

PRELIMINARY REPORT

ACCIDENT
aircraft AW139 registration marks I-TNCC,
Cima Nambino (TN),
5th of March 2017

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AgustaWestland AW139 registration marks I-TNCC

ANSV safety investigations are conducted in accordance with Annex 13 to the Convention on International Civil Aviation and EU Regulation No 996/2010. The sole objective of the safety investigation of an accident or incident under these Regulations is the prevention of future accidents and incidents. It is not the purpose of such an investigation to apportion blame or liability. Accordingly, it is inappropriate that ANSV reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

This Preliminary Report is published to provide details of the initial facts. It contains facts which have been determined up to the time of issue and contains neither conclusions nor safety recommendations. It is published to inform the aviation industry and the public of the general circumstances of the accident and should be regarded as tentative and subject to alteration or correction if additional evidence becomes available. The investigation is continuing and a final report will be published in due course.

Aircraft Type and Registration	Leonardo Helicopter Division (former AgustaWestland) AW139 I-TNCC.
Date & Time (UTC)¹	5th of March 2017, 12.19'.
Location	Cima Nambino, Madonna di Campiglio (TN).
Description of Occurrence	CFIT ² .
Type of Flight	HEMS ³ .
Persons on Board	7: Pilot, HTCM ⁴ , Hoist Technician, Doctor, Nurse, HEMS Crew Member and Canine Unit.
Injuries	Doctor: serious injuries. Nurse, Hoist Technician, HEMS Crew Member and Canine Unit: minor injuries.
Nature of Damage	Aircraft: main rotor, front cabin, right engine, tail rotor, tail rotor transmission shaft, nose landing gear, hoister (photo 1 and photo 2).
Pilot in Command	Age 48 years, male, Italian ATPL (H) ⁵ ; Class 1 Medical Certificate. AW139 Rating, Instrument Rating. Total flight experience 4405h; 804h on the AW139; 110h IFR ⁶ . Regular flight schedule in the 3 months before the accident.
Aircraft Information	AW139 registration marks I-TNCC 2483h 05' total time.

¹ UTC: Universal Time Coordinated. Local time, at the time of accident, was UTC+1 hour.

² CFIT: Controlled Flight Into or Toward Terrain.

³ HEMS: Helicopter Emergency Medical Service.

⁴ HTCM: Helicopter Technical Crew Member.

⁵ ATPL (H): Airline Transport Pilot Licence (Helicopter).

⁶ IFR: Instrument Flight Rules.

MTOM⁷ 6400 kg. 2 engines Pratt&Whitney PT6, 1679 shp. Hoister Breeze HS 20200-431, cable length 90 m, max load 272 kg.

Weather Conditions

Following the METARs⁸ from the closest weather stations at the time of the accident.

Paganella (2125 m/6970 ft), 23 km SE from the impact location:
LIVP 051155Z 21015KT 0000 FZFG VV/// M01/M03 Q1004
RMK MON INVIS VAL INVS VIS MIN 0000;
LIVP 051255Z 22016G26KT 0000 FZFG VV/// M00/M02
Q1003 RMK MON INVIS VAL INVS VIS MIN 0000;
LIVP 051355Z 21019KT 0000 FZFG VV/// M00/M02 Q1002
RMK MON INVIS VAL INVS VIS MIN 0000.

Bolzano Airport, 47 km NE from the impact location:
LIPB 051150Z 17008KT 130V200 9999 SCT050 15/03 Q1006;
LIPB 051250Z 16009KT 130V200 9999 SCT060 15/01 Q1005;
LIPB 051350Z 20010KT 9999 SCT050 15/01 Q1005.

