AAIB Bulletin 2/2025

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(ALL TIMES IN THIS BULLETIN ARE UTC)

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.

Serious Incident

Aircraft Type and Registration:	Boeing 787-8, G-TUIB
No & Type of Engines:	2 General Electric Co GEnx-1B64/P2G01 turbofan engines
Year of Manufacture:	2012 (Serial no: 34423)
Date & Time (UTC):	21 December 2023 at 0830 hrs
Location:	Birmingham Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 10 Passengers - 291
Injuries:	Crew - None Passengers - None
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	62 years
Commander's Flying Experience:	23,499 hours (of which 2,964 were on type) Last 90 days - 105 hours Last 28 days - 61 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

G-TUIB had crossed the Atlantic and was holding to make an approach into Manchester Airport (MAN), on a day of significant weather disruption owing to the high wind conditions that were forecast to affect the northern half of the UK. The commander then elected to divert to the nominated alternate of East Midlands Airport (EMA) but was denied because of capacity constraints at EMA and instead diverted to Birmingham Airport (BHX). On final approach to BHX, the aircraft encountered windshear and carried out a missed approach. A fuel emergency was declared and the aircraft subsequently landed below final reserve fuel after its second approach.

Safety action in relation to diversions and aircraft emergencies has been implemented by both EMA and BHX following their own internal investigations. The actions taken addressed the process for determining and communicating airport capacity for diversions, and prioritisation for aircraft that have declared an emergency.

History of the flight

G-TUIB was operating an overnight flight from Cancun, Mexico, to Manchester Airport (MAN), United Kingdom where it had a scheduled arrival time of 0735 hrs. During the planning stage the crew reviewed the weather and loaded additional fuel to account for strong winds forecast at MAN. The aircraft was not at maximum weight and the crew elected to load an additional 984 kg of fuel.

Flight planning

The weather information provided to the crew before the flight included TAFs and METARs for relevant airports. The amended TAF for MAN was timed at 1758 hrs on 20 December 2023 which covered the period of the expected arrival for the aircraft. The forecast showed low cloud with light to moderate precipitation with westerly winds of 25 kt gusting to 42 kt, but with clouds clearing between 0800 hrs and 1100 hrs.

> *'EGCC 201758Z 2018/2124 27018G28KT 9999 SCT020 PROB40 TEMPO 2018/2023 8000 RA BKN009 BECMG 2023/2101 BKN012 TEMPO 2023/2109 6000 RA -RADZ PROB30 TEMPO 2101/2107 BKN006 BECMG 2103/2106 28025G42KT BECMG 2108/2111 FEW020 PROB30 TEMPO 2109/2122 7000 SHRA BECMG 2116/2119 30020G32KT'*

The TAFs for EMA (EGNX) and for BHX (EGBB) for the same period indicated similar weather conditions.

> *'EGNX 201654Z 2018/2118 26015KT 9999 SCT030 TEMPO 2018/2110 BKN012 TEMPO 2018/2024 27018G28KT 6000 -RADZ BECMG 2100/2103 26020G30KT PROB40 TEMPO 2100/2110 6000 -RADZ PROB30 TEMPO 2108/2118 29030G40KT*

> *EGBB 201654Z 2018/2118 27012KT 9999 SCT030 TEMPO 2018/2021 6000 -RADZ BKN012 PROB30 TEMPO 2018/2024 29015G25KT PROB30 TEMPO 2021/2024 BKN012 BECMG 2100/2103 27015G28KT TEMPO 2100/2110 BKN012 PROB40 TEMPO 2100/2110 6000 -RADZ PROB30 TEMPO 2108/2118 29028G38KT'*

The crew interpreted that there would likely be strong winds on arrival, but mistakenly believed these would dissipate after 0600 hrs. They decided to add some discretionary fuel sufficient to be able to carry out a missed approach and still protect diversion fuel, to account for potential disruption on arrival at MAN due to the strong winds.

The Operational Flight Plan (OFP) stated the final reserve fuel was 1,911 kg and listed EMA as its nominated destination alternate. The minimum diversion fuel to divert to EMA was calculated as 3,217 kg. This included destination alternate fuel and the final reserve fuel. The plan also detailed fuel requirements to divert to other airports. A diversion to BHX required an additional 149 kg. The 984 kg of extra fuel equated to about an additional 15 minutes. As the aircraft was operating below the maximum takeoff and landing weights, significant extra fuel capacity was available to the crew.

MAN has dual runways, left and right, both aligned 05/23. EMA has a single Runway 09/27. BHX has a single Runway 15/33. The Aeronautical Information Publication for BHX includes the following warning:

> *'Due to runway orientation relative to prevailing winds, pilots should anticipate crosswinds and may experience building induced turbulence and wind shear on aerodrome in strong wind.'*

The latter stages of the flight

Once the aircraft reached UK airspace, it descended towards 9,000 ft amsl and pertinent events from this point are shown in Figure 1.

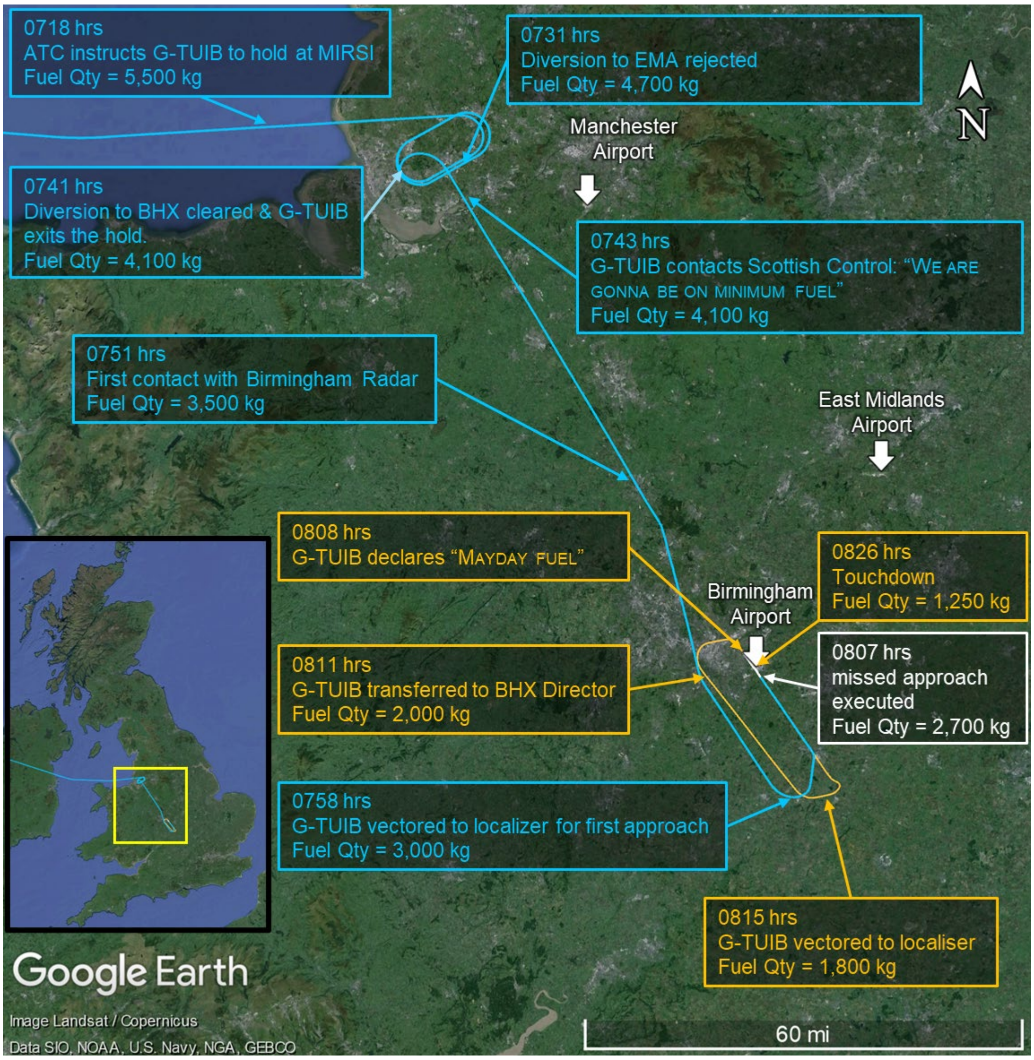


Figure 1

G-TUIB recorded ground track annotated with significant events
© 2024 Google Earth

The Pilot Monitoring (PM) contacted Manchester Radar at 0718 hrs. The controller instructed the crew to hold at MIRSI, and that seven aircraft were ahead in the hold. When the crew asked the length of delay they should expect, the controller responded that there was a queue of arrivals awaiting improvements in the wind and that it was not possible to provide an Expected Approach Time (EAT) since the delay was not known. The runway in use was Runway 23R and the controller reported a surface wind of 280° at 28 kt, with gusts up to 41 kt[1].

