

Technical report

A-029/2020

Accident on 30 July 2020,
involving a PC-28 CRUISER
operated by FLYBAI, S.L., registration EC-NAP,
at Burgos Airport
(Villafría-Burgos, Spain)

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Notice

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission regarding the circumstances of the accident object of the investigation, its probable causes and its consequences.

In accordance with the provisions in Article 5.4.1 of Annexe 13 of the International Civil Aviation Convention; and with Articles 5.5 of Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010; Article 15 of Law 21/2003 on Air Safety; and Articles 1, 4 and 21.2 of RD 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent their recurrence. The investigation is not intended to attribute any blame or liability, nor to prejudge any decisions that may be taken by the judicial authorities. Therefore, and according to the laws detailed above, the investigation was carried out using procedures not necessarily subject to the guarantees and rights by which evidence should be governed in a judicial process.

Consequently, the use of this report for any purpose other than the prevention of future accidents may lead to erroneous conclusions or interpretations.

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ABBREVIATIONS

° ‘ “	Sexagesimal degrees, minutes and seconds
°C	Degrees Celsius
AEMET	Spain’s State Meteorological Agency
AENA	Spanish Airports and Air Navigation
AESA	Spain’s National Aviation Safety Agency
ATPL	Airline Transport Pilot License
ATO	Approved training organisation
CAMO	Continuing airworthiness management organisation
CPL	Commercial Pilot License
CTR	Control zone
DME	Distance Measuring Equipment
EASA	European Union Aviation Safety Agency
ELT	Emergency location transmitter
g	Normal acceleration
h	Hours
IFR	Instrumental flight rules
kg	Kilogrammes
KIAS	Knots indicated airspeed
km	Kilometres
km/h	Kilometres/hour
kt	Knots
kW	Kilowatts
l, l/h	Litres, Litres/hour
LEBG	ICAO code for Burgos Airport
m	Metres
mm	Millimetres
m/s	Metres/second
m ²	Metres squared
METAR	Aviation routine weather report
N	North
W	West
PAPI	Precision Approach Path Indicator
PPL	Private Pilot License
rpm	Revolutions per minute
SOP	Standard operating procedures
TAF	Terminal aerodrome forecast
UTC	Coordinated universal time
VOR	VHF omnidirectional range

Technical report

A-029/2020

Owner and Operator:	FLYBYSCHOOL-FLYBAI, S.L.
Aircraft:	PS-28 CRUISER, registration EC-NAP (Spain)
Date and time of accident:	30 July 2020; 10:36 UTC
Site of accident:	Burgos Airport- LEBG (Villafría-Burgos)
Persons on board:	1 (crew)
Type of flight:	General Aviation - Instruction - Solo
Phase of flight:	Landing - landing roll
Flight rules:	VFR
Date of approval:	26/05/2021

Synopsis

Summary:

On 30 July 2020, the PS-28 CRUISER aircraft, registration EC-NAP, made a round-trip solo instruction flight from Burgos Airport - LEBG. On landing, its nose gear hit runway 22 several times and eventually collapsed. The aircraft then slid along the runway on its nose before coming to a stop.

The student pilot was unharmed, but the aircraft sustained damage to its propeller, nose gear and nose cone.

The investigation has determined the accident was caused by a poorly executed landing, which resulted in the nose gear impacting the runway several times, causing it to collapse.

A failure to adhere to the approach and landing procedures is considered to have been a contributing factor.

No operational safety recommendations are proposed.

1. THE FACTS OF THE ACCIDENT

1.1. Overview of the accident

On 30 July 2020, at 10:11 UTC, the PS-28 CRUISER aircraft operated by FLYBYSCHOOL, with registration EC-NAP, took off from Burgos Airport - LEBG piloted by a student pilot for an instruction flight departing from and returning to the same airport.

The planned flight was a “solo” student pilot flight with a scheduled duration of 09:45 to 10:15 UTC, with three landings and take-offs authorised.

After performing the pre-flight checks and discussing the type of flight to be carried out with his instructor, the student pilot began taxiing. At that point, there was a change in the service runway from 04 to 22, due to a significant change in the wind, which, however, remained within limits acceptable to the school for conducting this type of flight.

The student pilot waited for another IFR traffic to take off. He confirmed this change with his instructor, modifying the taxi procedure and ensuring he was familiar with the new required traffic pattern.

He took off without incident. The flight proceeded normally, successfully completing two of the three authorised landings and take-offs on runway 22. According to the pilot's testimony, on the third landing that he expected to be the final landing, he had lost speed and made a



Photograph 1. Accident aircraft

hard landing with a couple of bounces on the runway. He reacted by deciding to perform a “go-around” to make a new stable approach.

During the headwind leg of this last attempt and fourth approach, the student heard his instructor, on the radio, simultaneously assisting another traffic from the same school because it was experiencing communication problems.