Verona Villafranca Airport, 96 km SSE from the impact location:
LIPX 051150Z 12005KT 9999 SCT020 13/06 Q1009
LIPX 051220Z 15005KT 9999 SCT020 14/05 Q1009
LIPX 051250Z 19005KT 140V230 9999 SCT020 14/04 Q1008
LIPX 051320Z 21008KT 150V240 9999 SCT020 14/04 Q1008
LIPX 051350Z 22006KT 190V260 9999 SCT025 15/04 Q1008

Pictures from webcams of nearby the ski areas one hour after the accident were collected: photo 3, funivia 5 Laghi, about 3 km from the impact location; photo 4, Folgarida, about 7 km from the impact location; photo 5, Pradalago, about 2 km from the impact location; photo 6, Campo Carlo Magno, about 4 km from the impact point.

Narrative

On March the 5th 2017 returning from an HEMS operation, the AW139 I-TNCC was tasked by the 118 Medical Service Operations Center for another HEMS mission. In detail, an avalanche on Cima Nambino hit two people, one of them buried in snow.

The I-TNCC crew then landed in Trento airport (LIDT) at 11.52'09" for fuel supply and to take on-board the required personnel for the HEMS operation. At 11.56'29", the I-TNCC took off and headed toward Cima Nambino following the trajectory depicted in figure 1, reconstructed from the FDR⁹ recorded data.

Unless otherwise stated all the numerical data in this Preliminary Report are from FDR source.

⁷ MTOM: Maximum Take Off Mass.

⁸ METAR: Aviation routine weather report.

⁹ FDR: Flight Data Recorder.

Two circling maneuvers were performed before arriving to Cima Nambino (arrows in figure 1). The flight lasted about 23’.

During the first half of the flight, the ground speed was maintained between 130 kts and 150 kts (figure 2), while the radio altitude was between 220 ft and 2870 ft. During the second half of the flight (figure 3), the speed decreased being between 110 kts and 26 kts. Also the height was lower on average, between 1220 ft and 28 ft, spending most of the time between 600 and 200 ft.

The AW139 marks I-TNCC approached the avalanche maintaining magnetic heading within 303° and 259° and first attempted to land. The pilot reported to the ANSV that the landing was aborted due to the “white-out” effect induced by the Main Rotor flow which lifted the fresh and soft snow present in that area. This is coherent to the CVR¹⁰ audio recordings. Therefore, a clockwise circling maneuver was performed in order to reposition the aircraft before the winching of the HEMS Crew Member and Canine Unit.

The FDR parameter “Gen. Ammeter” provides indirect information of the winch functioning: when load is applied, then the load percentage increases. Based on this parameter and on the CVR recordings synchronized to the data, it is possible to set the start of the winching phase at 12.18’35” (red line in figure 4). At that time, the ground speed was 0 kts and the radio altitude was 81 ft (figure 4). The magnetic heading was maintained within 258° and 262° up to the ground impact. The helicopter attitude is depicted in figure 5. During the winching phase, the recorded collective pitch was kept within 67% and 74% (figure 6).

At 12.19’37” a sudden variation of most the parameters is recorded: this is the time of the ground impact. In detail, a slight decrease in torque on both engines is followed by an even steeper decrease of the torque on the engine 2, that went to 0, and a fast increase of the torque on the engine 1 (figure 6). This last effect is reasonably due to the main rotor blade impact to the ground. Attitude shows abrupt changes followed by a steady state as well as accelerations (figure 7 and figure 8). However, these remain below 2,3 “g”: as per specification, the ELT¹¹ did not intervene.

From the beginning of the winching to the last second and half the ground speed oscillate between 0 kts and 4 kts. The radar altitude constantly decreases from 81 ft to 30 ft. Just four seconds before the impact the ground speed rises to 8 kts and the radar altitude further decreases to 26 ft.

The length of the winch cable out of the helicopter was measured first on the accident site, resulting 5,10 m (photo 7). This measurement was repeated after the wreckage was moved into a hangar, resulting at that time 8,35 m (photo 8). This last measurement is coherent to the recorded radar altitude. Such a big difference between the two measurements is because when

¹⁰ CVR: Cockpit Voice Recorder.

¹¹ ELT: Emergency Locator Transmitter.

on the accident site, part of the cable was entangled under the wreckage.

Before 12.19'37" no caution neither warning messages lighted up.