Footnote

[1] The maximum crosswind limit for the Boeing 787 during landing is 40 kt. However, various factors, including runway condition and runway width, may affect the crosswind limit. Crews are advised that gusts do not need to be taken into consideration for landing.

The METAR issued for MAN at 0720 hrs reported the same wind conditions and stated good visibility but with broken clouds at 1,400 ft agl and overcast at 2,000 ft agl, with temporary fluctuations bringing rain and broken clouds with a base at 900 ft agl.

At 0723 hrs, ATC passed information that the wind was from 280° at 31 kt, with gusts up to 46 kt to a different aircraft. Another aircraft, which executed a missed approach at MAN, informed Manchester Radar that they experienced windshear on approach and indicated that they would soon need to divert to Birmingham. At this time, the PM of G-TUIB informed Manchester Radar that they could hold for "ABOUT 10 MINUTES BEFORE WE NEED TO THINK ABOUT EAST MIDLANDS".

At 0728 hrs, the PM called East Midlands Radar advising that they may divert to East Midlands Airport (EMA). Three minutes later, the controller responded that they "CANNOT ACCEPT YOUR SIZE AIRCRAFT". The PM subsequently contacted Birmingham ATC, who confirmed they could accept them. The METAR for BHX at 0720 hrs reported the wind from 290° at 21 kt gusting 36 kt.

At 0737 hrs, the PM asked Manchester Radar for a diversion to BHX. Other aircraft were also requesting diversions. When the controller approved the diversion direct to BHX at 0741 hrs and transferred them to Scottish Control, G-TUIB had been holding for around 20 minutes and had 4,100 kg of fuel remaining. The minimum fuel required for a diversion from MAN to BHX would have been 3,366 kg.

Following first contact with Scottish Control, the PM reported that "WE ARE GONNA BE ON MINIMUM FUEL[2]", which the controller acknowledged. During the transit, the INSUFFICIENT FUEL Engine Instrumentation and Crew Alerting System (EICAS) message annunciated; the crew executed the checklist and discussed the consequence of the low fuel situation during the approach brief in case of further delay or a missed approach.

At 0750 hrs, shortly after G-TUIB commenced its diversion, the METAR for BHX stated wind was from 290° at 25 kt with gusts up to 39 kt, and scattered clouds at 2,800 agl. Following transfer to Birmingham Radar, the controller informed the crew that they had 33 nm to run and vectored G-TUIB for an ILS approach to Runway 33 at BHX. The aircraft intercepted the glide path with 2,900 kg of fuel remaining.

At 0805 hrs, with G-TUIB about 3.5 nm from touchdown, Birmingham Tower cleared the aircraft to land and reported the wind was from 300° at 27 kt gusting 37 kt. 1 nm before touchdown, the crew received a windshear warning from the aircraft system at 240 ft agl and, as required under Standard Operating Procedures, the crew commenced a missed approach with 2,700 kg of fuel remaining. During the climb out, on contacting Birmingham Radar, the crew declared "TOM173 REPORTING MAYDAY MAYDAY MAYDAY, TOM173 MAYDAY FUEL". The Birmingham Radar controller then instructed the aircraft to climb to 4,000 ft altitude and vectored G-TUIB for a further ILS, stating a track of 25 nm. The controller then transferred G-TUIB to Birmingham Director.

Footnote

2 The declaration of 'Minimum Fuel' informs ATC that, upon reaching the intended destination, any change to the existing clearance may result in arriving with less than the planned final reserve fuel. 'Minimum Fuel' is an ICAO recognised term, and that ATC should minimise any delays to the aircraft's route where practicable.

While G-TUIB was routing downwind for another approach, the EICAS FUEL QTY LOW message annunciated, and the crew executed the checklist. The controller vectored another aircraft, HA-LZY, which was already on frequency, for its approach to land ahead of G-TUIB. G-TUIB landed with 1,250 kg of fuel remaining, below the final reserve fuel of 1,911 kg indicated on the OFP.

Recorded information

The CVR/FDR had been overwritten, because the aircraft had remained in service following the event. However, the operator's Flight Data Monitoring program had data available from the flight.

While G-TUIB declared a fuel emergency on its first contact with Birmingham Radar after being transferred following the missed approach, the MAYDAY prefix was not used on first contact with Birmingham Director or in any subsequent R/T transmission.

The radar traces showed that Birmingham Director controller vectored another aircraft, HA-LZY, for its approach to land ahead of G-TUIB. HA-LZY was not yet established on the localiser for the ILS and flew through the localiser before it became established at 18 nm. This resulted in G-TUIB flying an additional track distance above the original 25 nm stated by ATC. The data showed that from the point of the missed approach to the point of landing, the actual track distance flown was 53 nm, and 1,450 kg of fuel was used. It was estimated from the recorded data that G-TUIB used about 400 kg of fuel to fly this additional track.

Fuel planning requirements

ICAO Annex 6, Part 1, section 4.3.6.3 outlines the fuel required to be carried. This included:

> *'Fuel planning*
>
> *d) destination alternate fuel, which shall be:*
>
> > *1) where a destination alternate aerodrome is required, the amount of fuel required to enable the aeroplane to:*
> >
> > > *i. perform a missed approach at the destination aerodrome;*
> > > *ii. climb to the expected cruising altitude;*
> > > *iii. fly the expected routing;*
> > > *iv. descend to the point where the expected approach is initiated; and*
> > > *v. conduct the approach and landing at the destination alternate aerodrome;*
>
> *e) final reserve fuel, which shall be the amount of fuel calculated using the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome, when no destination alternate aerodrome is required:*
>
> > *2) for a turbine engine aeroplane, the amount of fuel to fly for 30 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions;*

> *g) discretionary fuel, which shall be the extra amount of fuel to be carried at the discretion of the pilot-in-command.'*

These requirements are captured in AMC1 to Part-CAT.OP.MPA.150(b) Fuel policy.

Part-CAT.OP.MPA.180 *Selection of Aerodromes — Aeroplanes* requires the operator to select at least one destination alternate aerodrome for each instrument flight rules (IFR) flight, except under specific circumstances.

Aircraft emergencies

On declaring an emergency, CAP 413 states:

> *'8.12 Following the initial distress or urgency message, it is permissible for pilots and controllers to use 'MAYDAY' and 'PAN' as a callsign prefix at their discretion, where it is judged that this would have a beneficial effect on the outcome.'*

Fuel emergencies

A Safety Notice[3] outlines a 3-stage escalation process (obtaining delay information from ATC, declaring minimum fuel and declaring a fuel emergency) for crews to follow. SN-2019-002 states:

> *'The term MINIMUM FUEL was introduced by ICAO in 2012 and is used 'to describe a situation in which an aircraft's fuel supply has reached a state where the flight is committed to land at a specific aerodrome and no additional delay can be accepted.*

Recommendations

> *4.1 Operators and ATS providers should highlight during training that MINIMUM FUEL is not an emergency declaration but a statement of fact. Once ATC has responded with delay information (or distance to touchdown), the pilot will determine whether or not to declare a fuel emergency.'*

On fuel shortage, CAP 413 states:

> *'8.29 A pilot's declaration of "MINIMUM FUEL" indicates that no further fuel diversion options are available where the aircraft is committed to land at the pilot's nominated aerodrome of landing with not less than 'final reserve fuel'. However, "MINIMUM FUEL" RTF phraseology is not universally used by every aircraft operator and pilot. Controllers are not required to provide priority to pilots of aircraft that have declared "MINIMUM FUEL" or that have indicated that they are becoming short of fuel.*

Footnote

3 CAA SN–2019/002 *Protecting Final Reserve Fuel,* version 3 dated 24 March 2023. Available at https://www.caa.co.uk/our-work/publications/documents/content/sn-2019-002/ [accessed 4 October 2024].

