AAIB
Air Accidents Investigation Branch

AAIB Bulletin 8/2023

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The sole objective of the 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 AAIB 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.

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http://www.aaib.gov.uk

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(ALL TIMES IN THIS BULLETIN ARE UTC)

AAIB Field Investigation Reports

A Field Investigation is an independent investigation in which AAIB investigators collect, record and analyse evidence.

The process may include, attending the scene of the accident or serious incident; interviewing witnesses; reviewing documents, procedures and practices; examining aircraft wreckage or components; and analysing recorded data.

The investigation, which can take a number of months to complete, will conclude with a published report.

SERIOUS INCIDENT

Aircraft Type and Registration:	Piper PA-28-151 (Modified), G-BOTI	
No & Type of Engines:	1 Lycoming O-320-D3G piston engine	
Year of Manufacture:	1975 (Serial no: 28-7515251)	
Date & Time (UTC):	22 October 2022 at 1330 hrs	
Location:	9 nm final approach into Exeter Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Commercial Pilots Licence	
Commander's Age:	33 years	
Commander's Flying Experience:	331 hours (of which 40 were on type) Last 90 days - 21 hours Last 28 days - 16 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The pilot started an early descent while attempting to fly an ILS approach to Runway 26 at Exeter Airport. He lost situation awareness with respect to his position relative to the runway and ILS descent point, possibly due to or exacerbated by a malfunction of the glideslope deviation indicator on the course deviation indicator (CDI). His awareness would probably have been rectified by referencing the DME to confirm his position relative to the descent point. The approach controller noticed the early descent three minutes after G-BOTI departed the cleared level and instructed the pilot to climb. The subsequent approach was flown using the localiser and without vertical guidance to a successful landing.

The CDI had been reported as unserviceable prior to scheduled maintenance, which had been completed on the day of the flight, although no fault was found.

History of the flight

G-BOTI, a PA-28-151, was leased by a flight school based at Exeter Airport. It had been flown to Biggin Hill seven days prior to the incident flight to undergo routine maintenance. The maintenance organisation at Biggin Hill was the registered owner of G-BOTI.

One of the defects which had been reported prior to the maintenance was the aircraft course deviation indicator (CDI)[1], which had been unserviceable for several months. The pilot was

Footnote

[1] Course deviation indicator – an aircraft instrument used to receive and display VOR, localiser, glide path or GPS information to the pilot.

not employed by the maintenance organisation but was flying to build his experience. He had ferried the aircraft from Exeter seven days earlier and he was aware of the reported defect with the CDI. When he arrived at Biggin Hill on the day of the incident flight there was maintenance work still being carried out on the aircraft, causing a delay to the planned departure. Once the work had finished, the pilot spoke to the engineer who had been working on G-BOTI and the engineer confirmed the CDI was serviceable.

The flight departed Biggin Hill at 1150 hrs. There was one passenger on board who also held a pilot's licence, although he was not qualified to fly under instrument flight rules (IFR). The pilot flew under IFR outside controlled airspace and navigated enroute between VORs (Figure 1), plotting his position at various points and comparing with navigation software he was using on a tablet device. He was satisfied that the VOR indications on the CDI were correct and the instrument was operating normally.

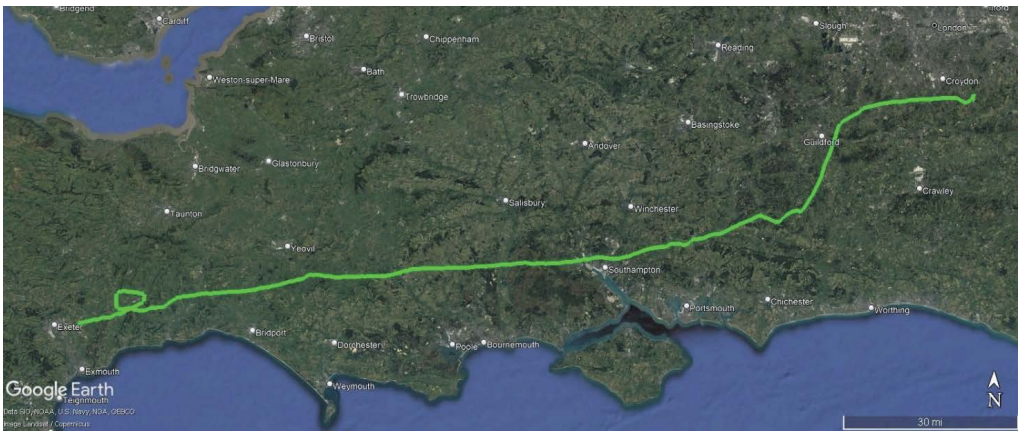

Figure 1
G-BOTI flight path

At 1311:37 hrs the pilot contacted Exeter Radar on 128.98 MHz and requested an ILS approach to Runway 26. The pilot stated that he had prepared for and briefed himself on the approach in advance, and although he had tuned the ILS frequency in the Garmin GNS430, he did not use the GPS function to navigate throughout the flight. At 1324 hrs the radar controller made a transmission; "YOU'RE CLOSING THE LOCALISER FROM THE RIGHT, WHEN ESTABLISHED DESCEND WITH THE GLIDEPATH".

The pilot recalled noticing the glideslope bar was centralised and he took this to indicate he was on the expected glidepath. He began his descent from the platform altitude of 2,600 ft but did not confirm his position with the DME. The aircraft was flying in IMC and the pilot was not visual with the ground. He did not recall seeing a red flag on the CDI, which would have indicated the instrument was unserviceable. When he initiated the descent, he was 12.5 nm from the threshold of Runway 26, which was approximately 5 nm before the expected descent point for the approach profile. The pilot continued his descent, with varying rates of descent that averaged approximately 600 ft/min, believing that the static glideslope deviation indicator on the CDI was confirming the aircraft's correct position on the glidepath.

G-BOTI descended to 1,155 ft amsl at 9.4 nm from the runway threshold when the radar controller queried his altitude. Three minutes after the pilot had begun descending, the controller then instructed him to climb. In response, the pilot initially arrested his descent and momentarily levelled the aircraft. The aircraft then descended to a minimum altitude of 1,150 ft before the pilot initiated a climb. The aircraft was 400 ft above terrain at its closest point, and the pilot did not have visual contact with the ground.

The pilot then flew a go-around during which he noticed that the glideslope deviation indicator on the CDI remained centralised, and he realised it was unserviceable. Following a discussion with ATC, he requested vectors for another ILS approach to Runway 26. On the subsequent approach, he used the localiser indicator and stored waypoints in the Garmin GNS430 to verify his position and descent point, and he flew to a successful landing.

Recorded data

The pilot provided the AAIB with a GNSS track log which was downloaded from a flight planning and navigation app. Radar and radio transmission recordings were also provided by Exeter Airport and NATS.

The aircraft took off from Biggin Hill at 1150 hrs and climbed to approximately 2,300 ft amsl, tracking towards Exeter. At 1318:11 hrs, while 23 nm from the threshold, the approach controller instructed G-BOTI to descend to 2,600 ft. After this transmission, the approach controller was changed. At 1325:01 hrs, when 12.5 nm from the runway threshold, a descent from 2,600 ft commenced. This initially levelled at 2,300 ft for 10 seconds before continuing (Figure 2).

At 1327:13 hrs, the aircraft was 9.4 nm from the runway threshold, descending at approximately 800 ft/min (Figure 3, Point A). The approach controller requested the pilot's altitude to which he replied 'ALTITUDE 1,100 DESCENDING'. At this time, the recorded radar altitude was 1,084 ft[2], the GNSS altitude was 1,155 ft and the terrain was estimated at 751 ft. After this query from the approach controller, the aircraft levelled at approximately 1,150 ft but descended to a minimum GNSS altitude of 1,096 ft. Terrain under the flight path undulated with the minimum clearance, based on GNSS altitude, estimated at 400 ft.