The student pilot aligned the aircraft with the runway. After flying over the threshold with an approximate speed of between 68 and 69 kt and the engine idle, he again made a hard landing with several bounces. According to his statement, just as he was about to execute a new "go-around", the aircraft's nose fell onto the runway, and it slid to a stop on the left side of the first third of runway 22.

According to the student pilot, he tried to communicate on the airport's frequency, 125.425, to report the accident, but it was not working, so he secured the aircraft and evacuated on

his own. However, the emergency services had been alerted and were on the way to the scene of the accident.

It should be noted that simultaneously with the solo flight, another school flight was carried out. During this flight, the pilot student declared an emergency due to communications failure and subsequent engine failure, which forced him to make an emergency landing, on the opposite runway 04 to the one on service at that time, the 22, temporarily coinciding with the last landings of the pilot student of the event.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal				
Serious				
Minor				
Unharmmed	1		1	
TOTAL	1		1	

1.3. Damage to the aircraft

The aircraft sustained significant damage to its nose landing gear, propeller and lower forward fuselage.

1.4. Other damage

There was no third-party damage.

1.5. Personnel information

The 32-year-old student pilot was taking an ATPL course, and the accident flight was his first "solo" flight, having received the required authorisation from the ATO to carry it out.

He had a total experience of 31:15 flying hours and 106 landings. Of these, 21:45 hours were in the type of aircraft involved in the accident.

His last flight prior to the event was a round-trip flight from LEBG on the same day with the same aircraft. It departed at 9:00 UTC, included 5 landings, and lasted for 45 minutes. This flight was a preparatory flight for the solo flight, during which the student was given several instructions and recommendations, including specific guidelines on the approach and flare, and the manoeuvre was approved. According to his statement, the supervising instructor believed that the student pilot was sufficiently prepared to fly "solo".

The student pilot had a valid class 1 medical certificate in force until 23/04/2021 and classes 2 and LAPL valid until 23/04/2025.

1.6. Aircraft information

1.6.1. General information

The PS-28 Cruiser aircraft involved in this accident is the same type of aircraft and has the same equipment as the one described in the report with reference A-028/2020. These two accidents have been investigated jointly, and more information can be found in said report.

1.6.2. Maintenance information

The aircraft was built in 2019 with serial number: C0650. The aircraft's maintenance was carried out by the AESA-approved maintenance organisation FLY BAI Mantenimiento, S.L., according to Subpart F of Part M of Regulation (EU) No.1321/2014, and the current maintenance programme corresponding to ref.: MP-AV-PS28-FB ed.1 rev.4 of 17/07/2020. (See section 1.6.2. of Report A-028/2020).

At the time of the accident, both the aircraft and the engine had accumulated 1022:00 operating hours.

On the day of the accident, the aircraft had made 3 flights (2 piloted by the student involved in the accident), involving a total of 2 hours of flight and 15 landings. The day before, the aircraft was used for 5:40 hours of flight training and 5 landings, all without notable incidents.

The most recent overhaul of the aircraft and engine was a 50-hour inspection carried out on 27/07/2020 when they had 1011:00 flight hours. The lubricating oil, oil filter, spark plug connector and brake pads were replaced.

The scheduled 50-hour inspections of the engine and nose gear leg were also performed, during which the possible presence of cracks and general condition of the nose leg were checked. No notable findings were reported.

1.6.3. Airworthiness status

The PS-28 CRUISER aircraft with serial number C0650 and registration EC-NAP was registered with AESA's record of active registrations on 31/05/2019, with registration number 10227. The registration certificate lists the aircraft's leaseholder as the operating school at the time of the accident, with validity until 30/08/2025.

The aircraft had a Restricted Certificate of Airworthiness no.8141 issued by Spain's National Aviation Safety Agency on 30/11/2018, classifying it as a "Light sport aeroplane". It also had an airworthiness review certificate issued by the approved Continuing Airworthiness Management Organisation (CAMO), AVIATION VIP, S.L., according to Part M, subpart G, Regulation (EU) 1321/2014, valid until 29/11/2020.

In addition, the aircraft had a valid aircraft station license authorisation issued by AESA featuring various pieces of equipment, including a GARMIN GNC 255A communications and navigation unit, a TRIG TT21 transponder, and an ELT KANNAD 406 AF-COMPACT.

The last valid aircraft weight and balance sheet was submitted on 27/09/2018.

1.7. Meteorological information

1.7.1. General situation

There was an extensive Atlantic anticyclone at low levels with low relative pressures over the centre and west of the Peninsula.

1.7.2. Conditions in the area of the accident

At Burgos Airport, around the time of the accident (10:36 UTC), with natural daylight conditions, the METAR and TAF aerodrome reports were:

METAR LEBG 301000Z 17007KT 140V220 CAVOK 31/11 Q1018=

METAR LEBG 301030Z 16008KT 100V200 CAVOK 32/11 Q1017=

METAR LEBG 301100Z 16010KT 120V230 CAVOK 33/11 Q1017=

(Transcription: Burgos Airport, conditions described by the METAR at 10:00 and 10:30 and 11:00 UTC were wind between 7 and 10 kt, variable direction, temperature 31 to 33°C, high visibility, dew point 11°C, and QNH of 1017/1018 hPa.)