8.30 Controllers shall respond to a pilot's declaration of "MINIMUM FUEL" by:

1. confirming the estimated delay they can expect to receive expressed in minutes if the pilot is en-route to, is joining, or is established in an airborne hold; or

2. by expressing the remaining track mileage from touchdown if the aircraft is being vectored to an approach.

8.31 Controllers shall respond to a pilot who has indicated that they are becoming short of fuel but has not declared "MINIMUM FUEL", as above but shall then ask the pilot if they wish to declare an emergency.

8.32 Pilots declaring an emergency should use the following RTF phraseology "MAYDAY, MAYDAY, MAYDAY" or "MAYDAY, MAYDAY, MAYDAY FUEL" and controllers shall provide such aircraft with flight priority category A (ICAO Annex 6).'

East Midlands ATC investigation

An internal investigation by East Midlands ATC established that, prior to G-TUIB's request, Scottish Control had spoken to the East Midlands ATC asking which type of aircraft EMA could accept. At 0720 hrs, The ATC assistant spoke directly with the Airfield Operations unit, which is responsible for the monitoring of handling and movement at aircraft stands. Airfield Operations advised ATC that the airport could only accept two Boeing 737-800 or equivalent size and anything else would be dependent upon the ground handling agent capacity at the time of the request.

The radar controller received the request to divert from G-TUIB at 0728 hrs. The ATC assistant (ATCA) confirmed, based on the information provided to him by Airfield Operations, that the airport advised they could only accept B737-800 size aircraft, and the controller informed G-TUIB accordingly at 0731 hrs. Subsequently, at 0736 hrs, the ATCA spoke with the airport Centre Control Room (CCR), which is responsible for the allocation of aircraft stands, and established that the airport could accept a Boeing 787. This was then passed to the radar controller who then sought to contact G-TUIB at 0740 hrs but received no response.

An investigation by East Midlands ATC determined that the channels used to establish what the airport could accept had not resulted in a clear and effective understanding.

Following this event,

East Midlands ATC clarified that:

- the airport's Centre Control Room (CCR) was responsible for communicating the type and number of aircraft that the airport can accept to ATC and,
- any requests for additional or larger aircraft were to be passed to the CCR to make a decision.

Birmingham ATC investigation

An internal investigation by Birmingham ATC established that, at the time that the crew declared a MAYDAY, there were multiple aircraft in the approach sequence. An additional controller position (Birmingham Director), sat beside the Radar controller, had been opened due to the complexity and volume of inbound traffic resulting from the adverse weather

The investigation established that the Director controller sequenced HA-LZY ahead of G-TUIB since HA-LZY was already on frequency when G-TUIB made contact. It concluded that the controller was faced with a complex and high workload scenario which resulted in the opportunity to prioritise G-TUIB while repositioning HA-LZY being missed. This resulted in G-TUIB flying an extended track even though it had declared a fuel emergency.

As a result,

> Birmingham ATC issued an internal Safety Bulletin which emphasised that when an aircraft has declared an emergency:
>
> - controllers provide an aircraft in an emergency with flight priority category A and ensure that it has an uninterrupted approach to the selected aerodrome and rearrange the traffic pattern if necessary and,
> - when it is known that the emergency aircraft is committed to landing at the selected aerodrome, units shall consider the sterilisation of the landing runway.

Analysis

G-TUIB had crossed the Atlantic to make an approach into MAN but diverted to BHX owing to the high wind conditions. The aircraft had previously been denied the option to divert to its nominated airport of EMA. The serious incident was the result of the aircraft declaring a fuel emergency on executing a missed approach in response to windshear on final approach to BHX.

There were strong crosswinds at MAN and, for Runway 23, the wind was 50° off the runway centreline. One aircraft had experienced windshear on the approach while G-TUIB was holding. EMA would have afforded the opportunity to make an approach to Runway 27, substantially more into wind. The approach to Runway 33 at BHX was within crosswind limits for the aircraft but with a wind 40° off the runway centreline. It would have been reasonable to conclude that windshear was a likely threat, in view of what was being experienced at MAN for similar conditions.

Weather Assessment and fuel management

While allowing for the contingencies required by the regulations, operators seek to minimise the carriage of fuel necessary for the flight, owing to the fuel burn penalty from carrying excess fuel. Nevertheless, the crew identified a threat of high winds and the potential for delays on arrival at MAN. Incorrectly believing that the winds would dissipate from 0600 hrs, the commander requested some extra fuel, equivalent to about an additional 15 minutes of fuel. Given the aircraft weights, the crew had the option to load significantly more fuel.

Alternate selection and acceptance

Destination alternate airports are required to be nominated and accounted for in the fuel planning by the regulations. The destination alternate options were listed on the OFP with the additional fuel required above that for the planned alternate and included EMA and BHX. The nomination of an alternate does not guarantee that an aircraft will be accepted except in the case of a declared emergency. Instead, this will be dependent upon the airport's capacity to accept the diversion. On receiving a request for a diversion, ATSU would contact the relevant airport ATC who in turn will speak with the airport's ground agencies to determine stand and ground handling capacity.

EMA identified that the internal communication channels used had not clearly established the capability of the airport to accept an aircraft of the size of G-TUIB, a Boeing 787. This was as a result of ATC speaking directly to the airport Airfield Operations unit instead of the CCR. The consequence of the refusal of East Midlands to accept the requested diversion, meant that G-TUIB made an approach to an airport with significant crosswind and a possibility of windshear on final approach.

Decision-making and emergency handling

On arrival in the Manchester area, the crew ascertained from ATC that there were seven aircraft ahead and it was not possible to be given an EAT. ATC also advised the crew that MAN was also experiencing strong crosswinds and that an aircraft had executed a missed approach owing to windshear. Recognising that continuing to hold would not assure a landing at MAN, the crew made a decision to divert early, thereby helping to protect the extra fuel that remained.

The crew fulfilled the appropriate steps to protect minimum fuel and declared the MINIMUM FUEL on transfer to Scottish Control. Throughout, the relevant ATC agencies and crew had the necessary awareness of the situation.

Following the missed approach at BHX, the crew declared a fuel emergency on Birmingham Radar in accordance with the escalation process for '*Protecting Final Reserve Fuel*.' However, they did not subsequently use the MAYDAY callsign prefix on transfer to Birmingham Director, nor at any stage thereafter, but CAP 413 indicates it is permissible for crews to do so where it is judged that this would have a beneficial effect on the outcome.

Birmingham Director was aware that G-TUIB had declared a fuel emergency, as this had been relayed from the Radar controller, sitting beside him. Consequently, the absence of the use of the callsign prefix by the crew had little material effect with regards to their interactions with ATC. However, it did mean that crews of other aircraft on frequency would have been unaware of G-TUIB's low fuel status.

Extended track following the missed approach

Following the missed approach and declaration of the fuel emergency by the crew, the Birmingham Radar controller advised the crew to expect an estimated track of 25 nm to landing. While the Birmingham Director controller was fully aware of the situation, an internal investigation determined that the controller was faced with a complex and high workload scenario which resulted in the opportunity to prioritise G-TUIB ahead of HA-LZY being missed. The consequence was that G-TUIB used more fuel than anticipated by flying an extended track even though the crew had declared a fuel emergency. The consequential reduction in fuel remaining had the effect of reducing the options available to achieve a safe landing, if the aircraft had encountered windshear on the second approach.

Conclusion

The serious incident was the result of strong winds generating difficult conditions at the time of the arrival of the flight into the UK. The aircraft had departed Cancun with 15 minutes of additional fuel, although significant extra capacity was available. Having diverted from MAN to BHX the aircraft made a missed approach due to a windshear warning on final approach. This was followed by an extended track flown for a further approach because an opportunity to prioritise G-TUIB for an expeditious landing was missed. Safety action has been taken to clarify the process for determining and communicating airport capacity for diversions, and for the prioritisation of aircraft that have declared an emergency.

Safety action

The following safety actions were taken:

East Midlands ATC clarified that:

- the airport's Centre Control Room (CCR) was responsible for communicating the type and number of aircraft that the airport can accept to ATC and,
- any requests for additional or larger aircraft were to be passed to the CCR to make a decision.

Birmingham ATC issued an internal Safety Bulletin which emphasised that when an aircraft has declared an emergency:

- controllers provide an aircraft in an emergency with flight priority category A and ensure that it has an uninterrupted approach to the selected aerodrome and rearrange the traffic pattern if necessary and,
- when it is known that the emergency aircraft is committed to landing at the selected aerodrome, units shall consider the sterilisation of the landing runway.

