ANSV AGENZIA NAZIONALE PER LA SICUREZZA DEL VOLO

PRELIMINARY REPORT

ACCIDENT
aircraft Cessna 560 XLS+ registration marks OE-GES,
Milan Malpensa Airport (Italy),
5th of September 2019

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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	Cessna Citation 560 XLS+ OE-GES, S/N[1] 560-6036.
Ground Vehicle	Electric tractor Charlatte Model T135, S/N 135 3874.
Date & Time (UTC)[2]	5th of September 2019, 20.48'.
Location	Milan Malpensa Airport (LIMC).
Description of Occurrence	GCOL[3].
Type of Flight	CAT[4].
Persons on Board	5: pilot, copilot, 3 passengers.
Injuries (on ground)	Tractor driver: serious injuries.
Nature of Damage	Aircraft: left wing (photo 1 and photo 2). Tractor: destroyed (photo 3 and photo 4).
Pilot in Command	Age 59 years, male, Austrian. ATPL (A)[5]. C560XL/XLS TRI (A)[6] Rating, Instrument Rating. Class 1 Medical Certificate. Total flight experience: 8245h, most of them on C560XL/XLS. 2 landings and 1 takeoff from Malpensa Airport recorded since 3rd June 2019 (3 months before the day of the accident).

[1] S/N: Serial Number.
[2] UTC: Universal Time Coordinated. Local time, at the time of accident, was UTC+2 hours.
[3] GCOL: Ground Collision.
[4] CAT: Commercial Air Transport.
[5] ATPL (A): Airline Transport Pilot Licence (Aeroplane).
[6] TRI (A): Type Rating Instructor (Aeroplane).

Copilot	Age 27 years, male, Austrian. CPL (A)[7]. C560 XL/XLS Rating, Instrument Rating. Class 1 Medical Certificate. Total flight experience: 1275h.
Aircraft Information	C560XLS+ registration marks OE-GES had 3620h 46' total time. MTOM[8] 20200 pounds (9163 kg). 2 engines Pratt&Whitney PW545C, 4119 pounds (18,32 kN) takeoff thrust at sea level.
Weather Conditions	Following the METARs[9] (LIMC) at the time of the accident. LIMC 052020Z 36014KT 9999 RA BKN050 14/12 Q1015 NOSIG= LIMC 052050Z 36019KT 9999 RA BKN045 14/12 Q1016 NOSIG= LIMC 052120Z 36024KT 9999 RA BKN045 14/12 Q1016 NOSIG= LIMC 052150Z 36021KT 9999 RA BKN070 13/12 Q1016 NOSIG=
Narrative	On 5th of September 2019 the OE-GES aircraft was scheduled for a commercial flight from Milan Malpensa Airport (LIMC) to Vienna Airport (LOWW), with 2 crew members and 3 passengers on board. The aircraft was refueled with 6500 pounds of fuel, approximately 3250 pounds in each fuel tank, located, respectively, in each wing. It started the push back ground procedures at 20.31'40'' UTC from the stand number 353, in the "SEA Prime" parking area (figure 1). At 20.46'46'' the OE-GES contacted ground frequencies on 121.9 from point of release Q23 and received instruction to «Taxi via Papa Yankee Hotel to Charlie 1». The pilot of the OE-GES acknowledged and started taxiing via Papa at about 10÷20 kts ground speed and with a magnetic heading of about 078°; then he turned right on the Yankee, heading southbound, with a magnetic heading of about 168° and accelerating up to 24 kts ground speed (FDR[10] data depicted in figure 2, figure 4 and figure 7). At 20.48'28'' the OE-GES pilot in command said on ground frequency «OE-GES we've just hit something on Yankee», as an electric baggage tractor impacted the aircraft, while proceeding westbound on the demarked vehicular path perpendicularly to the Yankee apron taxiway (figure 1). Due to the impact forces, the OE-GES aircraft suddenly stopped and yawed about 110° left, coming to a complete stop with a magnetic heading of about 058°, and sustaining severe structural damages to its left wing (photo 1 and photo 2). Immediately after the impact, the left wing fuel tank started releasing large amount of fuel on the ground. None of the OE-GES occupants sustained any injuries as consequence of the impact. At the impact, the baggage electric tractor rolled left about its longitudinal axis and destroyed (photo 3 and photo 4). The tractor driver sustained serious injuries and was hospitalized.

[7] CLP (A): Commercial Pilot Licence (Aeroplane).
[8] MTOM: Maximum Take Off Mass.
[9] METAR: Aviation routine weather report.
[10] FDR: Flight Data Recorder.

The ANSV Laboratories downloaded the data from OE-GES FDR and CVR[11]. The FDR data were also converted to engineering units and the most significant plots are shown in figures 2 thru 7. For each of the 4 identified accident phases (impact, max lat/long acceleration, rest after impact, stop of all accelerations), the most significant parameters were summarized in table 1. These include time, ground speed, magnetic heading, vertical/longitudinal/lateral acceleration values.
The maximum values of the lateral and longitudinal accelerations are boxed in figure 2.
The accident event sequence can be confirmed also by the CCTV[12] video of the airport, which showed that both the tractor and the OE-GES aircraft where continuously proceeding respectively within the vehicular path demarcation and on the apron taxiway Yankee, until the impact occurred (photo 5).
The documents collected by the ground handler, the airport and flight operator, and related to the tractor driver licenses/certifications, the tractor maintenance records, the airport ground procedures, the aircraft registrations and certificates, where all found to be correctly up-to-date and valid.