The approach controller asked whether G-BOTI was on the glidepath to which the pilot replied he was. At 1327:29 hrs (Figure 3, Point B), the approach controller stated 'GOLF TANGO INDIA YOU'RE WELL BELOW THE GLIDE PATH LEVEL, CLIMB UP TO ALTITUDE 2,600 FT'. The pilot acknowledged this and commenced a climb. During this, the aircraft's heading became more westerly and the approach controller asked if G-BOTI was established or whether a repositioning was required. The pilot responded with a repositioning request, which the controller facilitated, and the subsequent approach was successful.

Footnote

[2] Radar altitude resolution is ± 50 ft.

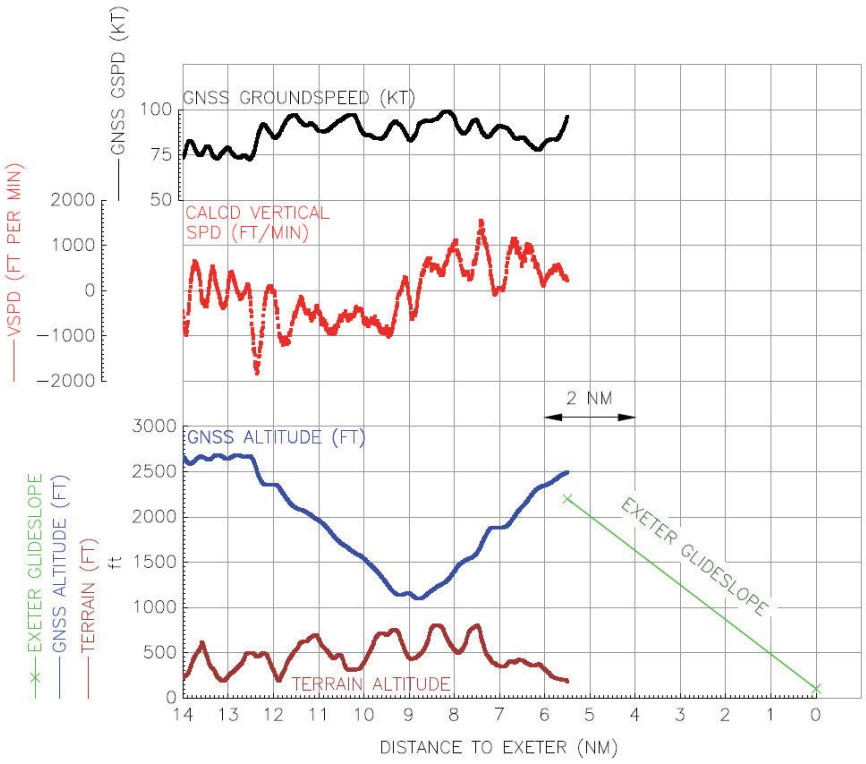

Figure 2

G-BOTI altitude and track distance from Exeter Airport.
Green line shows Exeter glideslope

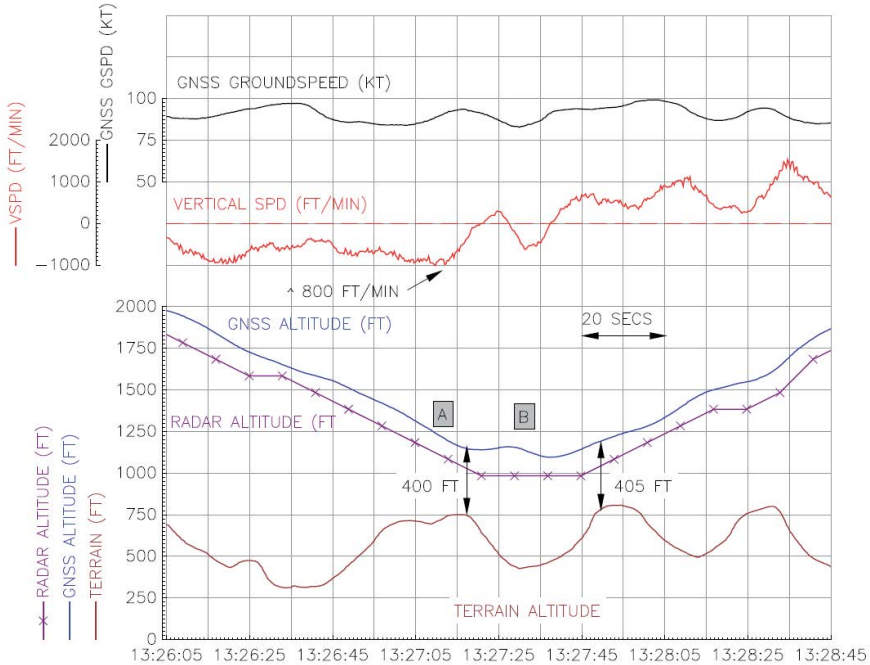

Figure 3

G-BOTI recorded data

Aerodrome information

General

Exeter Airport is an international airport with one runway, orientated 08/26. The landing distance available on Runway 26 is 2,036 m. The airport has regular commercial traffic and has various instrument approaches available for both runways.

Instrument Approach Chart

Aerodrome charts, including instrument approach charts, are published under Part 3 of the Aeronautical Information Publication (AIP)[3]. Aerodrome and approach charts can be produced by third parties and are based on the information published in the AIP. Both types of chart should contain the same information but may differ in presentation (Figures 4 and 5).

The ILS approach to Runway 26 at Exeter has a non-standard 3.5° glidepath[4] due to high terrain to the east of the airport. The published descent point from 2,200 ft is 5.5 nm from the runway threshold. From 2,600ft, which was the altitude from which G-BOTI was cleared to join the glidepath, the nominal descent point would have been at approximately 6.5 nm. This would not have been immediately apparent to the pilot when he received his clearance for the ILS approach.

Figure 5 shows the approach plate used by the pilot during the flight. For commencing a straight-in approach from the east, which was the clearance received by the pilot, the descent point is to be determined by DME. For aircraft without DME, there is a published procedural join to the ILS where timings can be used to join the ILS. There is a note which states that the glidepath signal is not to be used beyond 8 nm from the runway threshold[5] (highlighted in Figure 5).

Garmin GNS 430

The GNS 430 is a widely used integrated communication, navigation and GPS system with a colour moving map display. It is multi-functional and can be used to provide navigation information to a CDI, either from GPS or from a ground based navigational aid (VOR and ILS but not DME or NDB). Using deviation bars, the CDI can display horizontal and, depending on the navigation source selected, vertical guidance (Figure 6).

The frequency selections are made on the left of the unit. The communication section is at the top and the navigation section is at the bottom of the display. The active frequency, in white text, and standby frequency, in blue text, are displayed. The pale blue background highlights the frequency that can be altered using the selector knobs.

Footnote

[3] Aeronautical Information Publication's (AIP) contain regulations, procedures and other relevant information for aircraft operations.
[4] Standard ILS approaches have a 3° descent path.
[5] Standard glidepath coverage is to 10 nm.