Accident

Aircraft Type and Registration:	Socata TB-20 Trinidad, N33NW	
No & Type of Engines:	Lycoming IO-540 SER piston engine	
Year of Manufacture:	1990 (Serial no: 1073)	
Date & Time (UTC):	10 October 2023 at 1535 hrs	
Location:	Langham Airfield, Norfolk	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 2
Injuries:	Crew - 1 (Serious)	Passengers - 2 (Serious)
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	47 years	
Commander's Flying Experience:	121 hours (of which 27 were on type) Last 90 days - 3 hours Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by AAIB	

Synopsis

Shortly after taking off from an unlicensed airstrip, the aircraft drifted to the left, struck trees along the side of the runway and decended before striking the ground. A combination of turbulent air from the trees and a tailstrike is likely to have contributed towards the accident. The occupants were all seriously injured.

The position of the trees, in relation to the runway, was less than that recommended for unlicensed aerodromes in CAA Civil Aviation Publication (CAP) 793 '*Safe Operating Practices at Unlicensed Aerodromes*.'

History of the flight

The pilot and two passengers had flown from Nottingham to Langham earlier in the day. The pilot had not flown to Langham before but had visited the airfield two weeks previously, and sought advice from other pilots and the airfield tenant as part of his pre-flight planning.

There was a crosswind during final approach and landing requiring the pilot to 'crab' the aircraft, and after touching down the pilot felt the aircraft drag suddenly to the left during braking. During backtracking along the runway the pilot tested the aircraft's brakes and controls, could not find anything wrong, and did not see any damage to the runway surface that may have been contributory.

Upon embarking on the return flight to Nottingham, the weather was CAVOK with a wind from 230° at 12 kt. The takeoff roll commenced from the threshold of Runway 28 and the pilot recalls reaching 73 kt before the aircraft became airborne without pitch input.

An eyewitness saw the aircraft wheels leave the ground; shortly afterwards the aircraft "appeared to crab to the left" and then later "tip to the left." The passengers "felt a shunt" to the left as if the aircraft had hit something or had encountered a gust of wind. The pilot applied corrective control inputs but as the aircraft became level with the top of trees alongside the runway's edge, the left wingtip dropped and struck several trees. The aircraft descended steeply and came to rest on its left side.

Both passengers were assisted to escape out of the broken windscreen by bystanders, who then forced the right door open to extricate the pilot. Emergency services attended and the occupants were transferred to hospital, having sustained serious injuries.

Accident site

N33NW came to rest just inside the far edge of a wood, approximately 460 m from the threshold of Runway 28 (Figure 1). The left wing and engine had separated from the fuselage, causing a fuel leak. The aircraft's tail section including horizontal stabiliser and fin was attached but had been severely damaged in the accident sequence. The passenger cabin remained largely intact.

Figure 1
Accident site location

Rubber tyre marks matching N33NW's main landing gear were visible along the surface of the runway. They began 240 m from the threshold, continued for approximately 150 m, and corresponded to braking after N33NW's incoming flight. The marks deviated to the left after the left mainwheel crossed a slightly sunken and cracked area of the runway's surface.

Aircraft information

The Socata TB-20 is a low-wing, single engine piston aircraft with seating for up to four passengers (Figure 2). It has a 9.85 m wingspan and retractable landing gear.

The TB-20 standard airspeeds are: rotation 68 KIAS, initial climb 75 KIAS and optimum climb speed 95 KIAS. The manufacturer's takeoff settings for flaps are 10° and the aircraft is fitted with a manually operated rudder trim control, with a TAKE OFF setting to account for left yaw.

Maximum takeoff weight is 1,400 kg and at the time of the accident it was estimated the aircraft weighed 1,257 kg. The calculated takeoff roll at this weight is 232 m.

Figure 2
Socata TB-20 N33NW (used with permission)

Aircraft examination

The main wheels turned freely, and the tyres showed some wear and light flat-spotting typical of normal operation. The parking brake rotary switch was set to the 'off' position.

The underside of the tail cone had abrasion damage consistent with the tailcone being in contact with the runway during a tailstrike rather than impact damage with trees. (Figure 3) The pilot confirmed the damage was not present prior to the flight.

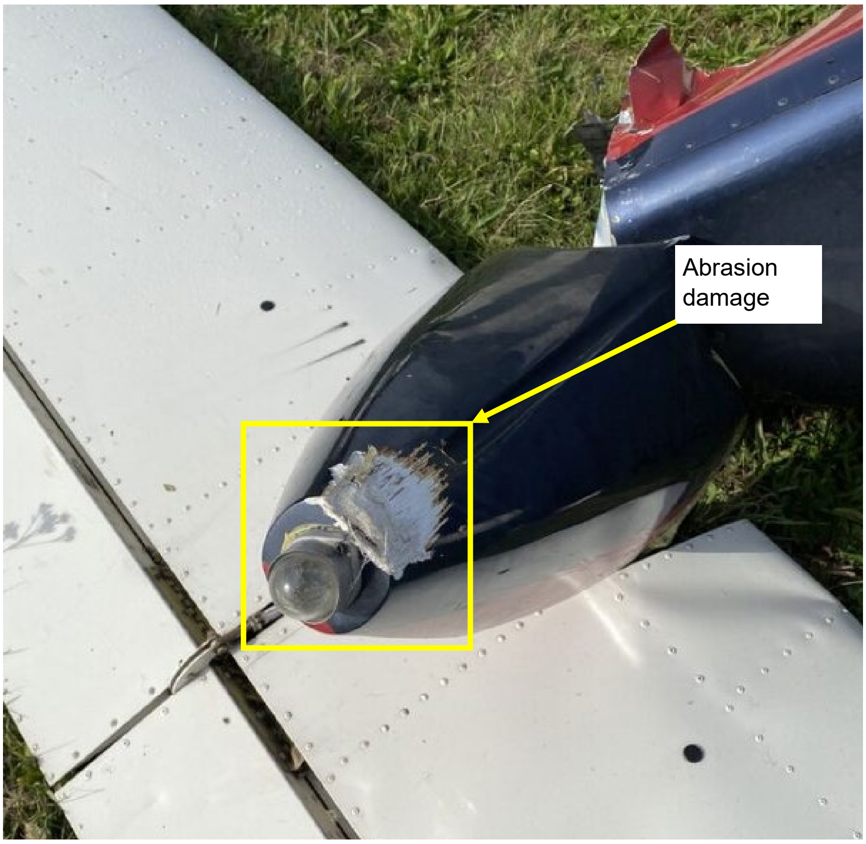


Figure 3
Tailstrike damage to the underside of the tailcone

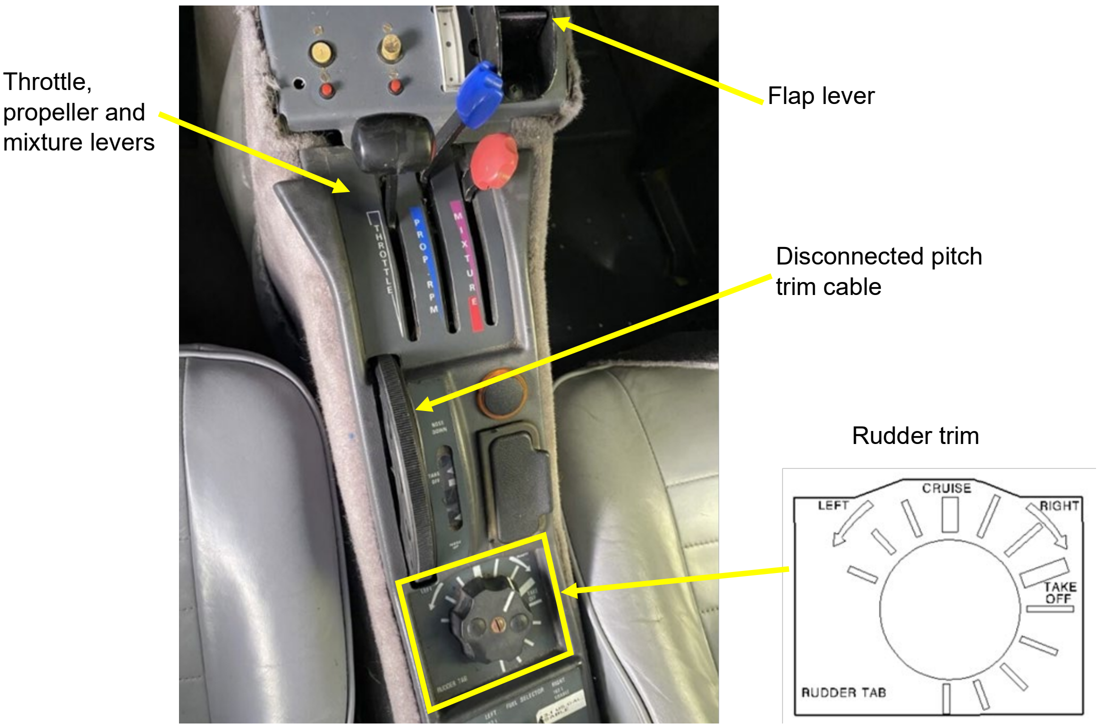


Figure 4
Control positions post-accident

Damage to the propeller indicated that it was under power at the time of the accident, and the throttle, propeller rpm and mixture levers were all fully forward which are the normal positions for takeoff (Figure 4).

