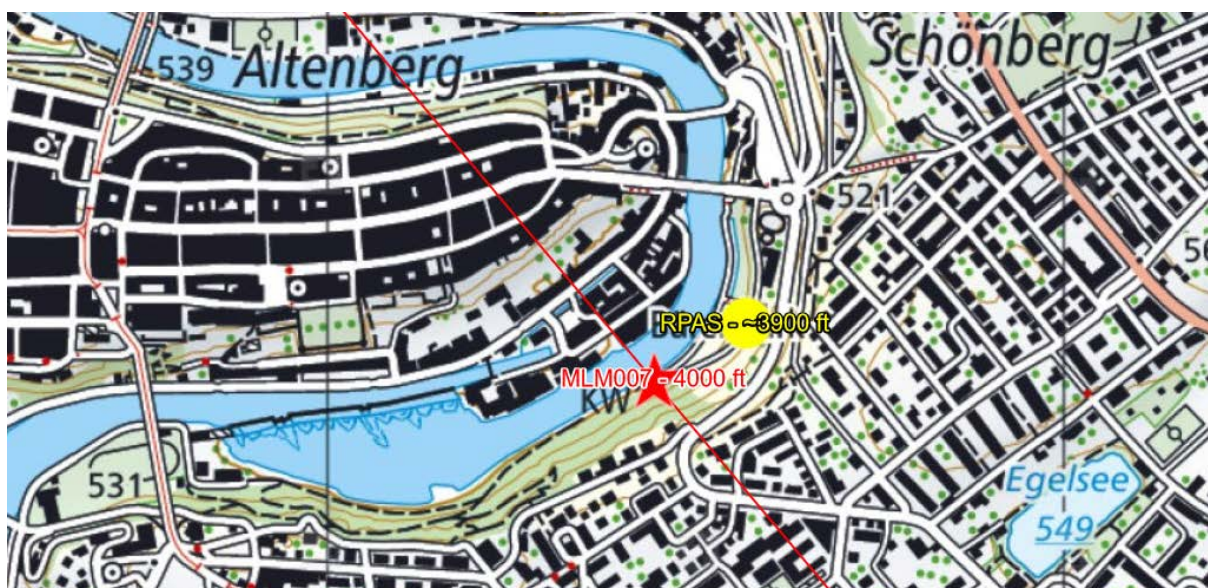


Illustration 3: Enlarged section of the map from illustration 2. The red line shows the flight path of 9H-CIO. The red star indicates where the aircraft reached 4000 ft. The yellow dot shows the area in which the crew could have seen the RPAS. Source of map: Swiss Federal Office of Topography.

At the time of the serious incident, the two drones involved in the test flights were in the vicinity of Bern's university hospital, approximately 2 kilometres north-west of 9H-CIO's position over ground. Therefore, any potential involvement of these two drones in the airprox with the business jet can be excluded.

Therefore, it seems most likely that the crew of 9H-CIO had sighted another unidentified RPAS.

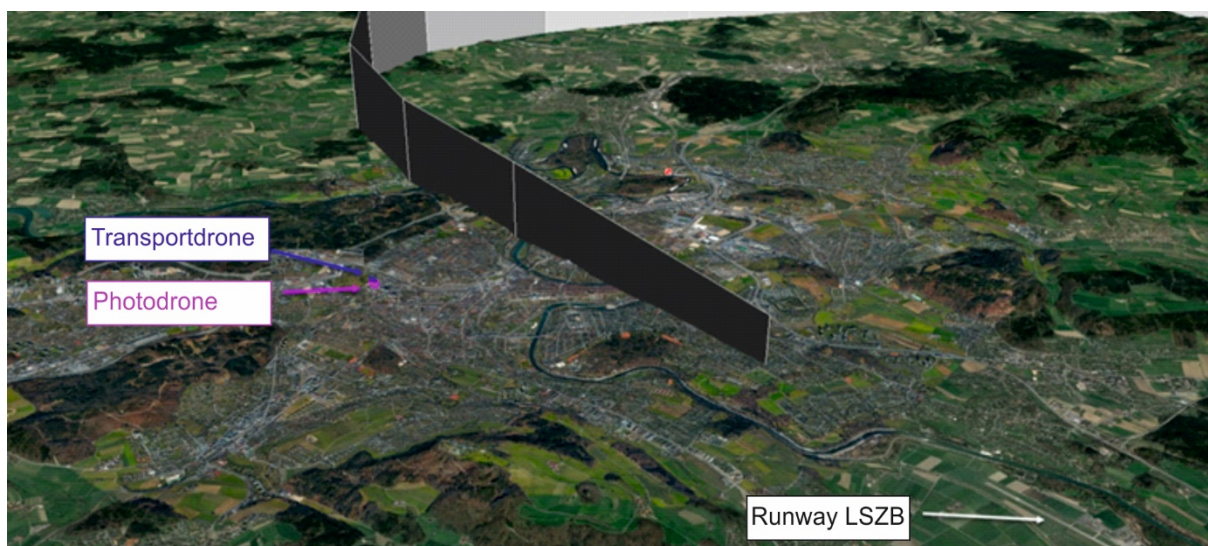


Illustration 4: A 3D image showing the flight path of 9H-CIO compared to the positions of the two drones involved in the test flights (purple and pink arrows). Source of map: Google.

Conclusions

As an RPAS can predominantly only be detected visually and not by collision warning devices, it is only a matter of time until collisions with aircraft occur.

Due to its mass and the nature of its materials, an RPAS can do considerable damage to important components of an aircraft. On [25 May 2018 in the Swiss canton of Ticino, a collision occurred between a two-seater helicopter and an RPAS](#), in which the helicopter's main rotor was damaged.

As previous incidents have shown (e.g. [the Airprox of the commercial aircraft A330-343, HB-JHB with an RPAS on 6 May 2017](#), southeast of Zurich Airport), measures which make an RPAS recognisable both to those directly affected and to third parties, such as air traffic control (see and detect), would considerably improve safety.

Based on article 45, paragraph 1 of the OSITI, the STSB will not investigate further and concludes the investigation with this summary report.

The German version of this report constitutes the original and is therefore definitive.

Bern, 30 September 2020

Swiss Transportation Safety Investigation Board