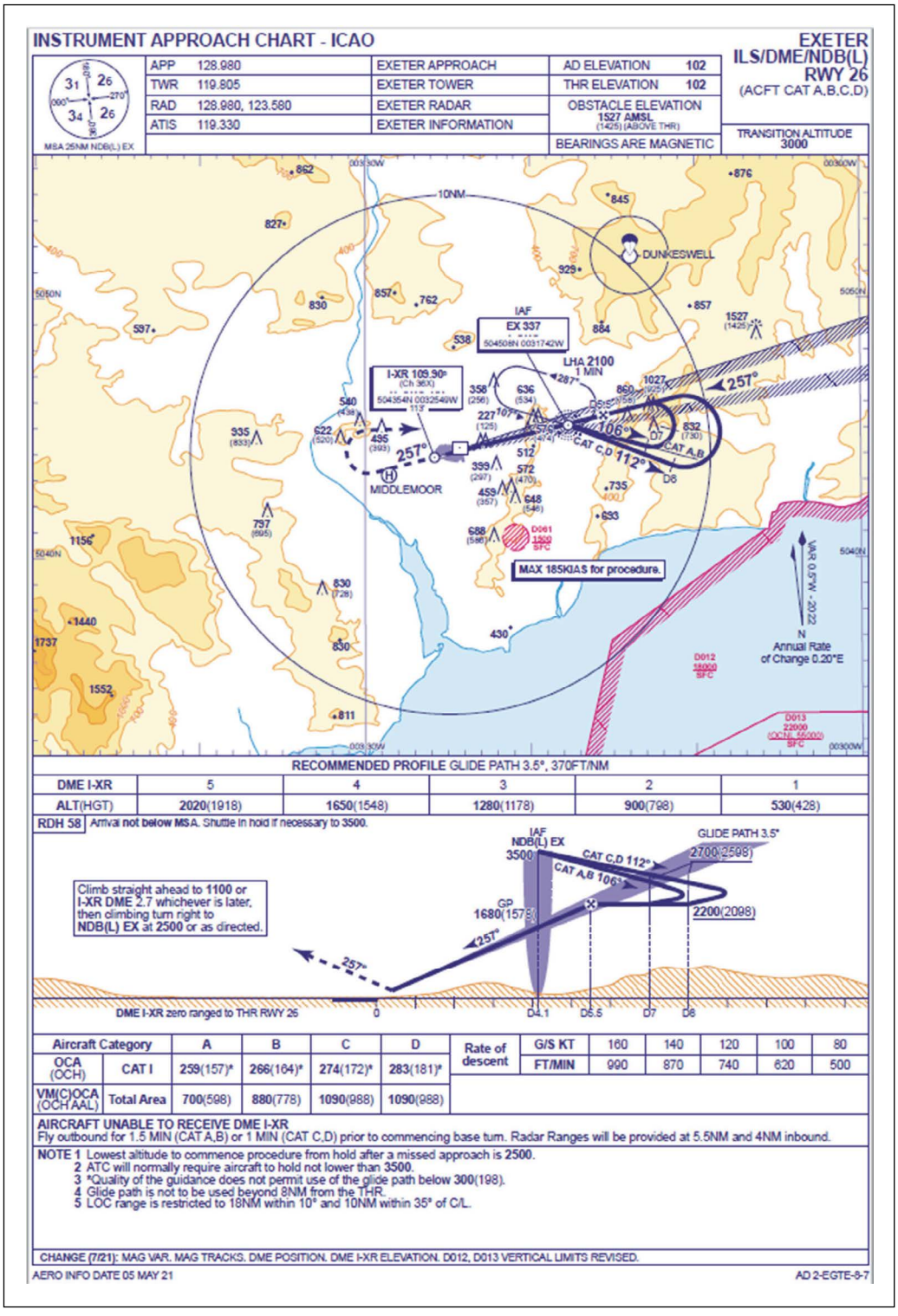

Figure 4

AIP ILS approach chart for Runway 26 at Exeter Airport

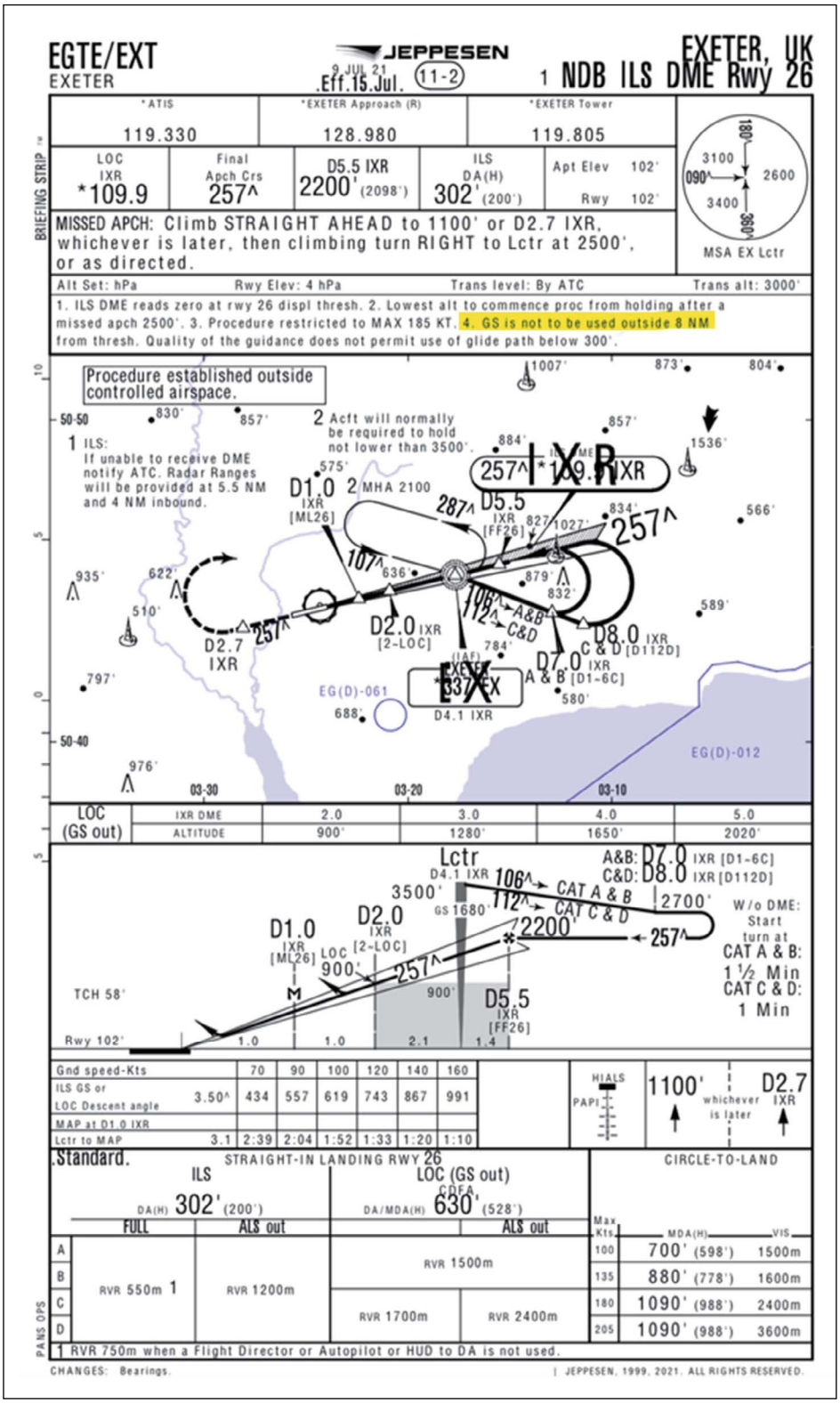

Figure 5

ILS approach chart used by the pilot of G-BOTI

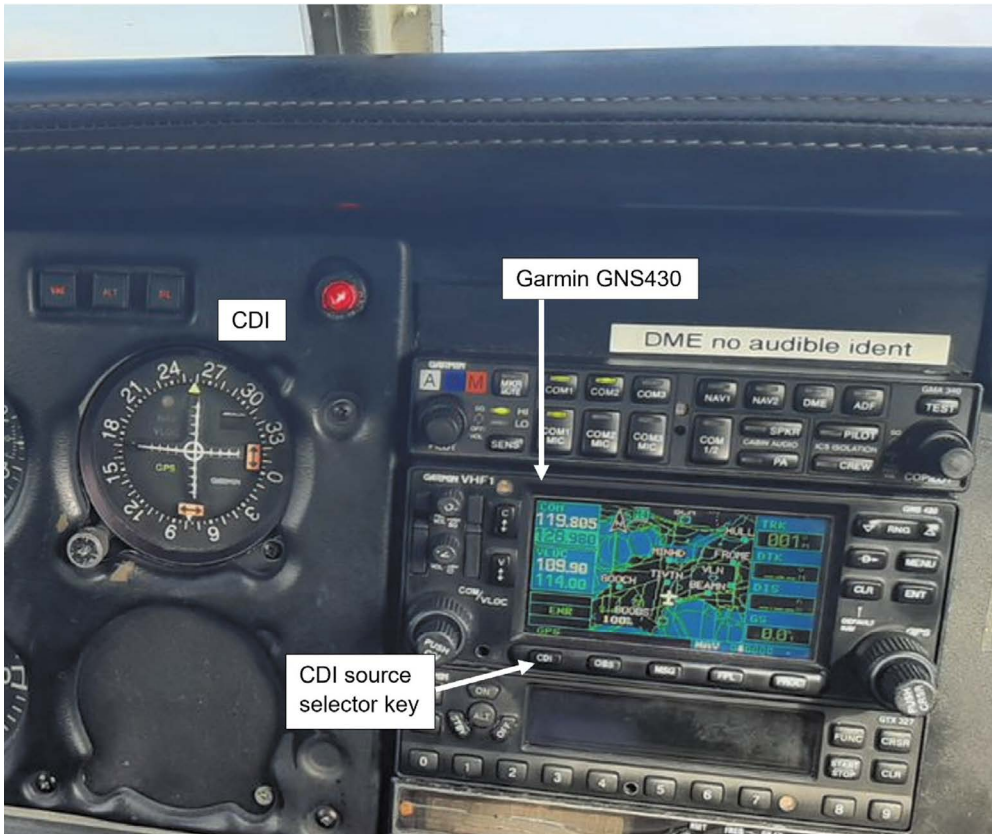

Figure 6
GNS 430 and CDI fitted to G-BOTI

If a VOR or ILS is selected and identified, the 'CDI' source selector key located at the bottom left of the GNS 430 display screen must be selected to 'LOC' to display the navigation information on the CDI. The selection will be displayed above the 'CDI' key and repeated as a caption on the CDI display.

To use GPS-derived navigational data, the 'CDI' source selector key must be selected to 'GPS'. Then the GPS-derived navigation data will be displayed on the CDI along with a 'GPS' caption. In Figure 6, as GPS is the selected navigation source, 'GPS' is displayed above the 'CDI' source selector key and as a caption on the CDI. The orange flags next to the vertical and horizontal guidance bars on the CDI show that there is no valid navigational data, and the centred deviation bars should not be used.

The GNS 430 has many functions (the pilot's guide and reference consists of 266 pages), but there is no requirement for pilots to receive training on such navigation equipment. The GNS 430 in G-BOTI was fitted with a terrain database that could have been used to enhance terrain awareness.

During the power up sequence of the unit, a self-test page is displayed to confirm the CDI is displaying correctly. The test settings drive a half scale deflection of the glideslope deviation bar and remove its associated warning flag from view. To move on from this page the pilot must press the 'ENT' key.

Maintenance

The aircraft was returning from Biggin Hill where a 100-hour maintenance inspection had been carried out. In addition to the routine tasks, an avionics engineer worked a reported defect with Nav 1, the GNS 430; '*Nav 1 INOP (identifying but not displaying VOR or glideslope)*'.

Using an IFR4000 test set, the engineer checked the operation of Nav 1. The VOR indication was recalibrated because it was found to be 5° out of alignment, but the glideslope was found to be working correctly even at low signal strengths. The defect was cleared and a further report on its operation during the next flight, the incident flight, was requested.

Immediately after the incident flight, the operator restricted the aircraft to VFR flights. However, subsequently, an instructor from the operator found that the GNS 430 and its CDI were operating normally.

Meteorology

The weather conditions at Exeter Airport at the time of the serious incident was scattered cloud at 800 ft agl, a cloud base at 2,500 ft agl and good visibility. The wind was from 170° at 11 kt and the temperature was 16°C.

Personnel

The pilot held a valid CPL and his medical was in date. He had held a PPL since 2016 and completed his CPL and instrument rating skills test in 2021.

Air Traffic Control

General