Further Investigation

The ANSV safety investigation continues exploring:

- AMS[13] requirements;
- human factor;
- environmental factor;
- apron taxiway operations;
- airport lighting;
- ground drivers training.

[11] CVR: Cockpit Voice Recorder.
[12] CCTV: Closed Circuit TV.
[13] AMS: Apron Management Service.

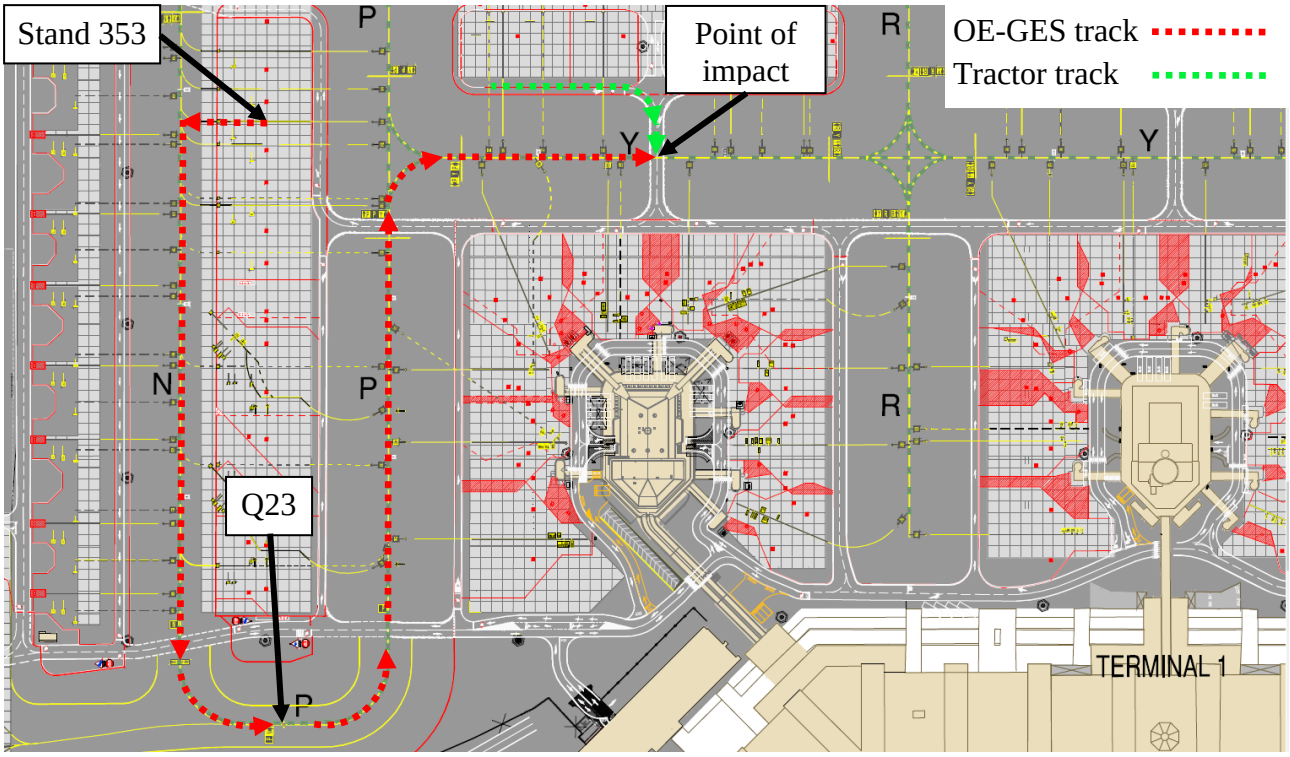

Figure 1: Milan Malpensa Airport, indication of ground tracks.

Photo 1: aircraft left wing damaged.

Photo 2: left wing damage details.

Photo 3: baggage tractor after the impact.