Both flaps were extended to the takeoff setting of 10°, matching the flap operating lever's position. The rudder trim rotary switch was set to just over half-way between the CRUISE (0°) and TAKE OFF (10°) position. Due to rudder structural damage the rudder trim tab's position could not be correlated with the switch position. The pitch trim cable had come away from the control wheel, likely due to damage sustained during the accident sequence. Damage sustained to the tail meant that the positions of the pitch trim indicator, stabilator and anti-servo tab could not be correlated.

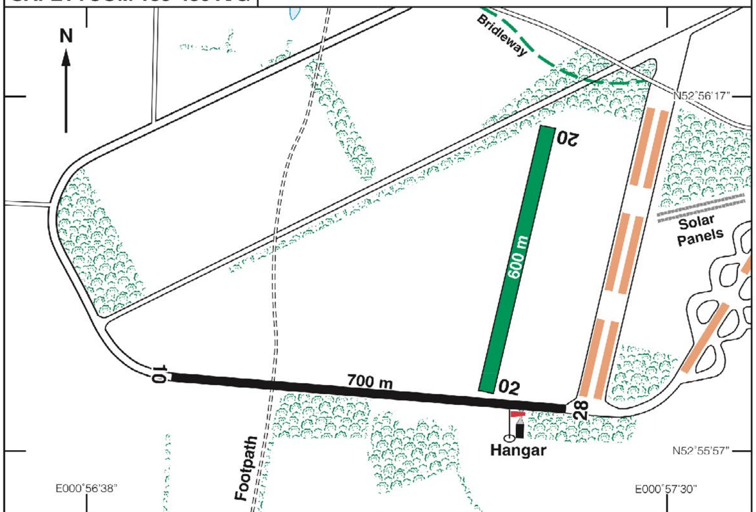
Aerodrome information

Langham is an unlicensed aerodrome located on the southern periphery of a disused airfield. Runway 28 is 700 m long, 15 m wide, and is part of the old airfield's concrete perimeter track. The runway's surface condition is varied along its length with some pothole and cracking damage. Its alignment is nearly perpendicular to the prevailing south-westerly winds. The Pooley's plate for Langham (Figure 4) shows the trees along the southern edge of Runway 10/28 and notes *'Airfield not suitable for inexperienced pilots due to obstructions.'*

N52 56.30 E000 57.38 **LANGHAM** 120ft AMSL

9 nm W of Sheringham.

SAFETYCOM 135·480 A/G



Rwy	Dim(m)	Surface	TORA(m)	LDA(m)	Lighting
10/28	700x15	Concrete	Unlicensed		Nil
02/20	600x18	Grass	Unlicensed		Nil

Op hrs: PPR by telephone. SR-SS.

Landing Fee: £20. **Customs:** Nil.

Hangarage: Nil. **Maintenance:** Available.

Remarks: Operated by H. Labouchere Esq. PPR.
No circuits.
Mast (lit) 98ft, 250m N of Rwy 20 threshold and very close to final approach on Rwy 20.
NE section of airfield is disused.
Airfield not suitable for inexperienced pilots due to obstructions.

Caution: Trees and Huts on approach to Rwy 28.

Figure 5

Langham airfield plate (Pooley's Flight Guide)

Runway 10/28 is lined by tall trees along much of its southern side (Figure 5). The trees at the runway's mid-point are approximately 9 to 10 m tall and are 3 m from the runway's edge, while those at the threshold of Runway 28 are in excess of 20 m tall.

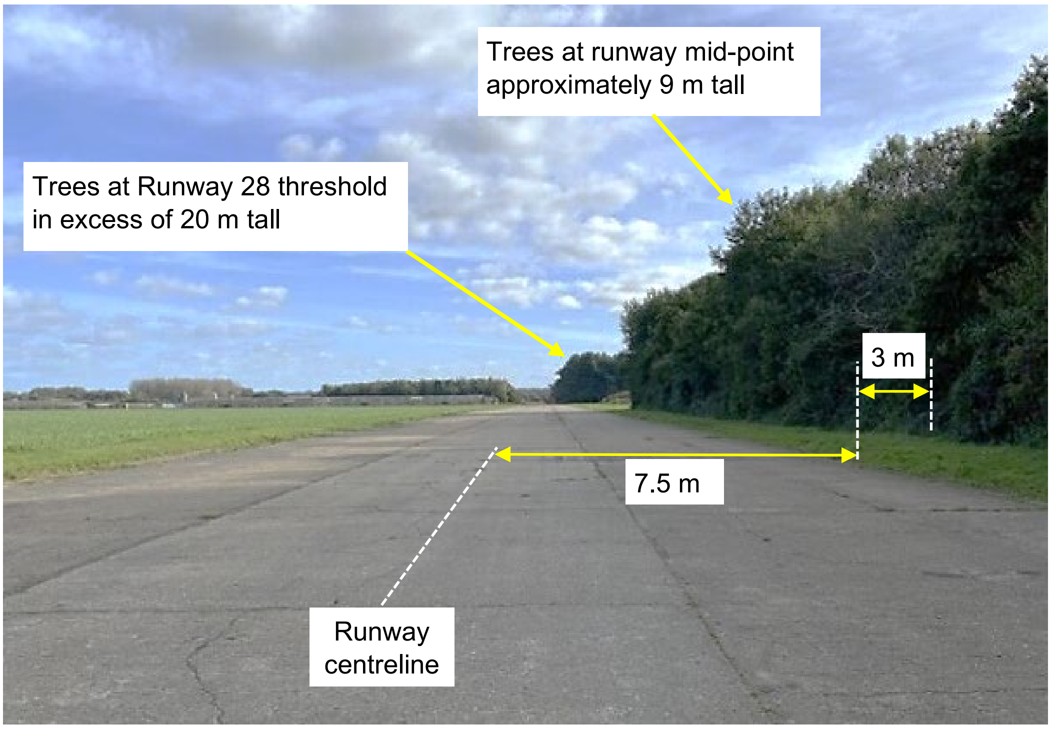


Figure 6

View along Runway 10, towards the threshold of Runway 28

Pilot information

The pilot held a valid Single Engine Piston rating and had flown a total of 121 hours, 10 of which were in the preceding 12 months. His flying comprised a mixture of circuits, local flights and rating revalidation.

CAA publications

CAP 793 '*Safe Operating Practices at Unlicensed Aerodromes*'[1] specifies the recommended minimum dimensions of the runway, and distances of obstacles from the runway. For the operation of light aircraft such as N33NW the minimum runway width is 18 m and with regard to obstacles it states:

> *'No vertical obstacles within 25 m either side of centre line. Runway end obstacles (hedges etc.) not above 2 m high.'*

Footnote

[1] Civil Aviation Authority publication CAP 793, Issue 1, June 2010, www.caa.co.uk/CAP793 [accessed December 2024].