The radar controller, who had recently taken over the frequency when G-BOTI was already at 2,600 ft on a closing heading for the localiser, described the traffic level as light, with G-BOTI and one other aircraft on frequency. After issuing a clearance for G-BOTI to descend with the glidepath once established on the localiser, the controller's attention turned to the other aircraft, which was behind G-BOTI in the traffic sequence. The controller stated it is normal for aircraft to join the glidepath at 2,600 ft, and the published platform altitude of 2,200 ft would only be used for aircraft joining within 8 nm. When the controller's attention returned to G-BOTI three minutes later, it was well below the glidepath and an immediate intervention was required to instruct the pilot to initiate a climb.

Manual of Air Traffic Services (MATS) Part 2

MATS Part 2 details the instructions and procedures specific to an Air Traffic Service Unit and is applicable in conjunction with MATS Part 1[6]. MATS Part 2 for Exeter Airport

Footnote

[6] Manual of Air Traffic Services (MATS) Part 1 - Civil Aviation Publication (CAP) 493.

contains the following guidance for controllers when vectoring aircraft for an ILS approach to Runway 26:

> '*Due to the steep angle glidepath aircraft should not be vectored to intercept the ILS localiser at a range exceeding 18 nm. The ILS glidepath provides coverage to a distance of 8 nm from the threshold. If an aircraft establishes beyond 10 nm from touchdown the pilot should be instructed "After 8 DME descend on the glidepath*.'

This phraseology was not used by the controller when clearing G-BOTI for the ILS approach, though G-BOTI established on the localiser outside 10 nm. The controller used the correct phraseology when clearing the subsequent aircraft in the sequence for an ILS approach two minutes later.

Other information

Situation awareness

Pilot situation awareness is understanding the aircraft's position in space, being aware of the potential factors which can impact the flight and being able to predict the future effects of those factors. It is important for pilots to maintain good situation awareness for effective performance. When a pilot does not have an accurate understanding of the aircraft state or position, the fidelity of those predictions is compromised.

Analysis

The pilot of G-BOTI did not have an accurate understanding of the aircraft's position relative to the runway, which compromised his situation awareness, particularly in relation to the high terrain and the runway threshold, to the degree that he began his descent 5 nm earlier than the charts allowed. This may have been as a result of his relatively low experience flying ILS approaches, compounded by the clearance received by ATC to intercept the ILS at a height which was not on the approach chart. The pilot believed that the CDI glideslope deviation bar was telling him he was at his descent point because he did not see an orange failure flag, which would have indicated the CDI was not serviceable and might have alerted him to his incorrect mental model of his position relative to the runway.