The pilot reported inadvertent IMC¹². This is coherent to the CVR audio recordings.

Further Investigation

The ANSV safety investigation continues exploring:

- environmental factor;
- organizational/management factors;
- flight crew training;
- other human factors that might be relevant to the accident and CRM (Crew Resource Management).



Photo 1: wreckage front view.

¹² IMC: Instrument Meteorological Conditions.



Photo 2: wreckage rear view.



Photo 3: funivia 5 Laghi, 14.10' Local Time.



Photo 4: Folgarida, 14.35' Local Time.



Photo 5: Pradalago, 14.40' Local Time.

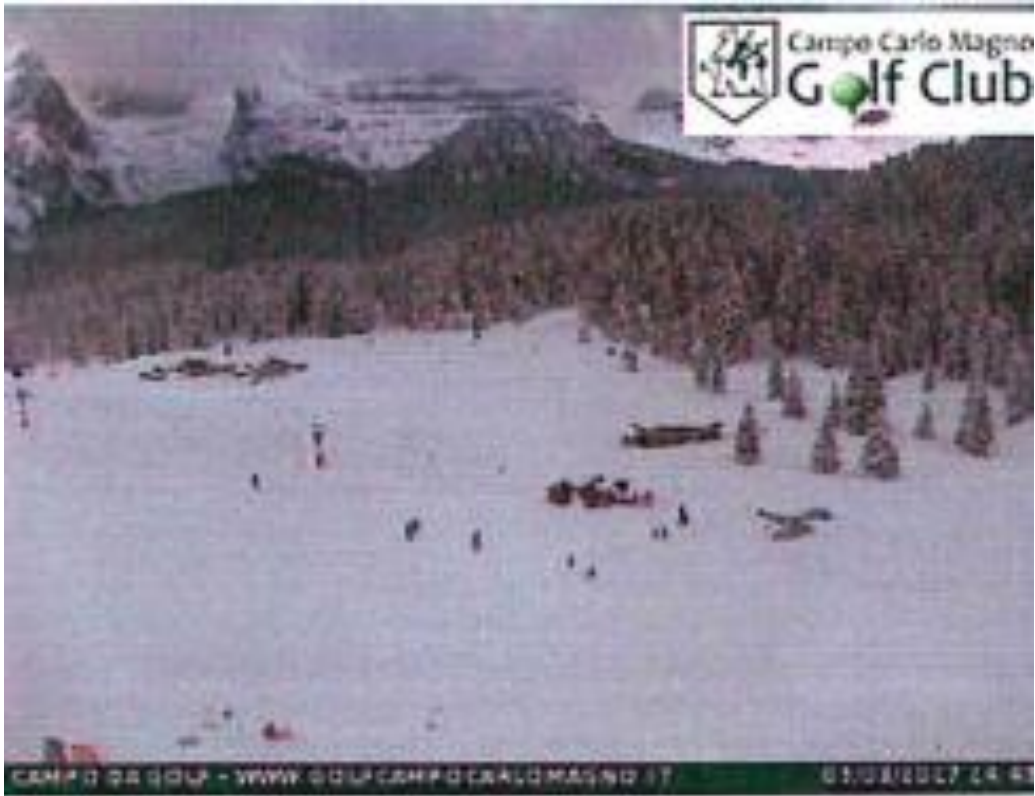


Photo 6: Campo Carlo Magno, 14.43' Local Time.



Figure 1: AW139 I-TNCC trajectory.

