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Safety Investigation Report

Ref. AAIU-2021-10-09-01
Issue date: 17 July 2025
Status: Final

Scope: Limited

As per ICAO Annex 13 and EU regulation EU 996/2010, decisions regarding whether to conduct a civil aviation safety investigation, and the extent of an investigation, are based on many factors, including the level of safety benefit expected to be drawn from such an investigation.
For this occurrence, a limited-scope, fact-gathering investigation and analysis was conducted in order to produce a short summary report. The investigation mainly focussed on the actions and conditions directly relating to the occurrence and might not cover all aspects of the aircraft operation and/or possible underlying safety factors due to the expected safety benefit of it and/or the extent of evidence/resources available.

SYNOPSYS

Occurrence class	Accident
Occurrence category	Powerplant failure or malfunction (SCF-PP)
Date and time[1]	Saturday 9 October 2021 12:20 UTC
Location	Field in Beernem – West Flanders – Belgium – N51° 9' 10.465'' E003° 23' 31.654''
Aircraft	Diamond Aircraft Industries DA40D
Aircraft category	Fixed wing - Small aeroplane (MTOW ≤ 5700 kg)
Location of departure	Airport of Ostend (EBOS)
Planned destination	Airport of Ostend (EBOS)
Type of operation	Non-commercial - Flight Training - Cross-country - Dual
Phase of flight	Maneuvring
Injuries	None
Aircraft damage	Substantial

What happened

During a training flight, the engine power decreased and stopped, forcing the crew to perform an emergency landing.

[1] All time data in this report are indicated in UTC, unless otherwise specified

1 THE OCCURRENCE

The airplane took off from Ostend Airport with an instructor and a trainee on board for a navigation flight – flying to Geraardsbergen, then Lokeren. After the navigation part, the flight concluded with an exercise of simulated forced landing. The location for the exercise was to the North West of the Ursel airfield.

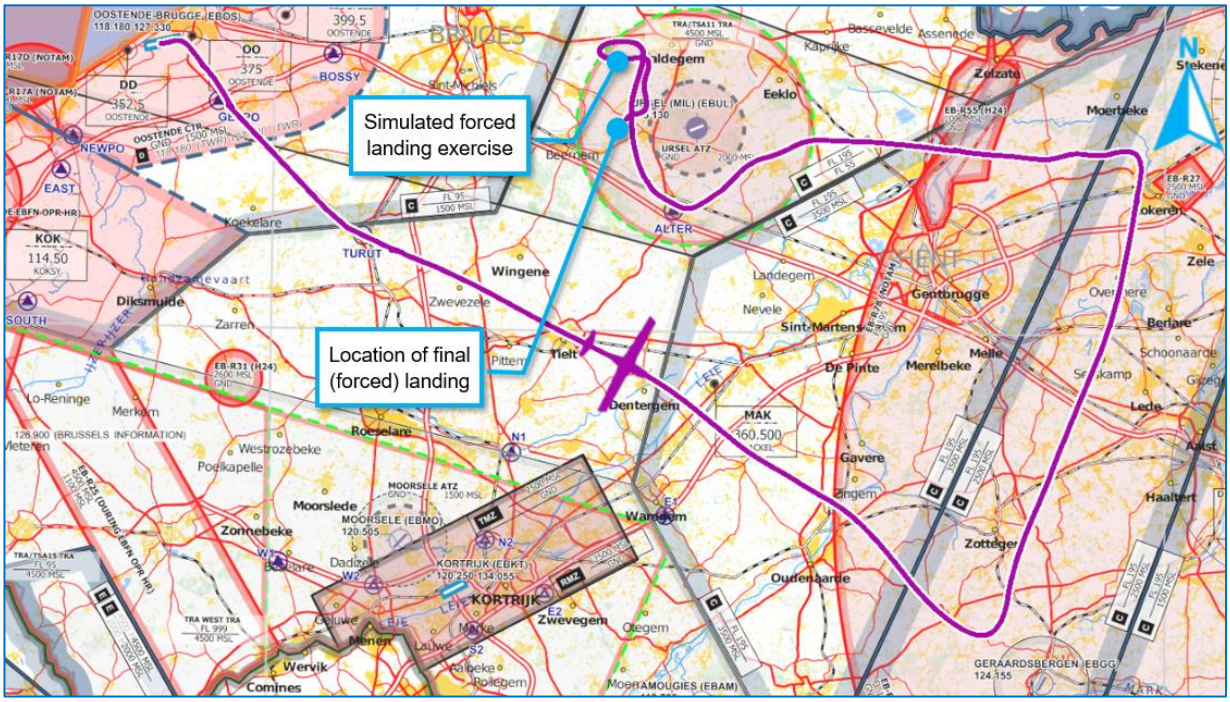


Figure 1 : complete flight track (from SkyDemon data)