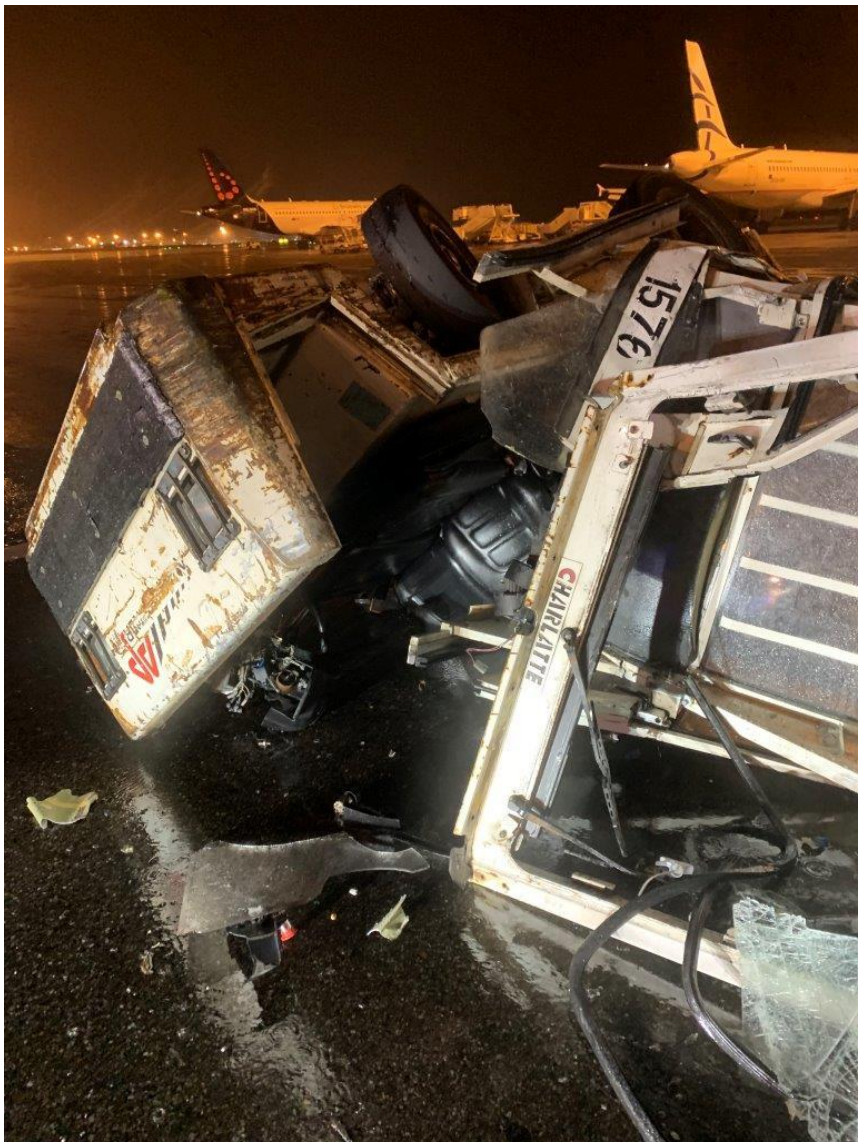

Photo 4: baggage tractor damage details.

Accident phase	Impact	Max lat/long acceleration	Rest after impact	Stop of all accelerations
FDR Time [sec]	664165	664166	664169	664172
Time [hh:mm:ss]	20:48:06	20:48:07	20:48:10	20:48:13
GS [kts]	24	13	0	0
Mag HDG (1)	167.4°	151.8°	56.9°	58.0°
Mag HDG (2)	168.7°	127.5°	58.7°	58.7
Vertical Accel [G]	1.027	1.218	0.921	1.007
Long Accel [G]	-0.011	-0.957	-0.035	0.000
Lat Accel [G]	0.007	-0.523	-0.367	-0.009

Table 1: most significant FDR parameters for each accident phase.