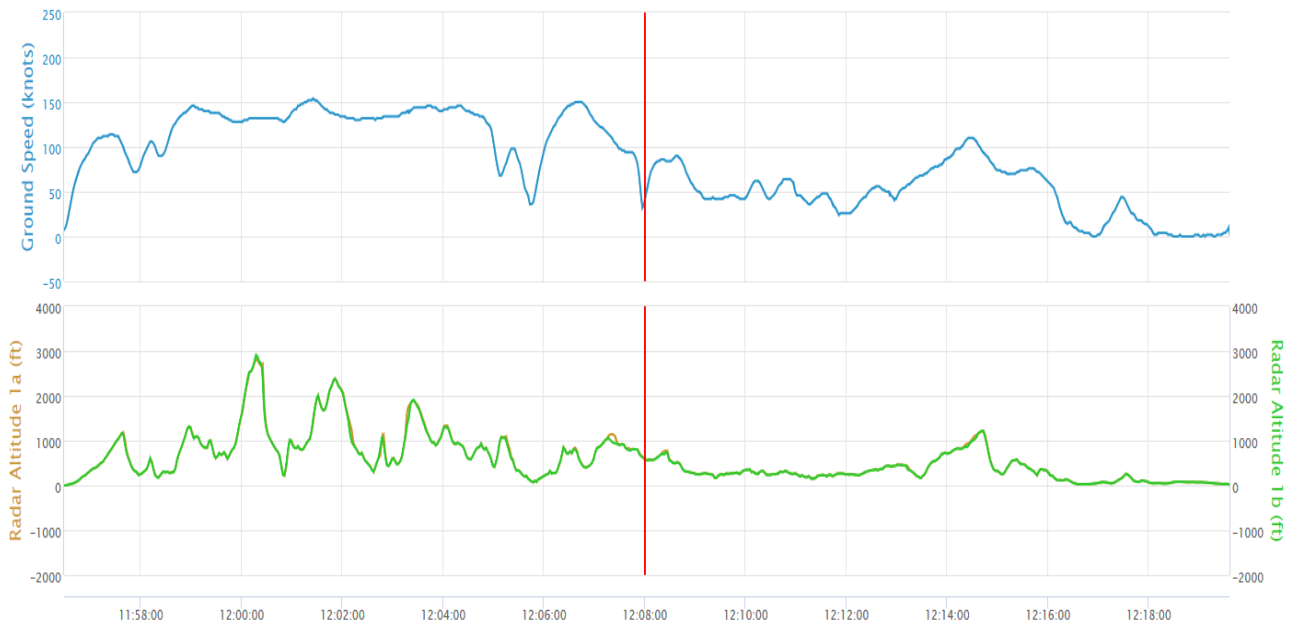


Figure 2: ground speed and radar altitude.