CAP 793 also contains information on the effects that nearby obstacles such as trees can have on winds:

> *'Aerodrome operators and pilots should investigate and be aware of the effect of various wind directions on operations, considering wind shear, roll over from trees and buildings on the aerodrome.'*

CAA Safety Sense Leaflet 12 – *'Strip Flying'*[2] provides advice to pilots on runway orientation and weather conditions:

> *'Strips will often be oriented around whatever the constraints of local agriculture and topography will allow, rather than the prevailing winds. Crosswinds and rotor turbulence from obstacles may therefore be common.'*

> *'Determine the weather conditions under which it is safe to use a strip and do not commence the flight unless these will be met. It may be that a particular strip is straightforward on a calm day but suffers from challenging low-level turbulence in higher winds.'*

Analysis

Langham airfield is described as not suitable for inexperienced pilots due to obstructions, referring to trees and huts on approach to Runway 28 and a mast on the approach to Runway 20. This does not specifically include the trees adjacent to the edge of Runway 28 along its length. The pilot had conducted detailed pre-flight planning including seeking advice from other airfield users as well as visiting the airfield in advance to become aware of its features. He had conducted a successful approach and landing on the incoming flight.

Upon departing, the aircraft accelerated to its takeoff speed within the expected takeoff roll distance, indicating that there were no engine performance or braking issues before becoming airborne.

During the takeoff or the early climb it is likely that the tail struck the concrete runway as the pilot did not recall having seen the damage prior to flight. The pilot subsequently disagreed with this analysis, but the evidence still suggests this is a contributory factor to the accident. The passengers remembered feeling as if the aircraft had hit something or been caught by a gust of wind as it took off, but neither the passengers or pilot were aware of a tailstrike. It is probable that as the aircraft became airborne it encountered some form of turbulent air in the lee of the trees from the crosswind. As the pilot applied corrective control inputs, the combination of encountering turbulent air and a tailstrike is likely to have led to the aircraft entering an unstable climb.

Footnote

2 Civil Aviation Authority Safety Sense Leaflet 12: Strip Flying, May 2022 caa8230_safetysense_12-strip-flying_v12.pdf [accessed December 2024].

The distance between the left wingtip and the trees was 5.5 m with the aircraft on the runway centreline. This is less than the minimum distance recommended within CAP 793 which, although not mandatory, would have been 15 m. The aircraft was seen to drift left after becoming airborne, it is possible that the rudder trim position set to approximately half the manufacturer's TAKE OFF setting was contributory, but it was not possible to confirm the cause. During the climb the margin between the wingtip and the trees was then reduced to an extent that the pilot was unable to recover the aircraft's position before striking the trees.

CAA Safety Sense Leaflet – *'Strip Flying'*[3] includes information on approach challenges, which is also applicable during takeoff:

> *"Strips will often be oriented around whatever the constraints of local agriculture and topography will allow, rather than the prevailing winds. Crosswinds and rotor turbulence from obstacles may therefore be common."*

Pilots flying to unfamiliar or unlicensed airfields are encouraged to consider how the effects of features particularly close to a runway such as trees and buildings may further reduce expected safety margins.

AAIB comment

Pilots flying to unfamiliar or unlicensed airfields are encouraged to consider how the effects of features, particularly close to a runway, such as trees and buildings identified during pre-flight planning may further reduce expected safety margins in the event of an unexpected flight situation developing. CAA CAP 793 and Safety Sense Leaflet 12 provide information to assist with pre-flight planning.

Footnote

3 Civil Aviation Safety Sense Leaflet 'Strip Flying (SS12), https://www.caa.co.uk/media/cwjom2ph/safetysense_12-strip-flying.pdf [accessed December 2024].

Accident

Aircraft Type and Registration:	UAS Malloy Aeronautics T005	
No & Type of Engines:	4 Electric T-Motor Engines	
Year of Manufacture:	2024 (Serial no: 31)	
Date & Time (UTC):	2 April 2024 at 1530 hrs	
Location:	White Waltham Airfield, Berkshire	
Type of Flight:	Experimental test flight	
Persons on Board:	Crew - None	Passengers - None
Injuries:	Crew - N/A	Passengers - N/A
Nature of Damage:	UA damaged beyond economic repair	
Commander's Licence:	General line of sight certificate (GVC)	
Commander's Age:	33 years	
Commander's Flying Experience:	177 hours (of which 2 were on type) Last 90 days - 3 hours Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

Synopsis

During a test flight to validate a flight control software update, the UA climbed and veered left. It then descended and struck two unoccupied General Aviation (GA) aircraft, coming to rest underneath the second. The UA was destroyed.

The operator's investigation identified that the UA lost control due to the software commanding more thrust than needed for level flight. Several technical, process and human performance factors contributed to the accident.

The operator has taken thirteen safety actions to prevent reoccurrence.

History of the flight

A test flight was being conducted to validate a software update, which implemented visual tracking and following capability when flown in AUTO mode. The Remote Pilot (RP) was assisted by Command Unit Operator (CUO) and a Competent Observer (CO). The flight was being operated under the Open A3 Category.

The flight was planned to take place at White Waltham Airfield, within the area (shown in white in Figure 1) designated for use as a UA site by the airfield and at least 150 m away from any buildings. After the airfield granted the operator permission for the flight, the operator's flight team prepared the UA and conducted a team briefing and a set of pre-flight checks.

After being powered on, the UA was unable to acquire a GNSS signal, preventing a geofence, which mirrored the white area shown in Figure 1, from being applied. The RP decided to proceed with the flight on the basis that several means to activate the Flight Termination System (FTS) were available in case of an emergency.

The team launched the UA and completed a short flight which validated the STABILISED, ALT HOLD and LOITER flight modes. The UA was then repositioned. The RP launched the UA and, when he selected the AUTO mode, the UA climbed and veered left.

The RP was reported to have shouted "kill, kill, kill" and attempted to activate the FTS from his controller, which was not successful. The RP then used the backup controller to activate the FTS, which was successful. The RP and CUO then lost sight of the UA as it descended to the ground, with the CUO and CO both hearing "an impact with what they assumed to be one of the unoccupied General Aviation aircraft" parked outside a nearby hangar.

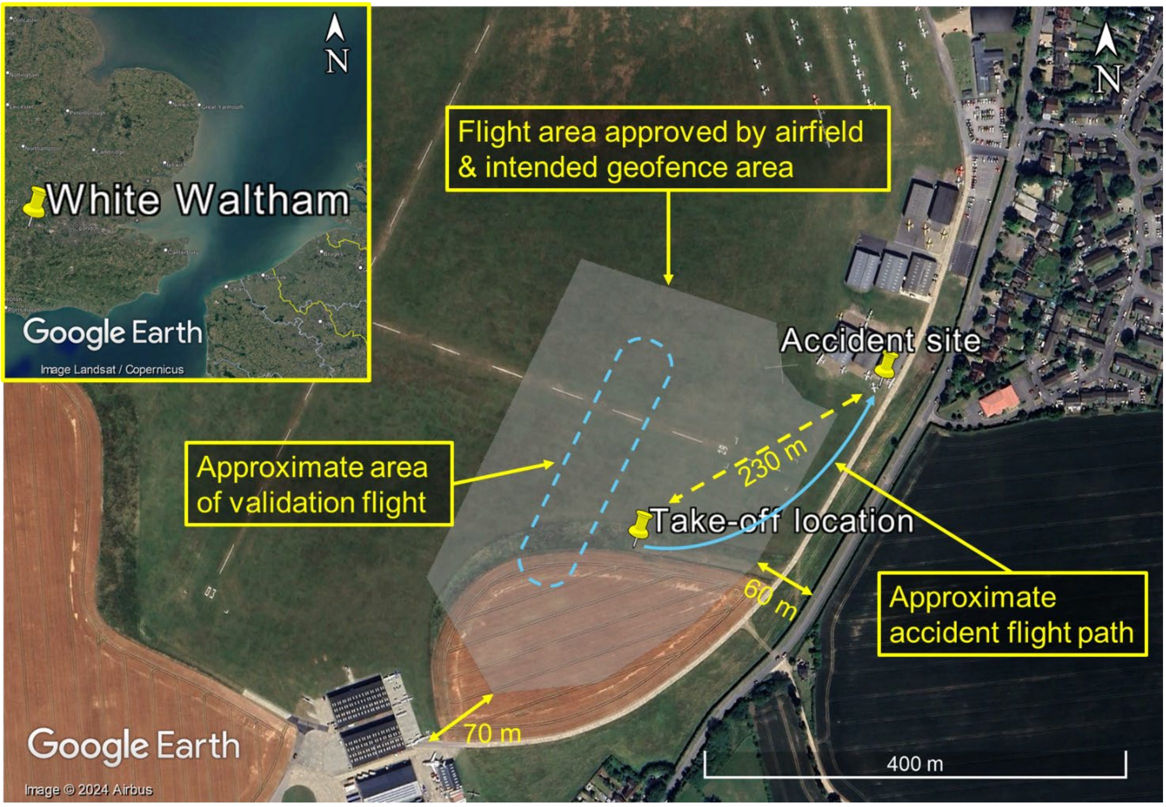


Figure 1

White Waltham Airfield and designated UA area
© 2024 Google, Image © Airbus

Accident site

The UA was found beneath a parked aircraft (Figure 2) about 230 m from the launch site, and about 50 m outside of the geofence normally used by the operator for flights at this location. The UA was damaged beyond economic repair and there was minor scratching to the aircraft.