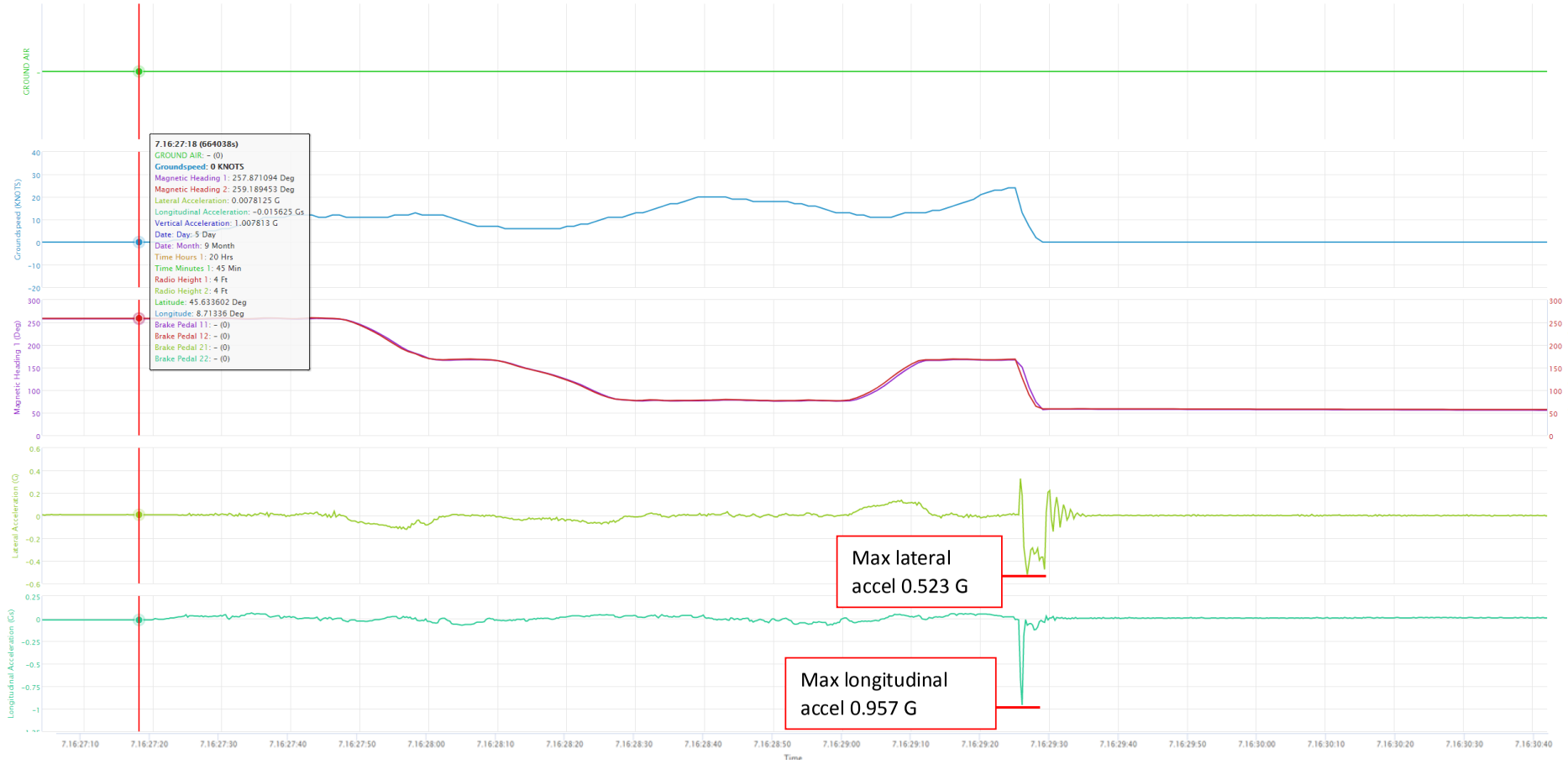

Figure 2: OE-GES FDR data − Start taxiing phase (Ground/Air, Groundspeed, Mag HDG1, Mag HDG2, Lateral Accel, Longitudinal Accel).

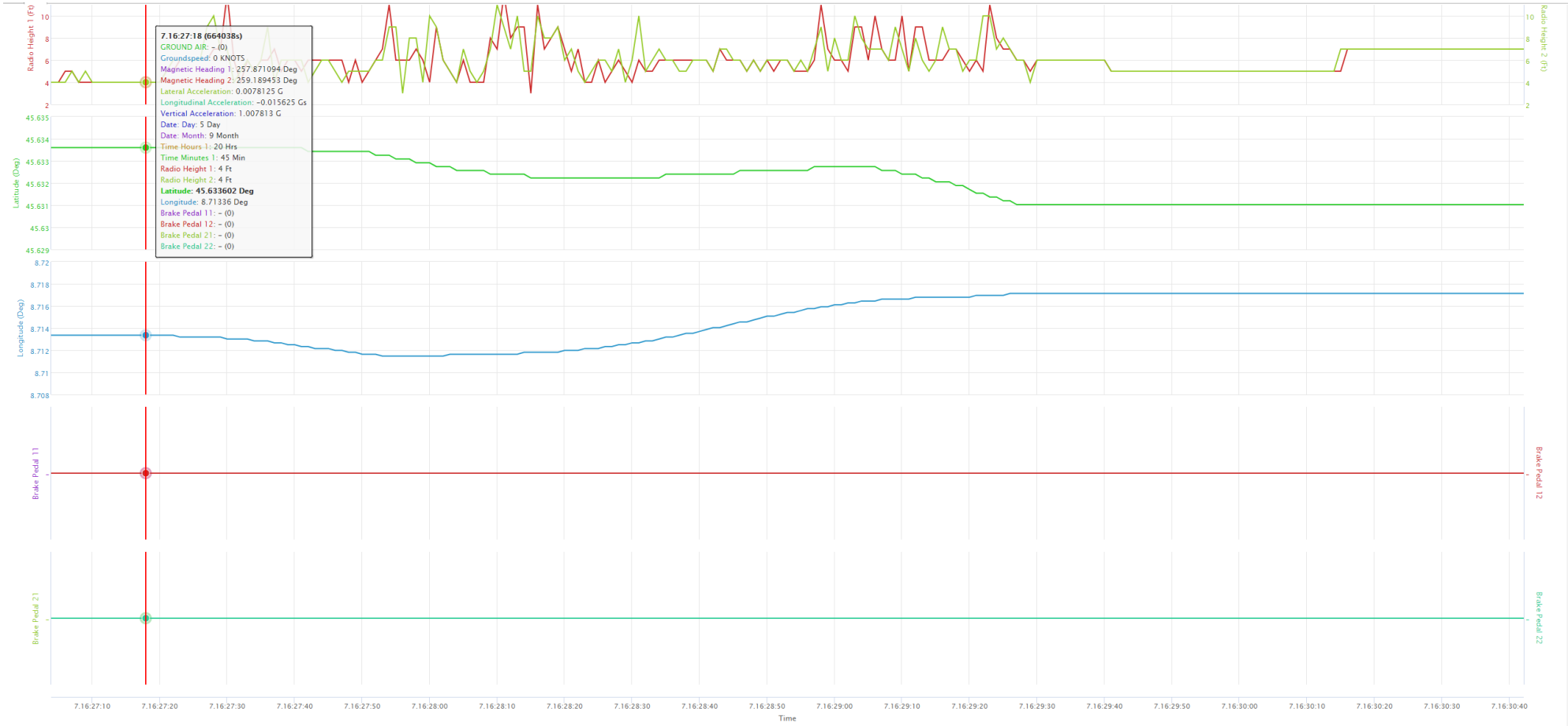

Figure 3: OE-GES FDR data − Start taxiing phase (Radio Height1, Radio Height2, Latitude, Longitude, Brake Pedal 11/12, 21/22).