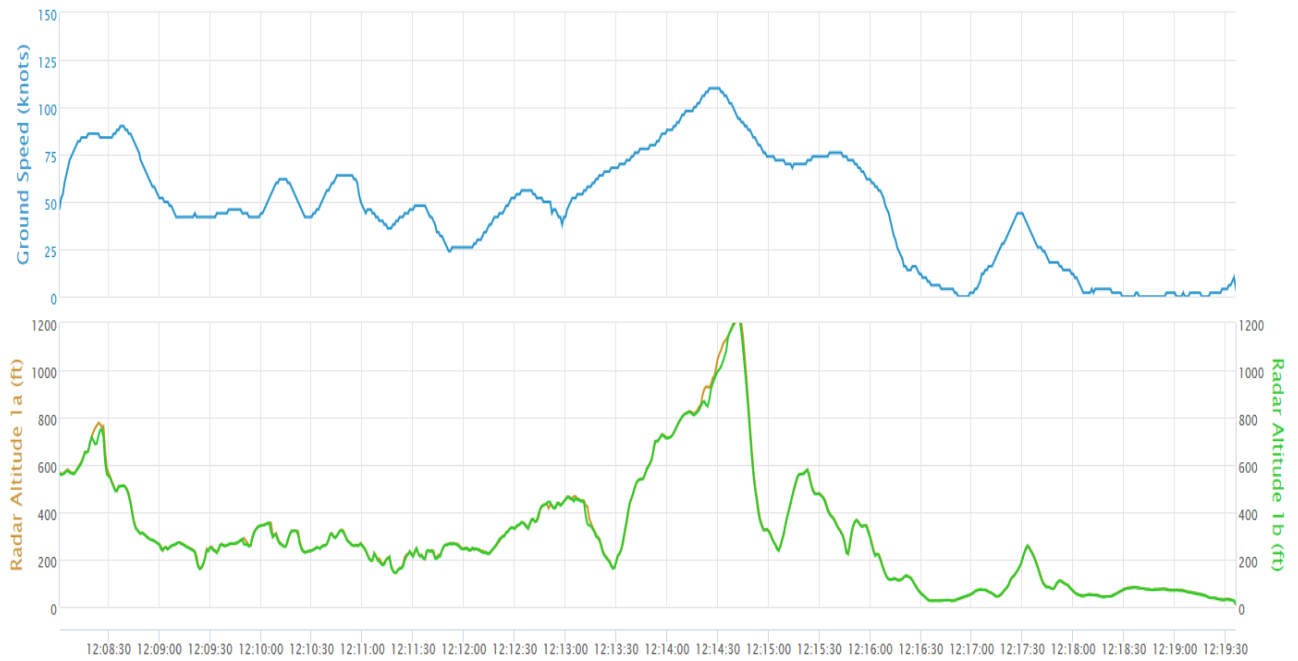


Figure 3: ground speed and radar altitude (second half of the flight).

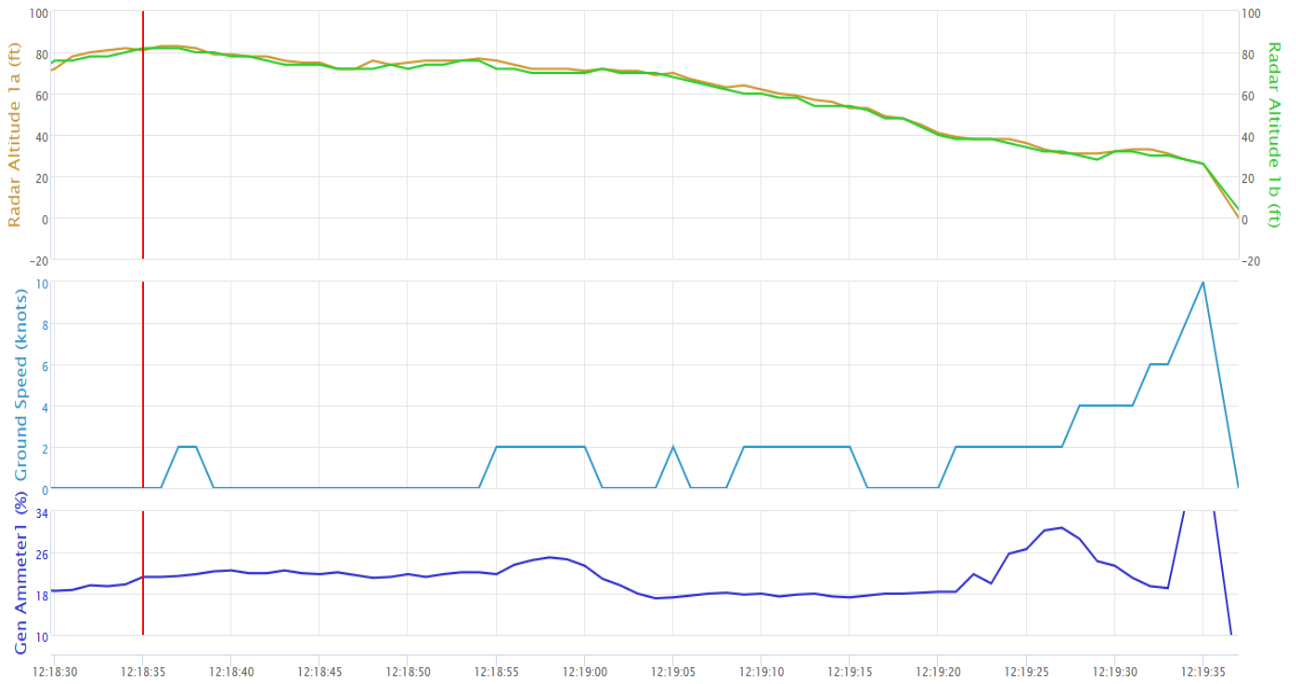


Figure 4: Gen Ammeter 1, radar altitude and ground speed during the winching phase.