When an aircraft approaches a descent point from an altitude below the glideslope, the glideslope deviation indicator will show deviation reducing until it becomes zero at the descent point. A static indicator showing no deviation may be a compelling reason to believe that the aircraft is on the glideslope or, in this case, that it has reached the descent point. The pilot did not recall a visible flag on the instrument which meant the CDI display would have been consistent with what he expected to see at that point. However, a check of the DME is an important, independent way to confirm that the aircraft is, in fact, where the pilot thinks it is. A DME check by the pilot of G-BOTI would have revealed that he was further from the airport than he thought and outside the 8 nm within which the glidepath signal was reliable. In addition, a check of the DME as the aircraft descended through 2,200 ft amsl would also have highlighted the fact that the aircraft was below the descent profile.

The CDI had been reported unserviceable prior to the maintenance activity, but it was tested immediately prior to the incident flight and no fault was found. It was reported unserviceable again after the incident flight and it is possible there was an unidentified, intermittent defect with the instrument.

The Exeter controller intervened to stop the aircraft's descent toward terrain, possibly preventing a CFIT event. The clearance given to the pilot of G-BOTI for the ILS approach did not comply with unit procedures to use the phraseology '*after 8 DME descend on the glidepath*', which may have prompted the pilot to confirm his DME before initiating a descent. The aircraft was below the minimum safe altitude for three minutes before the controller queried the pilot.

Conclusion

The pilot started an early descent while attempting to fly an ILS approach to Runway 26 at Exeter Airport, due to degraded situation awareness. This was possibly exacerbated by a malfunction of the glideslope deviation indicator on the CDI.

The approach controller did not use the correct phraseology, which would have made the approach clearance conditional on the pilot confirming his distance from the runway threshold using DME. The pilot would in any case have improved his situation awareness – and probably prevented this serious incident – by checking the DME range at the descent point and when descending through 2,200 ft. A DME check is an important part of procedures such as this because it provides an independent means of confirming that it is safe to descend.

Although the CDI was reported unserviceable before the scheduled maintenance, no fault was found during testing. It is possible that there was an unidentified, intermittent defect with the instrument.

Published: 6 July 2023.

AAIB Correspondence Reports

These are reports on accidents and incidents which were not subject to a Field Investigation.

They are wholly, or largely, based on information provided by the aircraft commander in an Aircraft Accident Report Form (AARF) and in some cases additional information from other sources.

The accuracy of the information provided cannot be assured.

ACCIDENT

Aircraft Type and Registration:	Alpi Pioneer 300, G-IPKA	
No & Type of Engines:	1 Rotax 912ULS piston engine	
Year of Manufacture:	2005 (Serial no: PFA 330-14355)	
Date & Time (UTC):	20 August 2022 at 1600 hrs	
Location:	Fenland Airfield, Lincolnshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Left landing gear failure and damage to left wing	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	76 years	
Commander's Flying Experience:	2,840 hours (of which 877 were on type) Last 90 days - 17 hours Last 28 days - 6 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and AAIB visual examination of the landing gear	

Synopsis

Whilst taxiing after landing the left main landing gear collapsed due to the failure of the swinging leg. The leg had fractured in overload initiating close to the weld between the swinging leg and its pivot tube. As a result of this investigation the Light Aircraft Association (LAA) are reviewing design and manufacturing aspects of the type's landing gear, including whether on-going maintenance action is required.

History of the flight

The aircraft landed on Runway 26 at Fenland Airfield. As the aircraft taxied, its left main gear collapsed causing the left wing to contact the ground (Figure 1).

Aircraft information

The Alpi Pioneer 300 is a small two-seat, low-wing aircraft, of mainly wooden construction. The aircraft is fitted with electrical retracting tricycle landing gear.

The main landing gear leg consists of an upper strut which pivots around an axial trunnion when the landing gear is raised or lowered. The 'swinging leg', also referred to as the drag strut, is hinged off the bottom of the upper strut. A damper, which provides the landing gear suspension, is fitted above the swinging leg (Figure 2).

Figure 1

G-IPKA once it had come to rest

Figure 2

Alpi Pioneer left main landing gear

G-IPKA's annual inspection for its Permit to Fly revalidation was completed on 31 July 2022, approximately 5.5 flight hours and 9 landings prior to the accident. The owner reported that during the inspection particular attention was paid to the landing gear, as he had identified a crack in the nose gear leg assembly earlier that year.

All three landing gear legs had been replaced by the owner in 2012 and had flown 725 hours and 837 landings since installation.

The owner reported that the aircraft had not suffered any heavy landings during this time but had mainly been operated from grass strips, some of which 'can be rough in places'.

Landing gear examination

The swinging arm and damper were removed from the aircraft for further examination (Figure 3).

Figure 3

G-IPKA left main swinging arm and damper

The swinging leg had failed around its full circumference, the crack initiating adjacent to the weld between the swinging leg tube and the upper pivot tube (Figure 4).

The fracture in the wall of the tube was indicative of overload, suggesting that the fracture had occurred rapidly. The inside of the tube, which is uncoated and had evidence of overspray on some of the inner surfaces, was lightly corroded.

The condition of the interface between the swinging leg tube and the pivot tube suggested the weld had not fully penetrated the parent material and is a possible factor in the initiation of the crack.

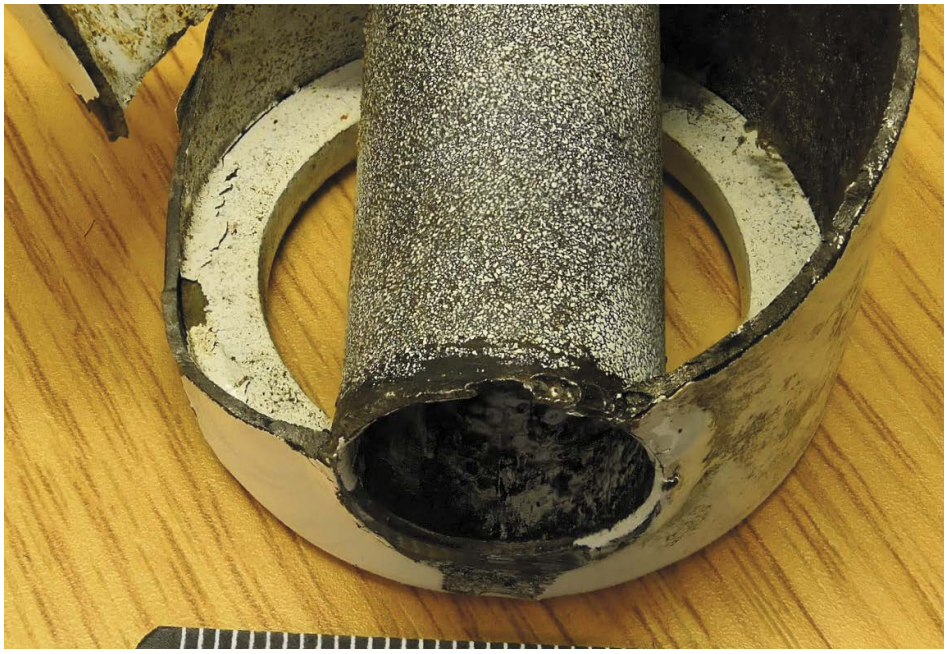

Figure 4
Swinging tube upper end

In August 2019 the LAA wrote a letter to all registered Alpi Pioneer 300 owners informing them of a similar failure of a Pioneer 300's landing gear. A crack had initiated close to the welded pivot tube and corrosion was present on the internal surfaces of the tube. It highlighted that corrosion may have been a factor in the failure and that this hinge is subjected to high stresses, especially in any crosswind landings. It suggested inspection for cracking around the hinge and that owners complete a landing gear retraction check every 25 hours which would include a check of the legs whilst in the 'relaxed' or unloaded state. Additionally, it suggested more regular checks if the aircraft 'is being operated from a bumpy runway' and identified that it is essential that the landing gear is thoroughly checked after heavy landings, especially following a touchdown made with any sideways drift.