TAF LEBG 300800Z 3009/3109 05012KT CAVOK TX36/3016Z TN16/3105Z =

(Transcription: Burgos Airport, conditions described by the TAF from the 30th at 08:00 UTC, valid until the 31st at 09:00 UTC, were wind direction 50° and speed 12kt, high visibility, maximum temperature at 16:00 UTC of 36°C and minimum temperature at 05:00 UTC of 16°C)

According to the METAR information, the average surface wind conditions on runway 04 were a 6 kt headwind and a 7 kt crosswind from the right. On runway 22, the wind conditions were a 4.5 kt headwind and a 5.4 kt crosswind from the left.

On runway 04, the maximum crosswind component was 5 kt (from 100° and 340°). On runway 22, it was 7 kt (from 140°).

Visibility was good, temperatures were high and there was a light southerly wind (less than 10 kt).

1.8. Aids to navigation

The LEBG airport runway is equipped with a PAPI 3° system for visual approaches and VOR/DME air navigation aids.

The flight was carried out under visual flight rules (VFR), so radio aids were unnecessary. However, no type of navigation system failure was reported.

1.9. Communications

This accident occurred in the context of another aircraft from the same school experiencing a communications and engine failure. Initially, since this second aircraft could not be contacted, the aircraft involved in this accident was used to establish contact with the instructor through the school's frequency. From the analysis of the communications made during the period in which the accident occurred, we have concluded the following concatenation of circumstances converged:

- The accident traffic was performing take-offs and landings.
- A second traffic had a communications failure.
- A third IFR traffic was approaching the airfield when the accident occurred and was informed and aborted its approach by proceeding to hold.
- The second traffic declared an engine failure and landed on runway 04, with the accident aircraft in the first third of runway 22.

All of this resulted in the second aircraft landing on runway 04 while the accident aircraft was on the last third of it, the firefighters and other assistance teams having already removed the debris scattered on the runway.

Following an analysis, the communications between the students involved were found to be inadequate, in concurrence with the confusing situations caused by the simultaneity of the events. However, the communications are not considered to have been a contributing factor in the accident under investigation.

1.10. Aerodrome information

Burgos Airport (LEBG) is an airport managed by AENA located northeast of the capital, between the municipalities of Gamonal and Villafría, where the military installations of the Villafría aerodrome were previously located.

Its GPS coordinates are 42° 21' 27" N y 3° 36' 49" O.

It has a paved 04/22 orientation runway, 45 m wide with 2,100 m of TORA. It has a PAPI 3^o system for visual approaches and VOR/DME air navigation aids. Its elevation is 903 m AMSL.