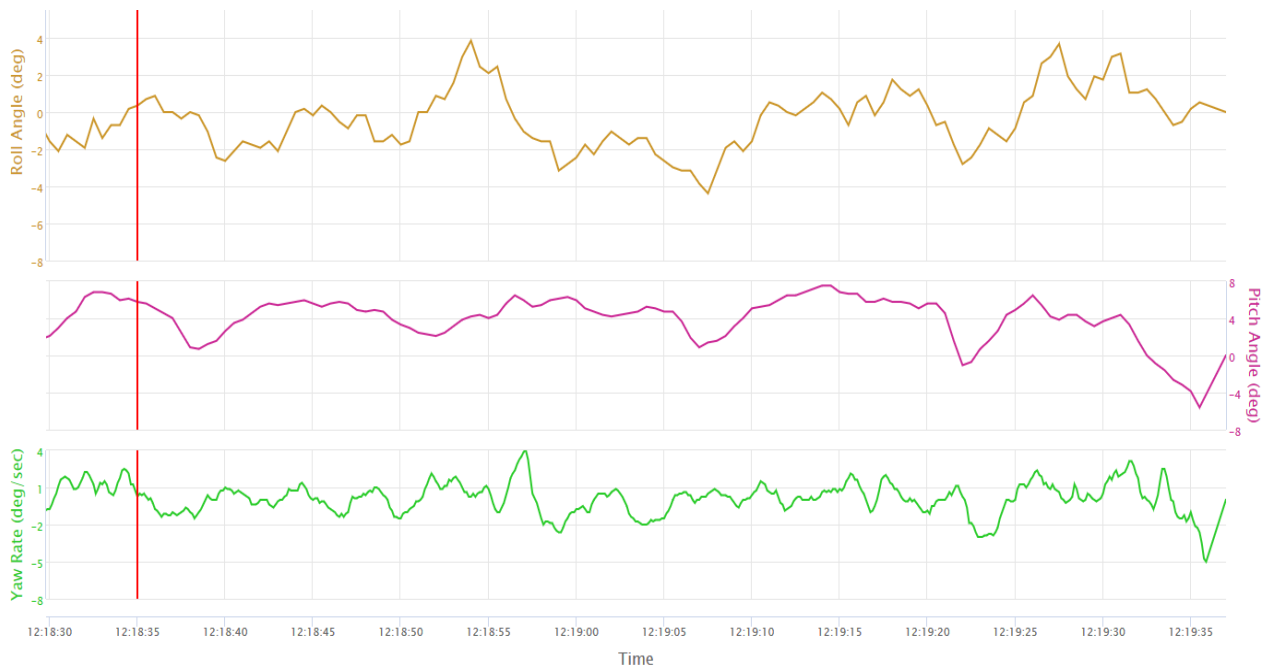


Figure 5: helicopter attitude during the winching phase (start at the red line).