Figure 2

The UA at the accident site, beneath a parked and unoccupied aircraft

Damage was later found to another parked aircraft, which was near to the aircraft partly seen in Figure 2. There was a hole in the outboard edge of the left horizontal tailplane, and a small component from the UA was found inside it (Figure 3).

Figure 3

Damage to the second parked aircraft (left), with debris removed belonging to the UA (right)

Recorded information

Log files from the UA indicated a sharp increase in throttle, which corresponded with a left roll and pitch up. The FTS activated about 10 seconds later, and the UA struck the parked GA aircraft about a second after.

Due to GNSS reception issues, the recorded GPS track indicated sudden position changes and only captured part of the successful validation flight. This data was therefore not used for the AAIB's investigation.

Aircraft information

The T005 is an in-development quad-motor UA with a MTOM of 4.5 kg, intended to carry a payload. It is a smaller variant of the Malloy T150 and was being developed to meet an urgent operational requirement.

Flight Termination System (FTS)

The RP operated the UA using a primary controller, connected to a laptop. By disconnecting the primary controller, control would 'fail-over' to his backup controller. If control was not possible with this controller, the FTS could have been commanded remotely by the CUO.

Whilst using the primary controller, the FTS could only be commanded with AUTO mode deactivated, because FTS commands from the primary controller were ignored when in AUTO mode. On the backup controller, the FTS could be operated in any flight mode. This was unique to the T005; on all other UAs produced by the operator the FTS activated regardless of the selected flight mode.

Personnel

The RP had 177 hours as a UA pilot. He had about 2 hours on the T005 type, mostly from simulator experience. He did not have any recent T005 experience when the accident occurred but had logged 1 hour of UA flying in the 28 days before the accident.

The investigation learned that the RP had about 5 minutes of FTS training in a simulator, although he was not aware that FTS commands from the primary controller were ignored in AUTO mode.

The CUO had 7 hours experience at the time of the accident.

The CO developed the visual tracking software being tested on the UA and was responsible for operating this software through a computer connected via a telemetry link to the UA on the accident flight.

Operating Safety Case

The operator held a CAA Operational Authorisation (OA) for Specific Category[1] operations, which referenced the operator's Operating Safety Case (OSC). The OSC documented the relevant procedures and safety checks, including geofencing requirements.

Footnote

1 https://www.caa.co.uk/publication/download/21784, CAA CAP722 Section 2.2.2 [accessed December 2024].

The investigation learned that the T005 test flights were not subject to the OSC and were being operated in the Open A3 Category[2].

Requirements under the Open A3 Category

Rule UAS.OPEN.040 of UK Regulation (EU) 2019/947 requires that UA operation in the Open A3 Category:

> *'(2) be conducted at a safe horizontal distance of at least 150 metres from residential, commercial, industrial or recreational areas'*

UAS.OPEN.040 refers to UK Regulation (EU) 2019/945 which specifies additional requirements for built-in geo-awareness functions, depending on the UA Class[3]. However, this Regulation does not come into effect until 1 January 2026, meaning geofencing was not required to fly the T005 UA under the Open A3 category.

Operator's investigation

Following the accident, the operator temporarily grounded the T005 configuration involved in the accident until it had completed an internal investigation, which also included a review of its investigation processes following a safety occurrence.

Technical findings

The operator found that hardware simulation testing with the updated AUTO mode software used a flight model from an off-the-shelf UA which had a lower power to weight ratio and slower throttle response than the T005. In the AUTO mode, the software demanded more throttle than was needed for the UA to maintain height.

Software feedback loops were found to be poorly tuned, resulting in the motors responding too slowly to re-stabilise. The software implemented a roll angle limit of 60°, which the UA remained at until it struck a parked aircraft. In the larger T150, a limit of 30° is used.

The operator found that geofencing could not be applied due to poor GNSS reception, caused by interference from additional processing hardware fitted to the UAs chassis.

> As safety action to prevent reoccurrence of these issues, the operator has introduced four technical changes to the T005; the details of these are listed at the end of this report.

Footnote

2 https://www.caa.co.uk/publication/download/21784, CAA CAP722 Section 2.2.1 [accessed December 2024].

3 https://regulatorylibrary.caa.co.uk/2019-945-pdf/PDF.pdf (Part 4 is applicable to Class C3 UAs, which is the category applicable to the T005) [accessed December 2024].

Process findings

The operator's Configuration Management process required configuration changes to UAs, such as payload changes or software model changes, to be supported by an associated 'Modification Management Form' (MMF). Specific changes required to support or deliver the scope of the MMF were managed via an Engineering Change Request (CR) process.

The operator found that an MMF to deliver the updated AUTO mode had not been completed, because the developers believed that the original MMF for the initial AUTO mode implementation was a sufficient application of the process to also encompass the update.

The operator's investigation also identified that there was no structured pre-flight check or Test Readiness Review before the flight test of the updated AUTO mode took place. At the time of the accident, there was no role defined to oversee test flight operations for the operator's development aircraft or ensure that changes implemented during development were appropriately assessed through the operators MMF and CR processes.

The pre-flight process included a step for briefing of emergency procedures and responses. The operator's investigation determined that the briefing was held, but it did not discuss emergency procedures to the level necessary for a developmental UA such as the T005.

> To address these issues, the operator has taken safety action to improve its change management process, and has reviewed and updated its procedures, personnel training and internal oversight. The detail of the action taken is documented at the end of this report.

Activation of the FTS

The operator told the AAIB that FTS operation is normally tested in the hangar before each flight, and that this test was successfully carried out before the accident flight. The operator stated that both the CUO and the CO were familiar with the FTS activation process on the T005.

Although the flight test team did not believe that the FTS had activated when the RP switched to the backup controller, flight logs showed that the FTS function activated successfully.

Other information

Previous T005 test flights

Before the accident flight, the same flight plan at the same location had recently been flown by another RP who held a more senior role (referred to as the 'senior RP' in this report). The AAIB learned that this earlier flight did not use geofencing, instead relying on two layers of FTS. The senior RP had been briefed on the requirement to deactivate AUTO mode before using the FTS, but it is unclear if his training made clear the importance of this step.

The AAIB was informed that the RP involved in the accident flight initially intended to abort the flight due to the poor GNSS reception preventing geofencing from being applied.

Subsequently, he was informed that there had been a previous T005 flight flown successfully without geofencing, and that as they were flying under the Open Category, they were not subject to the OSC. The operator's investigation report also noted that the flight team was delivery-minded in meeting the urgent operational requirement, and that their understanding of the previous T005 flight was reported to have alleviated the RP's concerns, subject to a ground test to verify that both FTS activation methods functioned.

Analysis

The accident flight

The accident occurred because the software commanded too much throttle when the UA entered AUTO mode, and the feedback response was too slow to correct it. This occurred because the flight model used in AUTO mode was not appropriate for the T005's thrust-to-weight ratio, and the throttle feedback response parameters were not optimised. The UA was able to enter a 60° roll because this was the limit defined in the flight model.

Application of emergency procedures

When the RP attempted to activate the FTS from the primary controller, he was unable to terminate the flight in a timely manner because the software ignored the FTS command when in AUTO mode. The RP was likely not familiar with the FTS activation procedure specific to the T005, which differed in that it required the AUTO mode to be deactivated first. Since this behaviour was different to that of the operator's other UA types, this may have led to the RP becoming startled when the UA appeared to not respond to the FTS command.

When the RP shouted "kill, kill, kill", the CUO could have activated the FTS on the remote controller before the RP did so using the backup controller. The CUO was likely not 'primed' to activate the FTS promptly, and so did not immediately do so when prompted by the RP. Although the CUO knew how to operate the FTS, thorough pre-flight briefings can serve as an effective situational awareness tool and provide an aide-memoire for the expedient execution of those procedures when needed.