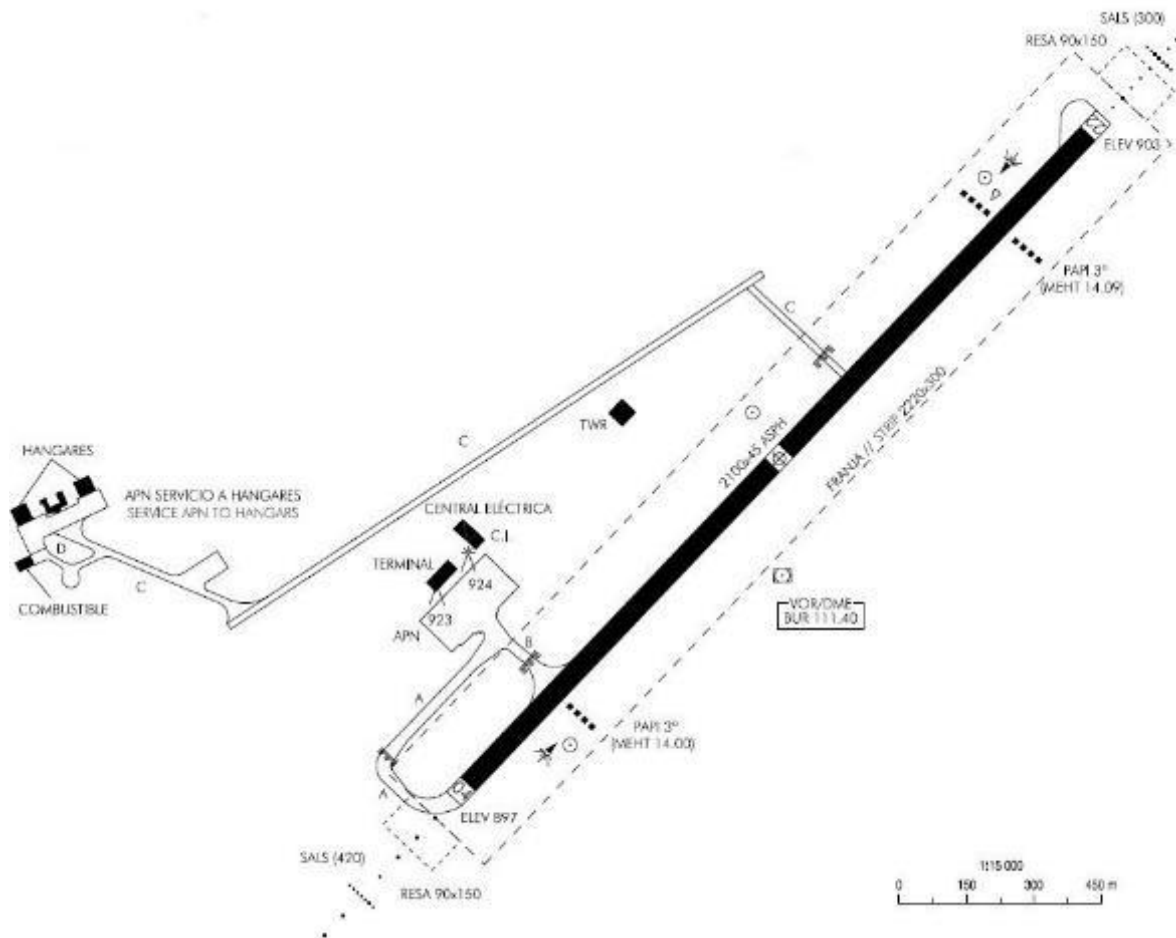


Figure 1. Aerodrome plan

1.11. Flight recorders

The aircraft was not equipped with a conventional cockpit voice recorder, but it had a Dynon SkyView HDX1100 system that records flight data and engine parameters, and this information was downloaded by the manufacturer.

Given the circumstances of the event, we performed a similar flight data extraction and analysis to the process detailed in section 1.11 of the jointly investigated A-028/2020 report.

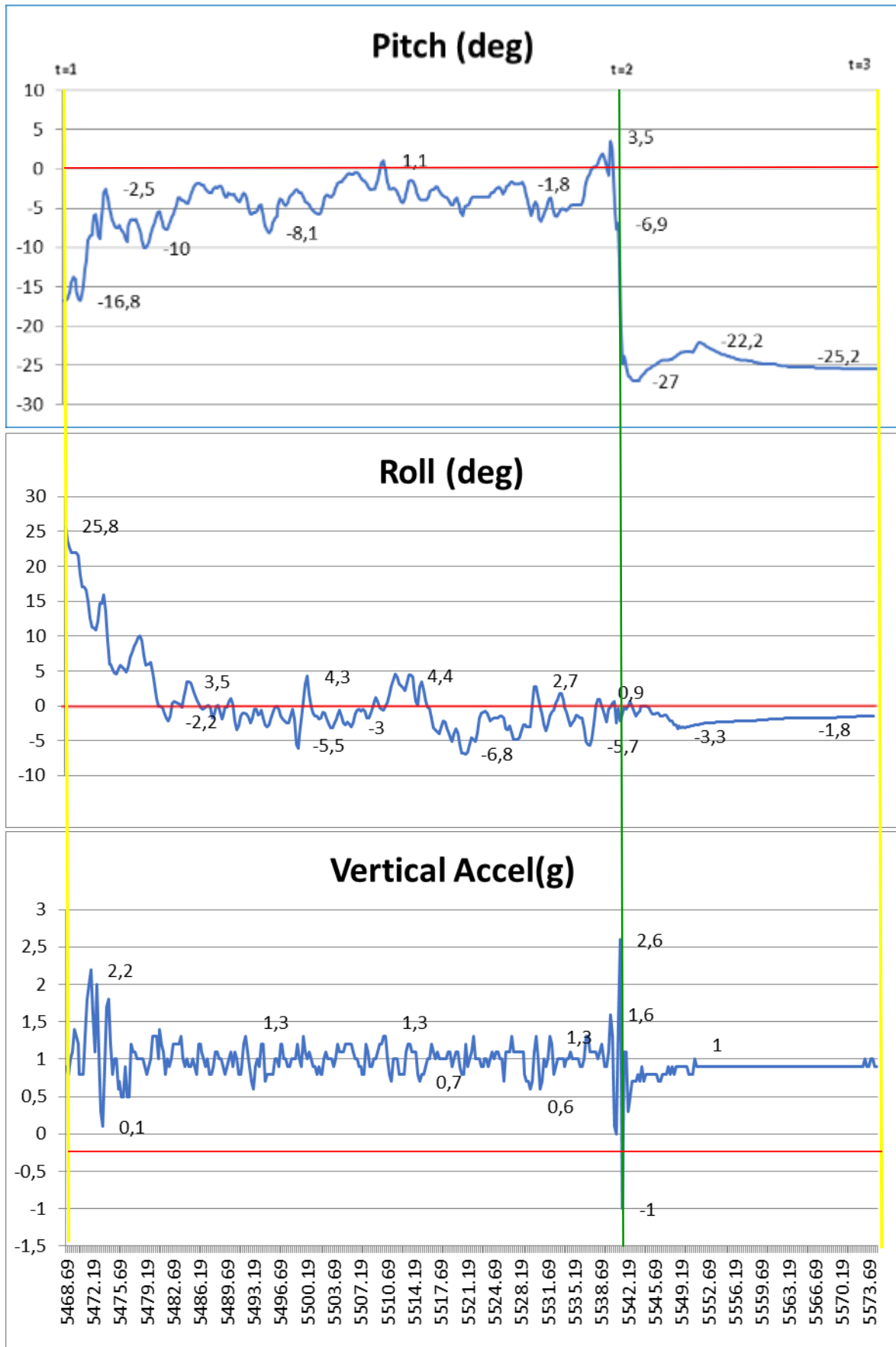
The analysis of the recorded data was carried out specifically for the period of time corresponding to touchdown. Thus, it starts at $t=1$, which corresponds to 10:34:59 UTC, and ends at $t=3$, which corresponds to 10:36:45 UTC.