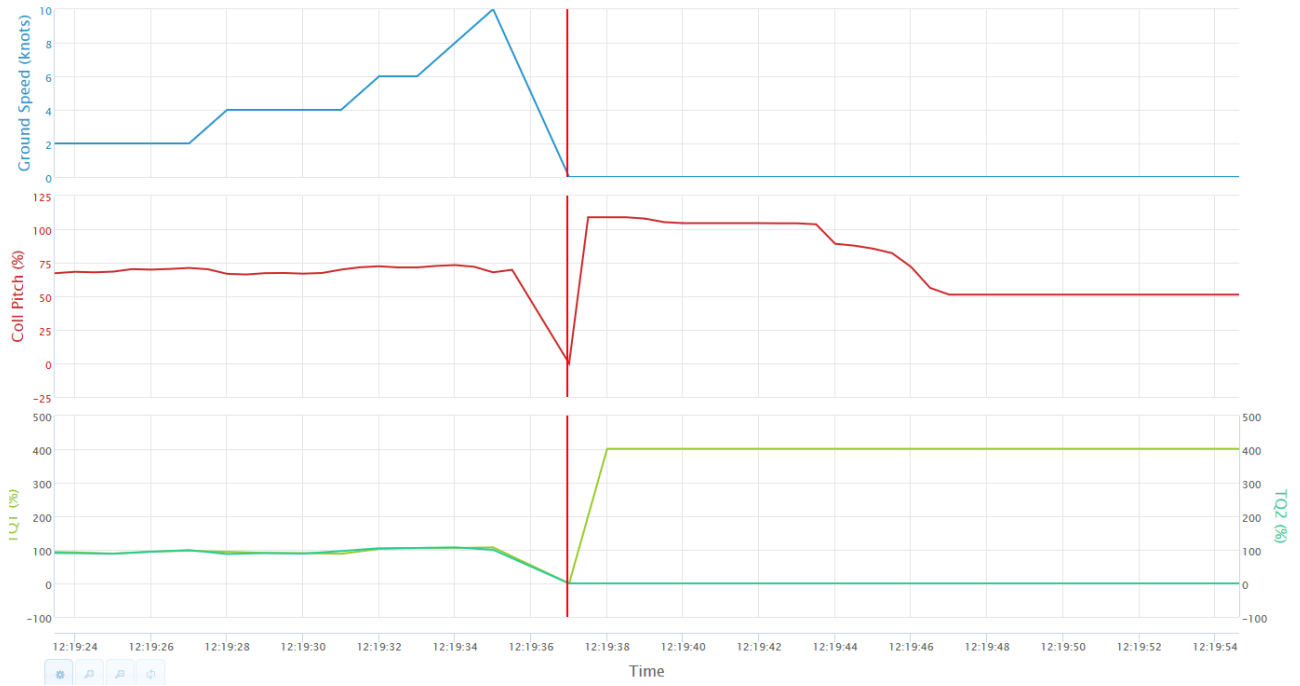


Figure 6: torque, coll. pitch and ground speed at the ground impact (vertical red line).