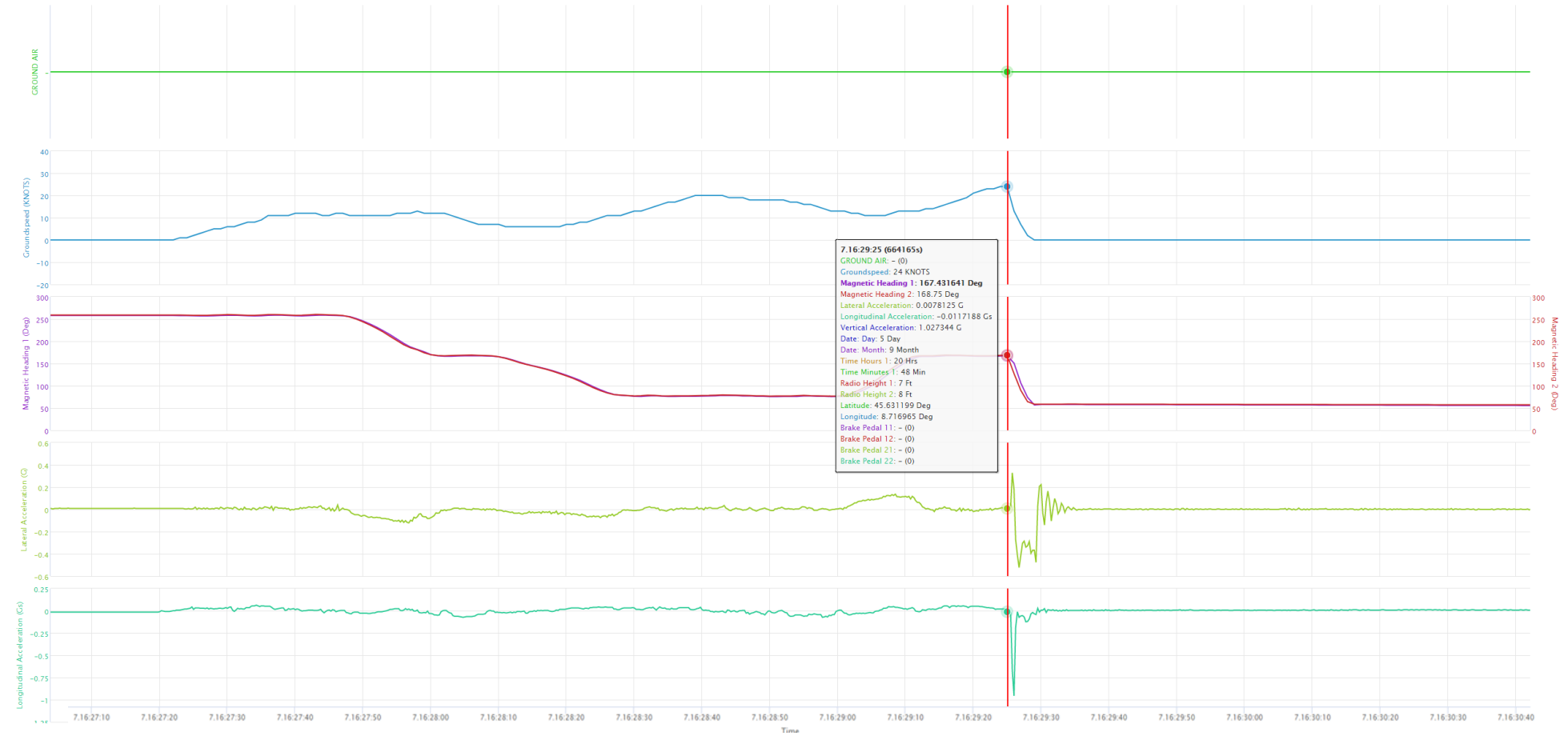

Figure 4: OE-GES FDR data − Impact phase (Ground/Air, Groundspeed, Mag HDG1, Mag HDG2, Lateral Accel, Longitudinal Accel).