The aircraft's pitch, roll, vertical acceleration, indicated speed, wind speed, engine rpm, and flap position parameters are illustrated in the attached graphs 1 and 2. In the graphs, the following time positions are differentiated (recorder parameter called "session time"), registering 240 recordings per minute:

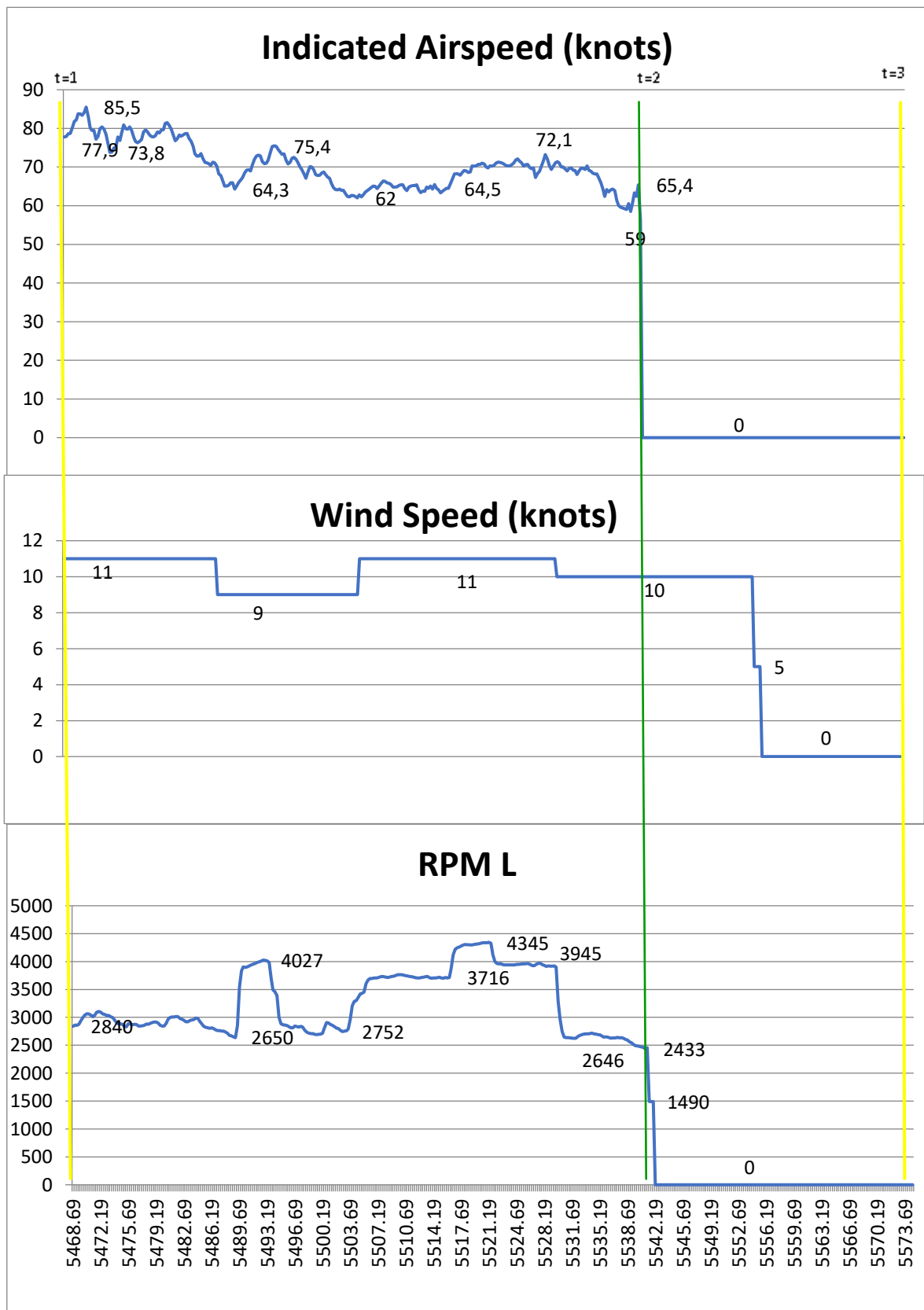
- t=1, recording: 5468.69 corresponding to 10:34:59 UTC.
- t=2, recording: 5469.69 corresponding to 10:36:11 UTC when the GEES warning appears.
- t=3, recording: 5574.69 corresponding to 10:36:45 UTC.