Analysis

The crack initiated from the interface of pivot tube to swinging leg tube. Poor weld quality between two components can act as a stress raiser at the interface and could serve to locate a crack. If the landing gear was subjected to a heavy landing or an element of lateral loading during a crosswind landing, this could increase the stress at the interface between the swinging tube and the pivot tube and cause a crack to initiate and propagate rapidly.

The pilot did not recall any particularly heavy landings, however, did say that the aircraft often flew from grass airfields where the surface condition can be rougher and may have been sufficient to initiate a crack.

Although the owner had inspected the landing gear components recently it would be difficult to inspect as the downtube of the main landing gear strut partially covers the location of the crack initiation.

Safety action

As a result of this investigation the LAA are reviewing the design and manufacturing aspects of the Alpi Pioneer 300 landing gear, including whether on-going maintenance action is required.

Accident

Aircraft Type and Registration:	Piper PA-28-161, G-EKIR
No & Type of Engines:	1 Lycoming O-320-D3G piston engine
Year of Manufacture:	1989 (Serial no: 2841157)
Date & Time (UTC):	22 March 2023 at 1300 hrs
Location:	Sandtoft Airfield, Belton, North Lincolnshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Left navigation and position lights, casing damaged. Scuffs to paint work on wing tip area
Commander's Licence:	Private Pilot's Licence
Commander's Age:	32 years
Commander's Flying Experience:	105 hours (of which 98 were on type) Last 90 days - 16 hours Last 28 days - 7 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft wingtip collided with a delivery vehicle which was parked on the taxiway. The vehicle did not have permission to enter or park on the taxiway.

History of the flight

Having flown into Sandtoft Airfield earlier in the day the pilot was preparing for his return flight to Gloucester. Having started the engine, he proceeded to taxi from his parking position (Stand 7) across the runway and along Taxiway A to uplift fuel. There was a vehicle parked on Taxiway A completing a delivery to the cafe.

Having judged the gap to be sufficient for the aircraft wingspan, the pilot proceeded at a slow walking pace but clipped the port wingtip of G-EKIR on the side and wing mirror of the vehicle. The port wing navigation light and casing were damaged and there was paintwork scuffing to the wing tip area. The vehicle had damage to the right panel and below the right wing mirror. There were no injuries.

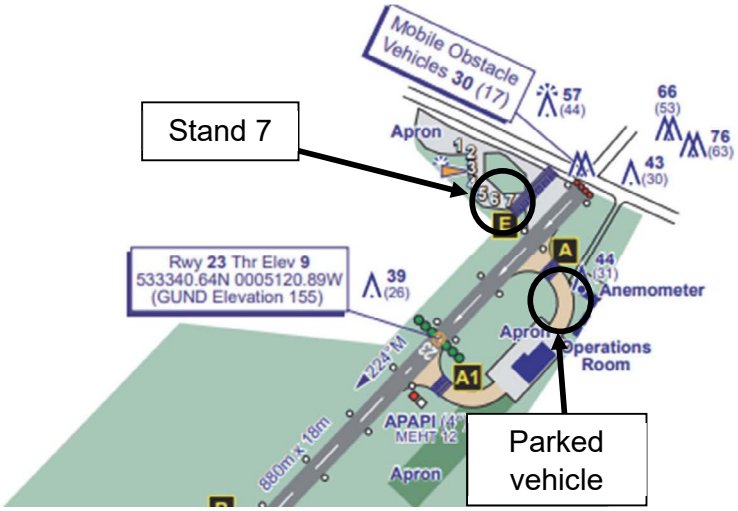

Figure 1

Map of parking area and site of collision at Sandtoft Airfield

Figure 2

Damage to the aircraft wingtip (top) and to the vehicle panel side panel (left) and below the wing mirror (right)
(Images used with permission)

Aerodrome information

Sandtoft is a licensed aerodrome although it restricts movements of aircraft requiring a licence primarily to Saturday and Sunday. The airfield provides an Air Ground Communications Service (AGCS), which is not viewed as an Air Traffic Service in the UK because it does not include an alerting service as part of its content. AGCS radio station operators provide traffic and weather information to pilots operating on and in the vicinity of the aerodrome.

Personnel

The pilot reported that he felt there was enough room for him to pass the van which was parked on the left side of the taxiway on the curve as he taxied from Stand 7. The vehicle was parked with a gap of around 1 or 2 m from the edge of the taxiway. G-EKIR has a wingspan of 10.70 m and the taxiway width is 15 m. At the time of the collision there was also another aircraft parked partly on the taxiway to the right of G-EKIR. It can be difficult to judge the space available against the wingspan from inside the aircraft. The pilot did not ask for assistance before attempting to pass the van.

The vehicle driver was on his first visit to Sandtoft, although he was accompanied by another staff member who had been before. He commented that there was no signage or barrier at the entrance and that it was common practice for the drivers to park behind the cafe. He did not realise that he was on the taxiway or that permission was required to enter the airfield.

Other information

Regulations regarding access

The Air Navigation Order 2016 and Regulations[1] contain regulations made by the CAA under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016. Section 2 Rules of the Air Regulations contains within Schedule 1, Section 3 rules regarding the movement of vehicles on the aerodrome:

> ***Access to and movement of persons and vehicles on the aerodrome***
>
> *13.— (1) Unless there is a public right of way over it, a person or vehicle must—*
>
> *(a) not go onto any part of an aerodrome without the permission of the person in charge of that part of the aerodrome; and*
>
> *(b) comply with any conditions subject to which that permission may be granted.*
>
> *(2) A person or vehicle must—*
>
> *(a) not go onto or move on the manoeuvring area of an aerodrome which provides an air traffic control service or*

Footnote

[1] CAP 393: Regulations made under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016 (caa.co.uk) [accessed 21 June 2023].

a flight information service without the permission of the person providing that service; and

(b) comply with any conditions subject to which that permission may be granted.

Sandtoft does not provide either an air traffic control service or a flight information service, so regulation (1) applies, and any vehicle requires the permission of the person in charge to enter any part of the aerodrome. There is signage at the entrance to airfield setting out the requirements for entry. The airfield operator does have a standing arrangement with the cafe for delivery vehicles to enter the taxiway providing they have the appropriate insurance, and the drivers understand the rules under which they must operate whilst on the taxiway. The vehicle involved in the collision had not sought or been granted permission from the airfield operator to enter or park on the taxiway. Since the accident the delivery company have instructed their drivers to park in the car park rather than entering the taxiway.

Vehicle insurance

Most vehicle insurance policies do not cover driving on an aerodrome and require a specific clause to be included for any cover to be valid.

Analysis

With the vehicle parked on the taxiway by the cafe and another aircraft parked partially on the taxiway on the other side, there was not enough room for G-EKIR to pass. The pilot judged the gap to be sufficient for his aircraft and did not ask for assistance. The wingtip struck the van causing limited damage to both the vehicle and the wingtip of G-EKIR. There were no injuries.

The vehicle driver had not asked for or gained permission from the airfield operator to be on the taxiway and the vehicle was probably not insured to do so either.

Safety action

As a result of this incident the following safety action was taken:

The delivery company have instructed their drivers to park in the car park for deliveries to the cafe rather than entering the taxiway.

The airfield operator will review the signage at the entry to the airfield to ensure it is appropriate for ensuring users are aware they are entering an active airfield.