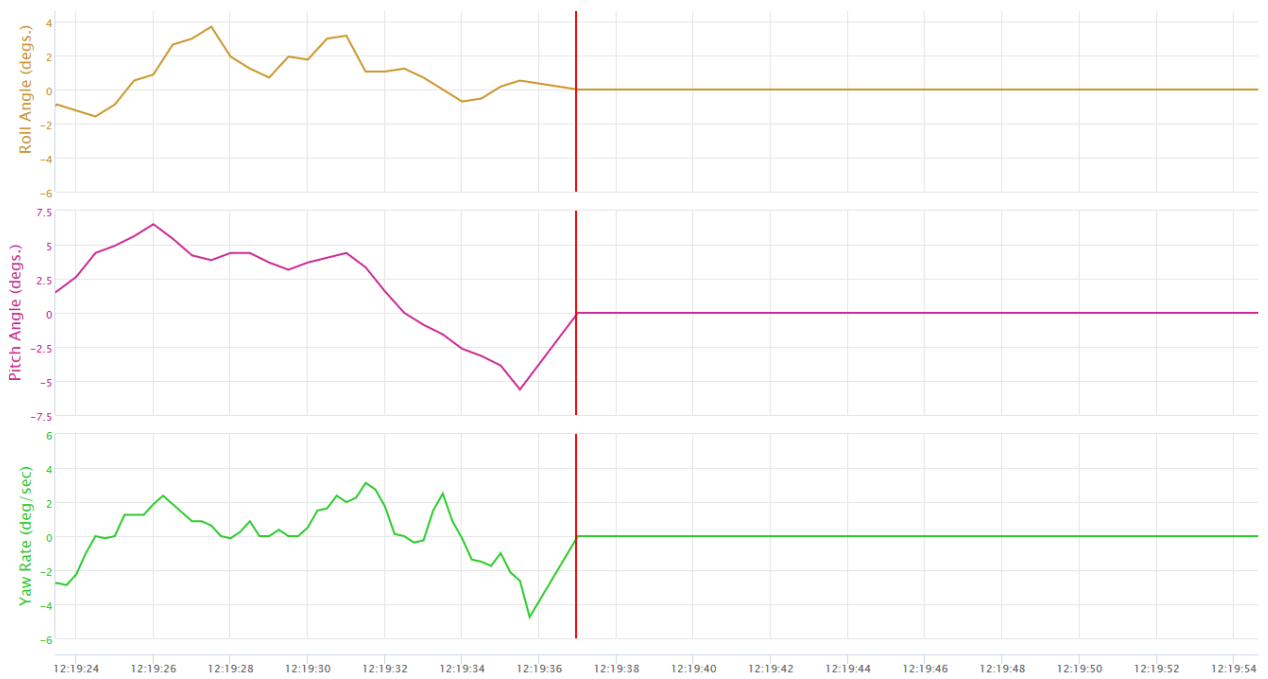


Figure 7: attitude parameters at the ground impact (vertical red line).

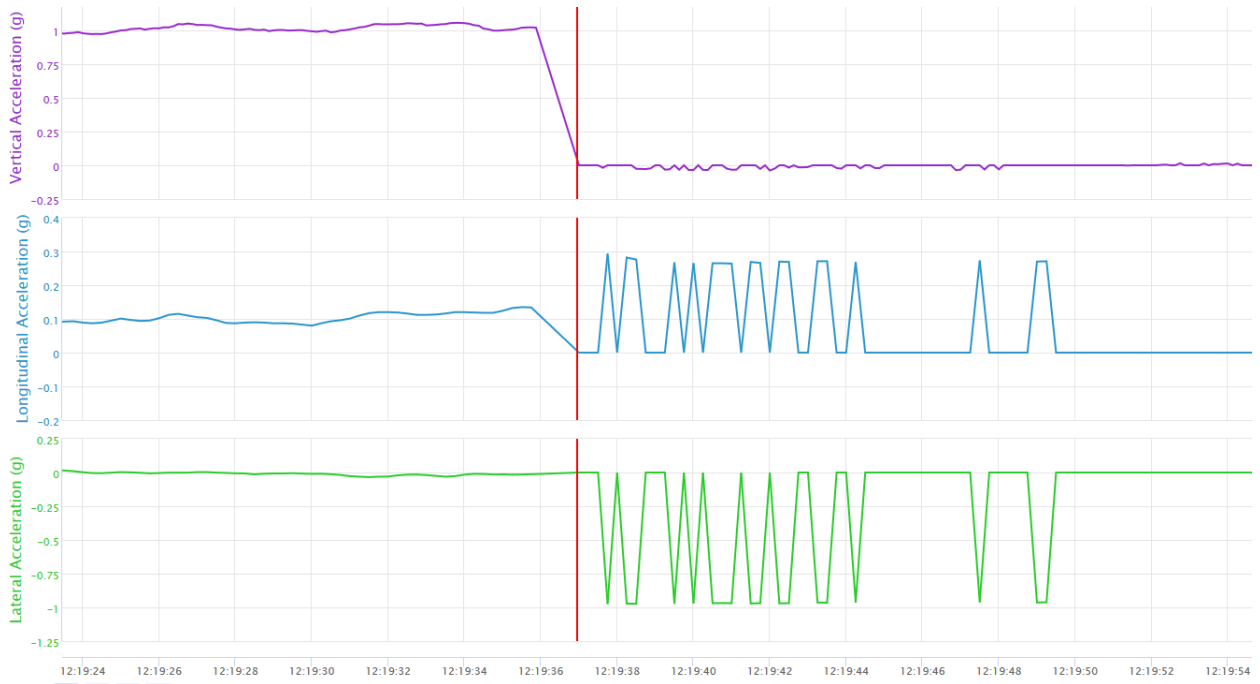


Figure 8: accelerations on the three axes at the ground impact (vertical red line).



Photo 7: winch cable length measurement on the accident site.



Photo 8: winch cable length measurement into the hangar where the wreckage is kept.