The results of the analysis of the data recorded during touchdown yielded the following conclusions:

- The pitch data was between the maximum positive and negative limits of 3.5° and -27° at 10:36:10 and 10:36:13 UTC.
- The roll data was between 25.8° and -7° at 10:34:59 and 10:35:51 UTC.
- The vertical acceleration had its maximum and minimum values of 2.6 g and -1 g at the same instant, 10:36:11 UTC. For reference, the maximum positive load factor limit with flaps extended for this type of aircraft is 2 g, and the maximum negative limit is 0 g. From 13:36:11 UTC (5540.94) to 13:36:12 UTC (5541.56), the "GEES" alert was recorded, which is displayed when the "g" metre is in the yellow range of the indicator (i.e. it is between the values of -0.5 and 3 g).
- The indicated speed had its maximum and minimum values at 85.5 kt and 0 kt at 10:35:01 and from 10:36:12 UTC until the end of the analysis period at 10:36:45 UTC. Up to 10:36:11 UTC (5540.94), the FLAPS OVERSPEED alert was registered, with minimum speeds of 65.4 KIAS.
- The engine rpm had its maximum value of 4,345 rpm at 10:35:51 and a minimum value of 0 rpm from 10:36:12 UTC to the end of the analysis at 10:36:45 UTC.
- The wind direction was between 53° to 181° , with speeds of 5 to 11 kt. The aircraft landed on LEBG runway 22.
- The flaps were at 14° for the duration of the analysed period.



Graph 1. Flight data during touchdown



Graph 2. Flight data during touchdown (continued)

1.12. Aircraft wreckage and impact information

After the nose gear bounced on the runway several times, it collapsed. The nose gear fork detached, leaving the aircraft to slide along on its deformed nose leg until it came to a complete stop on the left side of the first third of runway 22.

Due to the impact and detachment of the nose wheel, the aircraft's nose dropped onto the runway, causing the following damage:



Photograph 2. Damage to the propeller

- Propeller: blades damaged, eroded at the blade tips and one of them, cross-sectioned without detachment, roughly at its middle point.
- Damaged exhaust manifolds.
- Nose gear assembly: destroyed with the fork and nose wheel being wholly detached.
- Underside of fuselage: deformed in the anchoring areas of the main landing gear and nose.
- Lower engine cowling, broken and deformed.



Photograph 3. Damage to the exhaust manifolds



Photograph 4. Damage to nose landing gear



Photograph 5. Damage to lower engine cowling



Photograph 6. Pedal channel



Photograph 7. Damage to lower engine cowling



Photograph 8. Damage to lower engine cowling



Photograph 9. Damage to lower engine cowling

1.13. Medical and pathological

Not applicable.

1.14. Fire

Not applicable.

1.15. Survival aspects

Not applicable.

1.16. Tests and research

Not applicable.

1.16.1. Related reports/communications

1.16.1.1. Airport manager's report

In its accident report, the airport operator, AENA, indicated that at 10:36 UTC, the PS-28 CRUISER with registration EC-NAP, operated by the ATO FLYBYSCHOOL, damaged its nose gear and left the runway during its final landing on runway 22. Fire and maintenance personnel immediately went to the scene, reporting that the aircraft's sole occupant was unharmed.

The airport was closed until the aircraft was removed and the two other aircraft in the area at the time were informed of the emergency to ensure they landed safely. The end of the emergency was declared at 11:15 UTC.

The air traffic control service confirmed the accident had occurred in the first third of runway 22, which was the preferred runway at the time, and that at 10:31 UTC, upon joining the final for runway 22 for its last landing, the aircraft apparently made a hard landing, collapsing its front nose landing gear damaging the aircraft nose, with no personal injury.

According to information from the fire service, there was a liquid spill on the runway, although the type of liquid was unspecified. The aircraft remained on the left side of runway 22 until it was removed at 11:15 UTC, and the runway was declared clear.