Accident

Aircraft Type and Registration:	Zenair CH 750, G-WXYZ	
No & Type of Engines:	1 Rotax 912iS piston engine	
Year of Manufacture:	2019 (Serial no: LAA 381-15436)	
Date & Time (UTC):	4 March 2023 at 1420 hrs	
Location:	Kingswinford, Dudley, West Midlands	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Minor)	Passengers - N/A
Nature of Damage:	Substantial damage to aircraft	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	76 years	
Commander's Flying Experience:	721 hours (of which 5 were on type) Last 90 days - 11 hours Last 28 days - 6 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and additional enquiries made by the AAIB	

History of the flight

The pilot of G-WXYZ had planned to fly from Tatenhill Airfield to Thruxton Airport. However, 30 minutes into the flight, he saw a red warning light illuminate on G-WXYZ's instrument panel. Four red warning lights were fitted to G-WXYZ: two for the engine control unit (ECU), one to indicate overall health of the electrical system and one to indicate a low fuel state. The pilot did not recall which of the four warning lights illuminated, but soon afterwards the engine stopped. He immediately selected a field in which to land and, aware of his aircraft's limited glide performance, positively lowered the aircraft's nose. However, G-WXYZ struck a hedgerow and the aircraft overturned, coming to rest inverted on a road next to the field. The pilot, who was wearing a three-point harness, sustained only minor injuries and, after turning off the fuel and electrical system, was able to exit the aircraft unaided.

Subsequently, the UK Zenair distributor examined the wreckage and established that both fuel pumps worked, and that the ECU powered up with no anomalies. The distributor remarked that, had an ECU fault been experienced in flight, it was unlikely to have caused the engine to stop, as the ECU has two redundant control lanes. Furthermore, electrical power for the ECU is drawn from an engine-driven generator, which also has a backup, and although the battery couldn't be tested, low battery voltage should not have caused the engine to stop.

The distributor considered that the most likely cause for the engine stoppage was fuel starvation, or a blockage in fuel flow. The distributor also noted that G-WXYZ had wing root fuel valves installed and, had these been closed, the fuel header tank for the engine would have been exhausted during the flight and the low fuel light would have illuminated.

AAIB Record-Only Investigations

This section provides details of accidents and incidents which were not subject to a Field or full Correspondence Investigation.

They are wholly, or largely, based on information provided by the aircraft commander at the time of reporting and in some cases additional information from other sources.

The accuracy of the information provided cannot be assured.

19 Apr 2023 **Robinson R44 II** **G-JINT** Gloucestershire Airport

On startup, the helicopter spun around twice while on the ground. The pilot, who was secured in a five-point harness, turned the throttle off and mixture to lean which brought the helicopter to a standstill. The pilot was uninjured and stated that he could not be sure of his feet position on the pedals during start. He did not consider the helicopter was overpowered at start, but has since purchased an additional weight for solo flights and is more aware of his feet position during engine start.

23 Apr 2023 **Pitts S-1S** **G-VOOM** Sywell Aerodrome, Northamptonshire

The pilot lost directional control whilst landing on a concrete runway, with a 12 kt crosswind component from the right. Despite application of full left brake and left rudder, the aircraft yawed to the right during the landing roll before nosing over, coming to rest inverted. The pilot was experienced on type and commented that if he had been given clearance to land on the parallel grass runway, or an available into-wind grass runway, the accident was unlikely to have occurred.

27 Apr 2023 **Rockwell Commander 112** **G-BDIE** Turweston Aerodrome, Northamptonshire

After a normal landing the left main landing gear retracted. The locking pin had seized inside the gear extension cylinder preventing the piston from locking in the down position. Normally this would be indicated to the pilot by the gear unsafe light, but the microswitch for this had failed so it was showing green.

14 May 2023 **Pegasus Quik** **G-CDPD** Harringe Court Airstrip, Ashford, Kent

The aircraft was caught by a gust of wind during landing causing it to leave the runway, enter the long grass and turn over. The pilot received minor injuries. There was damage to the aircraft's wing and propeller.

14 May 2023 **Sherwood Ranger ST** **G-YELP** Popham Airfield, Hampshire

Shortly after touchdown the aircraft started to turn to the right. The right main gear subsequently collapsed and the aircraft came to rest with the right wingtip on the ground. The right gear leg had lost a bolt that holds the wheel assembly to the gear bracing struts.

15 May 2023 **Mooney M20K** **G-GCKI** Welshpool Airport, Powys

The aircraft bounced on landing and veered off the runway onto the grass. The propeller was bent and the nose and right landing gear collapsed.

18 May 2023 **Piper PA-28-181** **G-YANK** Kingstanding Airfield, Oxfordshire

The runway profile prevented the pilot from seeing the end of the runway and the aircraft landed long. Despite braking the aircraft left the runway, travelled across the grass and struck a hedge at slow speed. The engine was shock loaded and one wingtip was damaged.

Record-only investigations reviewed: May - June 2023 cont

20 May 2023 **Skyranger 582(1)** **G-RHAM** Baxby Airfield, North Yorkshire

Shortly before the runway, the aircraft's main wheels caught the top of a hedge which pitched the aircraft down, and it landed on the nose gear which then collapsed.

20 May 2023 **Champion 7GCBC Citabria** **G-CONR** Magellan point, County Derry

During a landing on a beach, the aircraft nosed over and suffered substantial damage when it encountered a patch of soft sand in the last half of the rollout.

25 May 2023 **Campbell Cricket** **G-AXVM** A few miles from Wolverhampton Halfpenny Green Airport

The engine cut out at around 1,400 ft. During the subsequent forced landing in a field the rotor blades suffered damage.

28 May 2023 **DHC-1 Chipmunk 22 (Lycoming)** **G-BVZZ** Middle Wallop Airfield, Hampshire

While taxiing to clear the grass runway after landing, the tailwheel aircraft struck the runway marker sign situated at the edge of the peritrack, causing significant damage to the underside of the aircraft.

1 Jun 2023 **Colomban MC-15 CRI-CRI** **G-SHOG** Near Fifehead Magdalen, Dorset

At 400 ft, the left engine stopped and, with an inability to maintain altitude, the pilot made a forced landing in a field. However, he didn't notice a hump in the grass, and the aircraft bounced. During the subsequent, heavy touchdown, the pilot's head shattered the canopy and the landing gear suffered some damage.

5 Jun 2023 **912 Tanarg Microlight** **F-JYEZ** Strathaven Airfield, East Kilbride

The pilot misjudged his takeoff run and the aircraft hit a fence. The wing detached and all the propeller blades suffered damage.

10 Jun 2023 **Zenair CH 601HD** **G-CDDS** Weybourne Airfield, Norfolk

After landing the nose landing gear bungee failed, which caused the nose landing gear to collapse. The nose of the aircraft was damaged and the propeller struck the ground.

11 Jun 2023 **EV-97 Teameurostar UK** **G-MPAT** Chesham, Buckinghamshire

On final approach to Runway 33 the pilot observed the airfield windsock hanging vertically. The aircraft touched down further along the runway than normal and, despite the efforts of the pilot, the aircraft struck a hedge and fence at the end airfield. The aircraft sustained damage to the right wing, propeller and fuselage. After leaving the aircraft the pilot saw the windsock was now indicating a wind of between 5 and 7 kt at 150°.

Record-only investigations reviewed: May - June 2023 cont

13 Jun 2023	**Rotorsport UK Mtosport**	**G-CGDC**	Beccles Aerodrome, Suffolk

During landing the aircraft rolled to the right and slid to a halt on its side. The pilot could not recall whether the aircraft bounced on first touchdown or whether the left landing gear just lifted from the ground. The pilot exited with only minor injuries.