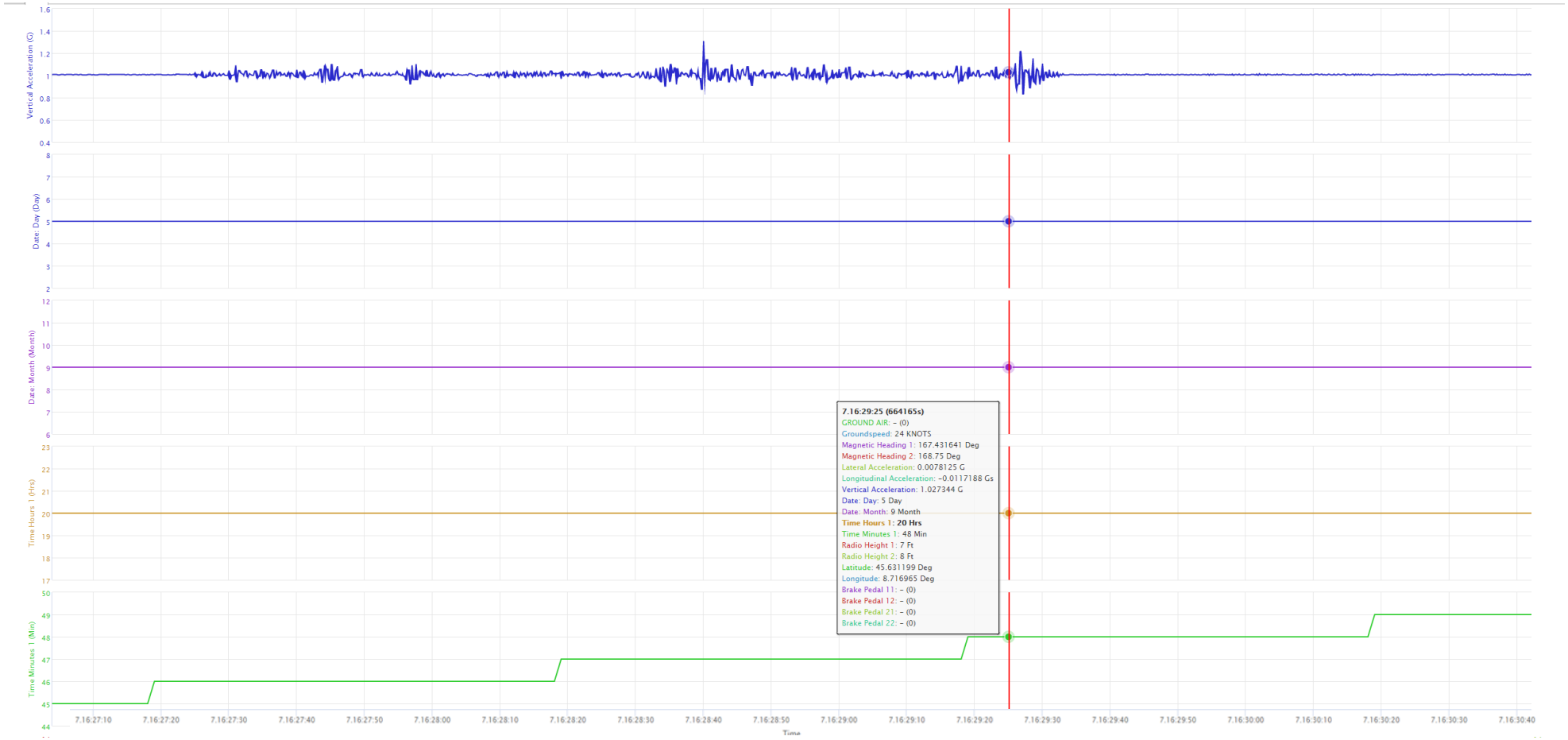

Figure 5: OE-GES FDR data – Impact phase (Vertical Accel, Date, Time).