A first simulated forced landing was performed, starting at 2000 ft above mean sea level (AMSL)[2] and ending at an altitude of 500 ft, engine at idle. The instructor then applied more power. The engine responded and the power indicator showed an increase, from 20% (idle) to 100%. The airplane climbed to 800 ft when the crew noticed an engine power reduction to 80%. The airplane levelled off at 1000 ft, the power loss preventing the airplane to climb further. The airplane maintained 1000 ft. The crew noticed a decrease of oil pressure.
The crew called EBUL on the aerodrome frequency to announce their intention to land on the airfield.

[2] Local terrain elevation is about 40 ft, so height above ground level (AGL) is more or less the same than AMSL.

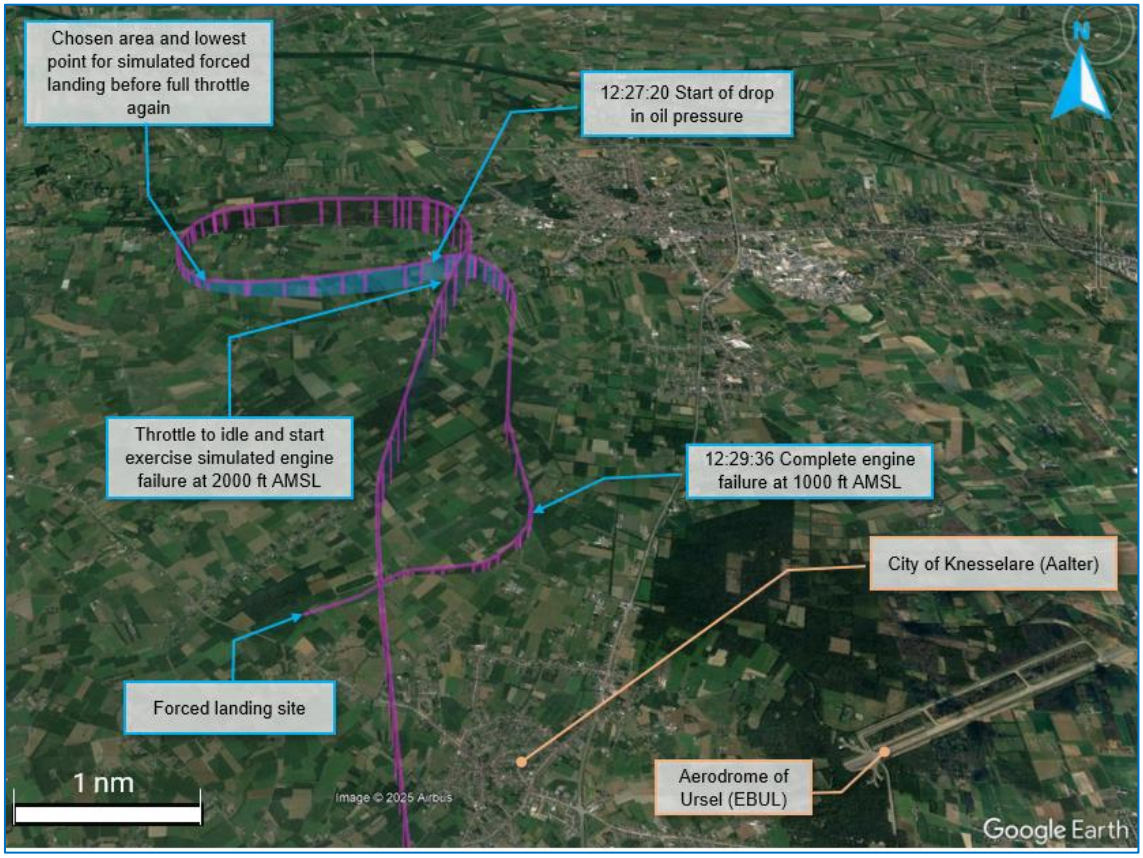


Figure 2: Last portion of the flight path (from SkyDemon and ECU data)

At that moment, the crew noticed oil fume coming from the engine cowling, around the cover for the oil cap. The oil pressure dropped to zero and the engine stopped operating.
The instructor, who had taken over the controls, determined that they were unable to reach EBUL and made a right turn to avoid the village of Knesselare and prepare to perform an emergency landing.