16 Jun 2023	**Skyranger 912(2)**	**G-SKRA**	Bellevue airfield, north Devon

During landing in a slight crosswind, the aircraft drifted to the left, the left wing and main landing gear struck the ground and the aircraft tipped forward onto its nose. The aircraft sustained significant damage.

17 Jun 2023	**Robinson R22 BETA**	**G-TGRD**	Llangoed Hall Country Hotel, Brecon, Powys

Following an uneventful approach, the helicopter was hover-taxiing to the helicopter landing pad when the low rpm warner sounded, and the helicopter started spinning. The pilot lowered the collective lever and landed heavily. The cause of the accident is believed to be a loss of engine power.

22 Jun 2023	**Rans S6-ES**	**G-CETY**	Felthorpe Airfield, Norwich

The aircraft bounced during landing. The nose gear collapsed and the aircraft became inverted.

22 Jun 2023	**Flylight Adam**	**G-NWRD**	Lower Upham Farm, Wiltshire

Just before landing, the aircraft became unstable which resulted in a hard touchdown and then it tipped onto its left side.

26 Jun 2023	**Jabiru UL-450**	**G-ICDM**	Sandown Airport, Isle Of Wight, Hampshire

Control was lost during the landing and the aircraft came to rest in rough ground to the side of the runway.

30 Jun 2023	**Mooney M20E**	**N7423V**	Andrewsfield Airfield, Essex

During a forced landing following a loss of power shortly after takeoff, the landing gear collapsed and the aircraft passed through a fence onto a public road.

Miscellaneous

This section contains Addenda, Corrections and a list of the ten most recent Aircraft Accident ('Formal') Reports published by the AAIB.

The complete reports can be downloaded from the AAIB website (www.aaib.gov.uk).

TEN MOST RECENTLY PUBLISHED FORMAL REPORTS ISSUED BY THE AIR ACCIDENTS INVESTIGATION BRANCH

1/2015 Airbus A319-131, G-EUOE
London Heathrow Airport
on 24 May 2013.

Published July 2015.

2/2015 Boeing B787-8, ET-AOP
London Heathrow Airport
on 12 July 2013.

Published August 2015.

3/2015 Eurocopter (Deutschland)
EC135 T2+, G-SPAO
Glasgow City Centre, Scotland
on 29 November 2013.

Published October 2015.

1/2016 AS332 L2 Super Puma, G-WNSB
on approach to Sumburgh Airport
on 23 August 2013.

Published March 2016.

2/2016 Saab 2000, G-LGNO
approximately 7 nm east of
Sumburgh Airport, Shetland
on 15 December 2014.

Published September 2016.

1/2017 Hawker Hunter T7, G-BXFI
near Shoreham Airport
on 22 August 2015.

Published March 2017.

1/2018 Sikorsky S-92A, G-WNSR
West Franklin wellhead platform,
North Sea
on 28 December 2016.

Published March 2018.

2/2018 Boeing 737-86J, C-FWGH
Belfast International Airport
on 21 July 2017.

Published November 2018.

1/2020 Piper PA-46-310P Malibu, N264DB
22 nm north-north-west of Guernsey
on 21 January 2019.

Published March 2020.

1/2021 Airbus A321-211, G-POWN
London Gatwick Airport
on 26 February 2020.

Published May 2021.

Unabridged versions of all AAIB Formal Reports, published back to and including 1971, are available in full on the AAIB Website

http://www.aaib.gov.uk

GLOSSARY OF ABBREVIATIONS

aal	above airfield level
ACAS	Airborne Collision Avoidance System
ACARS	Automatic Communications And Reporting System
ADF	Automatic Direction Finding equipment
AFIS(O)	Aerodrome Flight Information Service (Officer)
agl	above ground level
AIC	Aeronautical Information Circular
amsl	above mean sea level
AOM	Aerodrome Operating Minima
APU	Auxiliary Power Unit
ASI	airspeed indicator
ATC(C)(O)	Air Traffic Control (Centre)(Officer)
ATIS	Automatic Terminal Information Service
ATPL	Airline Transport Pilot's Licence
BMAA	British Microlight Aircraft Association
BGA	British Gliding Association
BBAC	British Balloon and Airship Club
BHPA	British Hang Gliding & Paragliding Association
CAA	Civil Aviation Authority
CAVOK	Ceiling And Visibility OK (for VFR flight)
CAS	calibrated airspeed
cc	cubic centimetres
CG	Centre of Gravity
cm	centimetre(s)
CPL	Commercial Pilot's Licence
°C,F,M,T	Celsius, Fahrenheit, magnetic, true
CVR	Cockpit Voice Recorder
DME	Distance Measuring Equipment
EAS	equivalent airspeed
EASA	European Union Aviation Safety Agency
ECAM	Electronic Centralised Aircraft Monitoring
EGPWS	Enhanced GPWS
EGT	Exhaust Gas Temperature
EICAS	Engine Indication and Crew Alerting System
EPR	Engine Pressure Ratio
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FAA	Federal Aviation Administration (USA)
FDR	Flight Data Recorder
FIR	Flight Information Region
FL	Flight Level
ft	feet
ft/min	feet per minute
g	acceleration due to Earth's gravity
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
hrs	hours (clock time as in 1200 hrs)
HP	high pressure
hPa	hectopascal (equivalent unit to mb)
IAS	indicated airspeed
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IP	Intermediate Pressure
IR	Instrument Rating
ISA	International Standard Atmosphere
kg	kilogram(s)
KCAS	knots calibrated airspeed
KIAS	knots indicated airspeed
KTAS	knots true airspeed
km	kilometre(s)
kt	knot(s)
lb	pound(s)
LP	low pressure
LAA	Light Aircraft Association
LDA	Landing Distance Available
LPC	Licence Proficiency Check
m	metre(s)
mb	millibar(s)
MDA	Minimum Descent Altitude
METAR	a timed aerodrome meteorological report
min	minutes
mm	millimetre(s)
mph	miles per hour
MTWA	Maximum Total Weight Authorised
N	Newtons
N_R	Main rotor rotation speed (rotorcraft)
N_g	Gas generator rotation speed (rotorcraft)
N_1	engine fan or LP compressor speed
NDB	Non-Directional radio Beacon
nm	nautical mile(s)
NOTAM	Notice to Airmen
OAT	Outside Air Temperature
OPC	Operator Proficiency Check
PAPI	Precision Approach Path Indicator
PF	Pilot Flying
PIC	Pilot in Command
PM	Pilot Monitoring
POH	Pilot's Operating Handbook
PPL	Private Pilot's Licence
psi	pounds per square inch
QFE	altimeter pressure setting to indicate height above aerodrome
QNH	altimeter pressure setting to indicate elevation amsl
RA	Resolution Advisory
RFFS	Rescue and Fire Fighting Service
rpm	revolutions per minute
RTF	radiotelephony
RVR	Runway Visual Range
SAR	Search and Rescue
SB	Service Bulletin
SSR	Secondary Surveillance Radar
TA	Traffic Advisory
TAF	Terminal Aerodrome Forecast
TAS	true airspeed
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Collision Avoidance System
TODA	Takeoff Distance Available
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
USG	US gallons
UTC	Co-ordinated Universal Time (GMT)
V	Volt(s)
V_1	Takeoff decision speed
V_2	Takeoff safety speed
V_R	Rotation speed
V_{REF}	Reference airspeed (approach)
V_{NE}	Never Exceed airspeed
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	VHF Omnidirectional radio Range

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