The airport navigation manager SAERCO carried out an investigation into the communications that took place during the confluence of various traffics with incidents, which, according to its assessment, resulted in a communication failure. As a result, It issued the following safety recommendations, which are not considered to have contributed to the accident under investigation in this report:

RECOMMENDATIONS			
CODE	APPLICATION	TYPE	RECOMMENDATION
SREC_20_30	SAERCO	Training/Divulgateion	It is recommended that the ATM Operations Directorate disseminate this report among its operational personnel.
SREC_20_31	AENA	Procedures/ Best practices	It is recommended to send this report to AENA for its knowledge, and if it considers it necessary, send it to the FLYBY school so that it, as far as possible: <ul style="list-style-type: none"> - Review its procedure (definition and application) for selecting frequencies on board, in case it is necessary to introduce any element of correction and / or improvement in it, as well as the optimal condition of its equipment on board. - Review the suitability of training in the correct use of frequencies

1.17. Organisational and management information

The aircraft was operated by a training organisation (ATO) approved by AESA on 13/11/2019. Its main operational base is at Burgos airport - LEBG, where it delivers pilot license training courses for ATPL, PPL and CPL permits, as well as various ratings.

As the information about the scope of the training in relation to the event under investigation coincides with that detailed in the jointly investigated report ref: A-028/2020, please refer to section 1.17 of said report.

1.17.1. Accident risk analysis report from the training organisation

After an exhaustive analysis of the accident and accompanying circumstances, the ATO detected possible deficiencies in the training and assessment system provided in its Training and Operations Manual. Given that there had been repeated similar accidents within a short period of time, it decided to act urgently and immediately. Therefore, it notified us that it would act on three levels: organisational, general and specific.

In view of the above, the ATO decided to adopt the following mitigating measures:

At an organisational level:

1. Change the structure of the ATO by creating two supervisory figures: one to reinforce the supervision of the students' practical training in order to detect issues and inadequate progress, and a second person to be responsible for standardising and supervising procedures, SOPs and the training of flight instructors.
2. Request the ATO Inspector modify the personnel structure in order to reinforce the safety and supervision of solo flights in particular.

At a general level:

3. Immediately and provisionally suspend solo flight authorisation for students in phase 2 (solo flight phase) in order to perform flights to check their knowledge levels and in-flight actions, verifying, among other aspects, those related to unstable approaches, emergency procedures, situational awareness, cross-checking of parameters, conflict resolution, priorities, etc.
4. The head of teaching and flight instruction assessed 60 pilot students in phase 2, having detected some type of discrepancy in 20 cases that have since been corrected through additional specific training sessions with an instructor. The students had to receive a favourable report from the flight instruction chief in order to re-establish solo flight clearance.
5. Raise awareness among personnel (Instructors, pilots and student pilots) of the possibility that similar approach control problems and unstable landings may occur again, and emphasise the importance of a stable approach and, failing that, the obligation to execute evasive manoeuvres to ensure acceptable safety levels are maintained.
6. Refresh, at a theoretical and practical level, the procedure and actions required to recognise said unstable and compromised approach situations, as well as the steps that should be taken to resolve them safely.

7. Include this accident in the next Safety Meeting to make the flight instruction chief, instructors and students aware of the situation and the procedures for resolving it.

At a specific level:

- Assign the student pilot involved in the accident as many additional specific training sessions with an instructor as needed to retrain him in areas where deficiencies are present.

According to the ATO, following the application of the proposed mitigating measures, the risk of a similar event being repeated would be substantially reduced to acceptable levels. Therefore, the probability of a similar event happening again is deemed unlikely, and with the seriousness of the event classified as considerable, they qualify the overall risk as tolerable.

1.18. Additional information

Please refer to the study of similar accidents also relevant to this event detailed in section 1.18 of report A-028/2020.

1.19. Useful or effective investigation techniques

Not applicable.

2. ANALYSIS

2.1. Analysis of the meteorological conditions

The meteorological conditions in the vicinity of Burgos Airport around the time of the event (10:36 UTC) were suitable for the flight, and no unexpected adverse conditions that could have contributed to the accident were recorded.

According to the METAR information, the average surface wind conditions on runway 22 were a 4.5 kt headwind and a 5.4 kt crosswind from the left. This is consistent with the data recorded on the aircraft around the time of touchdown, which indicates a maximum crosswind of 7 kt (from 140°).

Bearing in mind the aircraft is designed for maximum transversal and longitudinal components of 12 and 22 kt, respectively, we do not believe the wind influenced the aircraft's performance decisively during the operation.

2.2. Operational analysis

As in the event investigated jointly with this one (report A-028/2020 on the accident involving the EC-NAO aircraft), the student was in an advanced phase of the course and had the necessary authorisation to carry out this type of flight with satisfactory assessments from his instructors.

Given that it was the student pilot's release flight, and therefore his first flight alone, the instructor asked him to confirm whether he would feel comfortable flying alone, to which the student answered in the affirmative.

Just after the aircraft started to taxi, there was a change of runway. This development upset the student's initial plans because he had to taxi to another holding point and fly an inverted traffic pattern. The instructor, possibly to give the student confidence after the runway change, reassured him that he was familiar with the runway 22 traffic pattern.