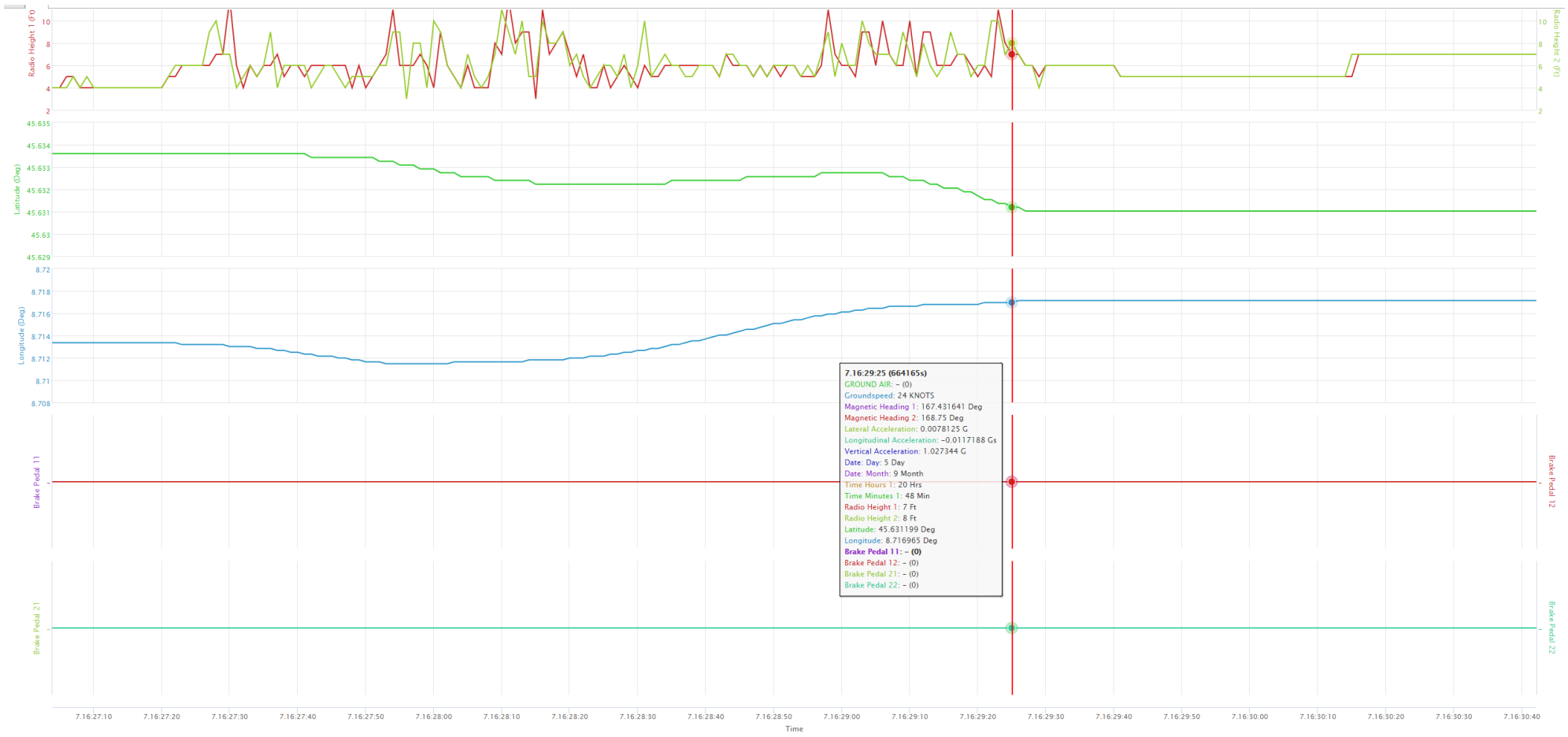

Figure 6: OE-GES FDR data – Impact phase (Radio Height1, Radio Height2, Latitude, Longitude, Brake Pedal 11/12, 21/22).