Decision to fly without a geofence

When the RP could not activate geofencing on the UA, it was reported he initially intended to abort the flight, despite the urgent operational need. His subsequent decision to continue was likely influenced by learning of a previous T005 flight that took place without geofencing, and also that they were flying under the Open Category with an understanding that geofencing was not required. The intended area for the test flight was at least 150 m from other activities on the airfield. In addition, other mitigations were available, such as having at least two functioning methods to activate the FTS.

Although the RP ensured that a redundant means of activating the FTS was available prior to flight, this mitigation was degraded by the UA's software ignoring FTS commands from the primary controller when in AUTO mode.

Management of change

The updates implemented into the initial version of the AUTO mode had not been supported by a second MMF. This precluded the opportunity for stakeholders to identify and assess any technical or safety risks associated with the update to the software.

To deliver updated safety-critical capabilities in a controlled manner, development projects rely on robust Change and Quality Management Systems. Such processes normally involve an accountable manager, such as a chief test pilot, to provide internal oversight and approval for delivery of new or modified capability in a safe way.

Conclusion

The accident occurred because, when AUTO mode was activated, excessive throttle was commanded by the flight control software which caused the UA to veer to the left. The operator identified that the software commanded excess throttle because the flight model and feedback loops were inappropriately tuned.

The flight team were unable to activate the FTS in a timely manner, in part because the pre-flight briefing did not sufficiently prepare them for enacting the emergency procedures, and because the software was designed to ignore FTS commands from the RP's primary controller when in AUTO mode. However, the FTS did successfully activate when invoked from the backup controller.

Although the RP initially refused to operate the flight when the geofence could not be applied, his decision was swayed by the fact that the geofencing is not required for Open Category flight, and because a previous T005 flight had taken place where a geofence was not used.

Safety actions

The operator has taken the following technical-related safety action:

The operator has:

- Replaced the throttle controller used in AUTO mode with a dynamic controller, to automatically adjust throttle based on measured response to throttle inputs.
- Adjusted the maximum bank, pitch and roll limits in AUTO mode to 30° for initial testing, which will be stepped up in 10° or 15° steps as the test program matures.
- Modified the T005 UA control software, so that FTS messages from the primary controller are no longer ignored when in auto mode.
- Relocated the GNSS receiver to the flank of the UA, where there is less interference to GNSS signals from other equipment onboard the UA.

The operator has taken the following personnel and process related safety action:

The operator has:

- Updated the pre-flight checklist to include a step requiring the RP to review the Quick Reference Handbook and emergency procedures. This includes procedures applicable to activating the FTS, specific to the UA type to be flown.
- Started to manage simulators using the MMF change process, to ensure that the simulators and test systems appropriately represent the final product.
- Reviewed and strengthened its Emergency Response Plan.
- Retrained its flight test team regarding requirements for operation in the Open Category, with focuses including the application of geofencing and the process to obtain an exemption from the Chief Test Pilot.
- Taken steps to minimise exposure of RPs and CUOs to commercial pressures to operate a flight, including empowering RPs to conduct a risk assessment to support their decision not to fly if they feel it is not safe to do so.
- Updated the MMF to include dedicated sections for; identifying and describing the modification, assessing the change scope and operational safety impacts, and capturing the relevant stakeholder reviews and authorisation.
- Updated the MMF to clarify roles and responsibilities of stakeholders involved in the change process.
- Updated their Change Management training syllabus to capture how roles interact with the MMF, steps to be followed within the change management process, and when the MMF and CR process must be followed.
- Appointed an Aviation Lead to provide oversight of aviation operations, flight safety, risk management, operational authorisation and regulatory compliance within the company.

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.

Record-only investigations reviewed: November - December 2024

23 Sep 2023 **Thruster T600N 450** **G-CBKG** Near Wellesbourne, Warwickshire

The aircraft was descending to land at Wellesbourne when the engine began to splutter and then stopped. Unable to re-start the engine, the pilot completed a successful forced landing into a field close to the airfield. After landing the pilot found that the coupling that held the carburettor onto the engine had come off. The pilot reported that when the coupling was removed the rubber was soft and pliable, however a subsequent laboratory assessment of the coupling found the material properties to be conforming to specification. A cause for the coupling becoming dislodged could not be determined.

19 Apr 2024 **Beech B60 Duke** **N82EC** Ronaldsway Airport, Isle of Man

On approach the pilot observed a no gear down indication. Despite cycling the selector there was still no sound from the gear motor or doors, and no green lights. Prompted by ATC to check the gear, the pilot performed a go-around during which he observed yellow fuel warnings. Concerned with the risk of ditching over the sea due to lack of fuel, rather than perform further airborne fault finding, the pilot performed a successful gear-up landing on the grass area north of Runway 26. The engineering investigation determined the gear did not deploy due to a faulty gear motor.

18 Jul 2024 **DHC-1 Chipmunk 22** **G-BFAX** Hamilton Airfield, Kent

After takeoff the engine power reduced to zero despite full throttle being applied. The pilot landed back on the runway but was unable to stop before contacting a livestock fence at the end of the runway. The aircraft was substantially damaged, but the pilot and passenger only sustained minor injuries.

20 Jul 2024 **Piper PA-38-112** **G-ETBT** Newhall Mains Airfield, Cromartyshire

The aircraft floated 100 m down the runway touching down late, and the pilot immediately braked. The recently qualified pilot was familiar with the airfield and aware of a bank at the end of the runway, so applied power and pulled up to clear the bank. The aircraft pitched up, stalled and came to rest in a cropped field, substantially damaging the nose and propeller.

31 Aug 2024 **Casa 1-131E Series 2000** **G-CIUE** Near Syerston, Nottinghamshire

Whilst in cruise, the engine speed momentarily dropped, then did not respond to throttle inputs as expected, before decreasing to idle. The pilot made a forced landing in a field containing crops and the aircraft nosed over.

Record-only investigations reviewed: November - December 2024 cont

15 Sep 2024 **Cessna 152** **G-CMAH** Near Buntingford, Hertfordshire

During a training flight, as the student was initiating a climb from about 1,500 ft agl, the engine started to run roughly. Carburettor heat had been used in the descent prior to this manoeuvre. The instructor immediately took control of the aircraft but was unable to stop the engine's deteriorating performance and maintain altitude. A forced landing was made, with limited field options given the low altitude, during which the nosewheel dug into the soft mud of a ploughed field, flipping the aircraft onto its back.

15 Sep 2024 **Marquart MA5 Charger** **G-BHBT** Near Goodwood Aerodrome, West Sussex

During flight, the pilot noticed that the pushrod that connected the lower and upper right ailerons was streaming behind the aircraft at approximately 45°, having detached at its lower end. The pilot reported that control of the aircraft was not affected but he made the decision to immediately return to Goodwood Aerodrome, where the aircraft landed uneventfully. The pushrod had fractured in fatigue in the threaded section at the lower pushrod fork end. The cause of the crack initiation was not determined.

20 Nov 2024 **Ikarus C42 FB80** **G-PAPI** Solent Airport, Hampshire

The aircraft was landing on Runway 23 at Solent airport. The crosswind component was 15 kt (from the right), which is one knot lower than the maximum crosswind demonstrated for the aircraft. The pilot reported the wind was somewhat gusty. The low afternoon sun impeded the pilot's visual references. The aircraft drifted to the left during the landing roll, striking a runway edge light which caused the nose landing gear to collapse. The aircraft came to rest at the edge of the runway.

6 Dec 2024 **Pegasus Quik** **G-CDFO** Balado Airfield, Kinross-shire

On landing, after a short training flight, the aircraft bounced and the student applied power whilst easing the control bar forward. However, there was not enough lift and the aircraft landed heavily causing the nosewheel to collapse.

23 Dec 2024 **Guimbal Cabri G2** **G-SHRU** Bicester Aerodrome, Oxfordshire

The helicopter landed hard, bounced, landed again and remained upright. Both skids were damaged.

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

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.

1/2023 Leonardo AW169, G-VSKP
King Power Stadium, Leicester
on 27 October 2018.

Published September 2023.

2/2023 Sikorsky S-92A, G-MCGY
Derriford Hospital, Plymouth, Devon
on 4 March 2022.

Published November 2023.

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