After take-off, the student completed two landings and two take-offs without incident; thus, his actions up until that point can be deemed as adequate and in line with the procedures established by the ATO. But on the third and final landing to finish "the release", the student failed to adjust the speed sufficiently, and during the flare manoeuvre, the aircraft dropped heavily onto the runway and bounced twice. Unlike the accident involving the EC-NAO aircraft, the student pilot of this aircraft realised the landing was unstable and unsafe and reacted by initiating a "go around" to make a new approach. This reaction was appropriate, although probably late, as the aircraft bounced more than once before he took action.

During this last circuit, another student who was also flying solo called on the school's frequency to declare an emergency due to a communications and engine failure, and eventually made an emergency landing on the opposing runway.

The simultaneity of the other incident, which, while it didn't have direct implications for this accident probably increased the pressure on the student during an already stressful release flight, and his lack of flight experience, caused him to lose focus on the landing and probably impeded his ability to execute a second "go around" manoeuvre that could have prevented the accident.

Furthermore, on his last approach, the student said he entered the final at 68-69 kt (the speed on final established by the school is 60 kt) and, once he reached the runway threshold, throttled back to idle and initiated the flare manoeuvre. At this point the aircraft's speed was excessively high and he had maintained power on the final leg; therefore, it's likely the aircraft maintained that speed until it reached the runway head. As it was going too fast, the aircraft bounced off the runway several times. This may have happened because the student failed to raise the nose sufficiently for the landing flare and hit the runway with its nose wheel, causing successive impacts until the nose leg collapsed and the aircraft stopped.

The accident, therefore, as in accident A-028/2020, occurred as a result of an irregular touchdown, which caused the nose gear fork assembly to detach. This irregular touchdown or hard landing was probably caused by the aircraft travelling too fast on approach and not having the correct attitude on touchdown, resulting in an unstable landing.

2.3. Analysis of the aircraft wreckage

The impact of the nose gear on the runway caused the wheel fork to detach. The aircraft then slid along on its nose leg and main gear until it came to a standstill.

The damage to the propeller, nose gear and underside of the fuselage is consistent with the aircraft's nose impacting the runway after the wheel fork detached and the wheel leg buckled in the direction of travel.

The wheel fork's mounting bolts and the nose leg were bent in the direction of the nose's impact with the runway, but there were no signs of any flaws or damages to suggest they were in a questionable condition prior to the event. The nuts and washers came off as a result of the impact.

2.4. Analysis of the aircraft's maintenance

The post-accident examination did not detect any pre-existing maintenance issues that may have been a factor in the event.

The maintenance records were in order, the aircraft and engine manufacturers' service bulletins were implemented correctly, and the scheduled overhauls and inspections carried out did not identify any issues relevant to the investigation.

2.5. Analysis of the organisation and management

The actions of the training organisation, both in terms of its compliance with the requirements for the student pilot and the condition of the aircraft, etc., were adequate and are not considered to have been a factor in the accident.

However, there was a failure to comply with the procedures established by the ATO for the approach. The approach speeds were higher than those established for the operation and in all cases resulted in unstable landings.

Given the extensive damage caused to the crashed aircraft, the training organisation proposed a series of mitigating measures (section 1.17.1.) of greater scope than those proposed in accident A-028/2020, which are considered adequate to reduce the risk of similar accidents.

3. CONCLUSIONS

3.1. Findings

- The accident flight was the student pilot's release flight and, therefore, his first "solo" flight, entailing other traffic at the same airport (LEBG) and three landings and take-offs. The flight was uneventful until the third landing when he was forced to make a "go-around" after a hard landing with two bounces.
- On the fourth and final approach, the aircraft again landed hard at an unnecessarily high speed, bouncing several times on the runway and causing the nose gear to collapse.
- The accident coincided with another incident at the same school, involving an aircraft that declared an emergency due to a communications and engine failure. While this forced the student pilot's instructor to attend both traffics simultaneously, it is not thought to have contributed to the accident.
- The analyses of the aircraft wreckage and maintenance records have not revealed any fault or defect attributable to the condition of the aircraft prior to the event.
- The student pilot executed an unstable final approach.
- Touchdown occurred abruptly at high speed and with vertical acceleration, causing the aircraft to bounce off the runway several times before the nose gear wheel fork detached.
- The aircraft travelled along the runway on the buckled nose gear leg without a wheel until it came to a standstill.
- All the nuts and washers on the wheel fork and gear leg mounting system came off; the bolts buckled but remained in the fork base plate.
- The wreckage, recorded flight data, and the student pilot's statement are all consistent with an unstable hard landing.
- In the period of one year, there have been 4 similar events involving solo flights operated by the same ATO on the same type of aircraft.
- The analysis of similar events has found that parts of the nose landing gear can be improved in terms of safety, particularly the mounting system that connects the wheel fork to the nose leg.

3.2. Causes/contributing factors

The investigation has determined the accident was caused by a poorly executed landing, which resulted in the nose gear impacting the runway several times, causing it to collapse.

A failure to adhere to the approach and landing procedures is considered to have been a contributing factor.

4. OPERATIONAL SAFETY RECOMMENDATIONS

No operational safety recommendations are proposed.