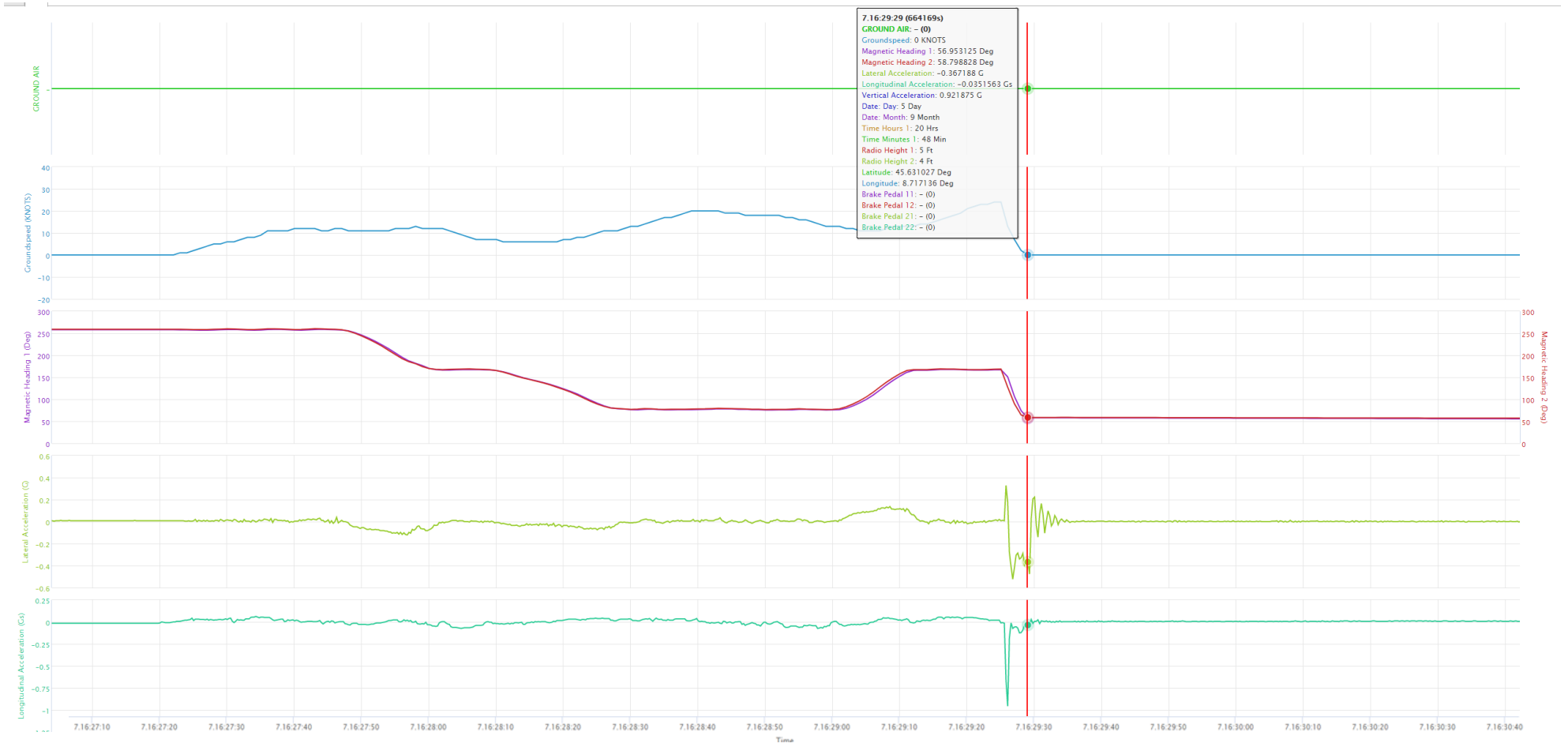

Figure 7: OE-GES FDR data − Rest after impact phase (Ground/Air, Groundspeed, Mag HDG1, Mag HDG2, Lateral Accel, Longitudinal Accel).

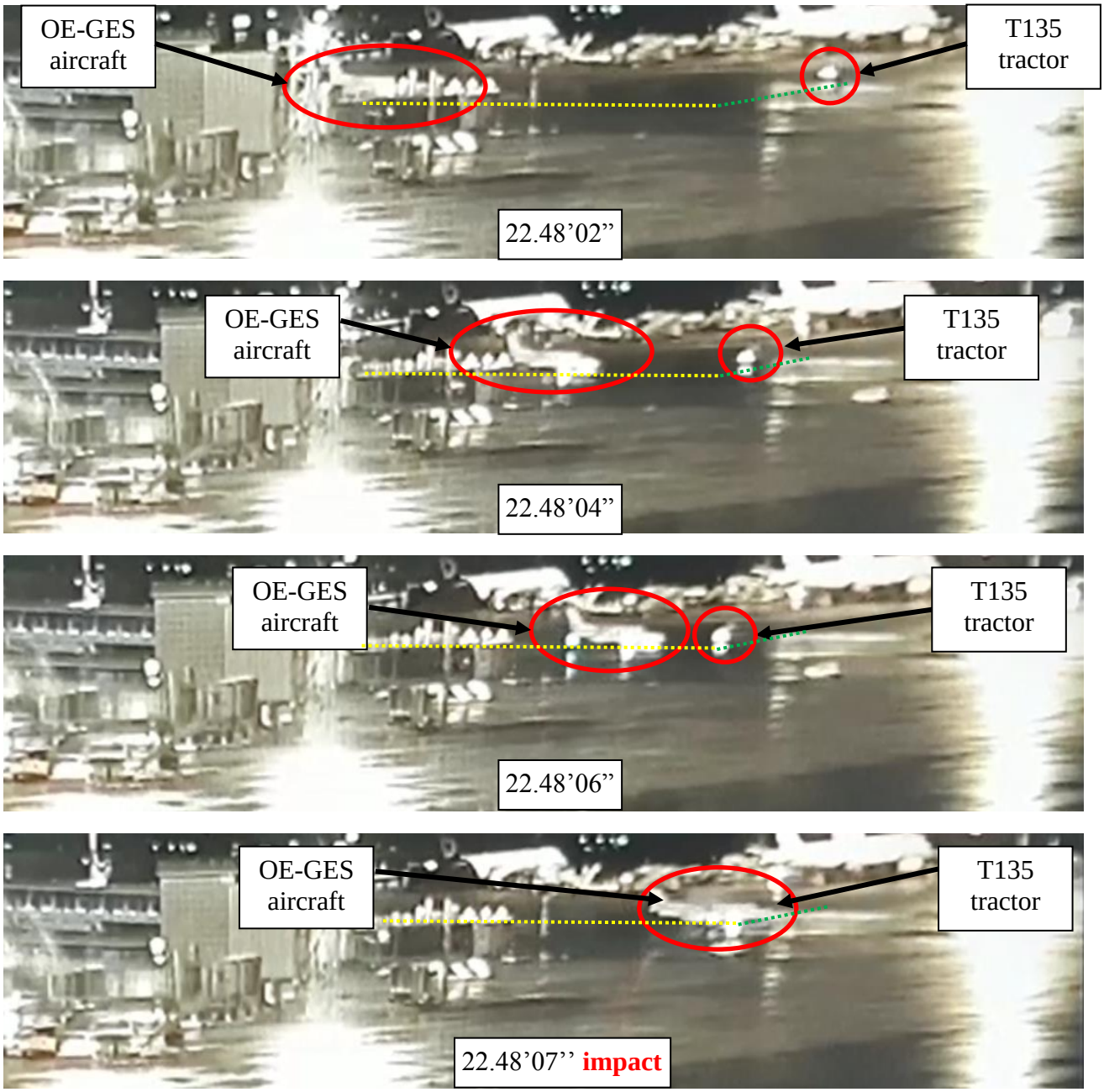

Photo 5: accident event sequence CCTV screenshot (hours expressed in "CCTV local time").