The instructor stated he announced a Mayday on the 'Brussels Information' frequency 126.9 Hz, although ATS reported no Mayday on their frequency.

He then proceeded to the emergency landing.

A first potential landing zone was selected, but during the approach, the pilot noticed the presence of a wooden fence crossing their path. He selected another field, further away.

The airplane landed on a beet field, rolled for 70 m before reaching a corn field, where the airplane stopped. The crash area is located 6 km West from the EBUL airfield.

The two occupants climbed out, uninjured. An airplane in flight at the moment saw the landing happening and notified ATS[3], who then notified the Rescue Coordination Center (RCC) to start a Search and Rescue operation

Figure 3: crash landing area (still from video taken by overflying aircraft in contact with Brussels Info)

[3] ATS: Air Traffic Service

2 CONTEXTUAL INFORMATION

2.1 Damage to the airplane

Most of the damage to the airplane was caused by the impact with the corn plants.

The nose landing gear and the right hand main landing gear leg were found ruptured.

The aircraft underside showed evidence of a heavy engine oil loss. Inside the engine compartment, broken chips of aluminum cast pieces and a copper bushing were found indicating engine internal damage.

2.2 Other damage

Corn plants were damaged by impact with the airplane.

2.3 Personnel information

Table 1 : General pilot data instructor

Age	24
License	CPL (A) Licence, first issued on 20 May 2019 by the BCAA
Ratings	MEP (land), valid until 31 May 2022 SEP (land), valid until 30 April 2022 FI(A), valid until 30 September 2023
Experience	326:15 FH (PIC: 231:28 FH) Instructor 91:18 FH (under supervision)

The data hereabove are for the flight instructor, the trainee started the courses in 2019 and accumulated 40 FH since then.

2.4 Aircraft information

2.4.1 General

Based on the earlier DV20/DA20 two-seat aircraft, Diamond Aircraft Industries designed a four-seat variant, the DA40 Diamond Star. The DA40 is a four-seat low-wing cantilever monoplane made from composite materials. It has a fixed tricycle landing gear and a T-tail. In 2002 the production of the Lycoming-engine variant was moved to Canada and the Austrian factory concentrated on diesel-engine variants.

The DA40 has officially appeared in only three versions, the DA 40, DA 40D and DA 40F, as documented on its type certificates.

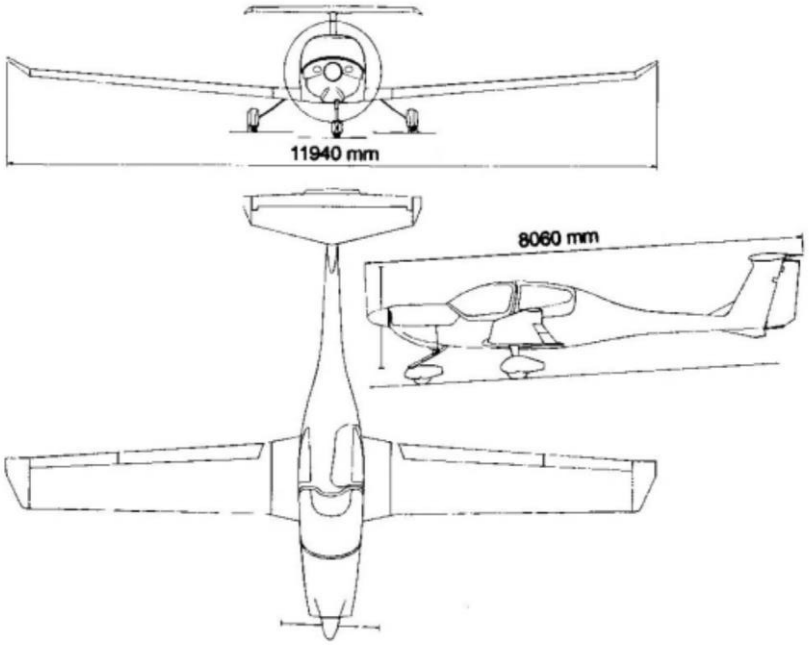


Figure 4: Diamond DA40D

Table 2 : General aircraft data

General	
Manufacturer	Diamond Aircraft Industries
Model:	DA40D
History	
Year of built:	2009
Serial:	D4.369
Engine	
Engine type	Diesel
Engine manufacturer and model	Technify Motors GmbH TAE 125-02-99 (Centurion 2.0) - 135 hp (101 kW)
Serial	02-02-04788 (2018)
Operating time	1050 FH
Propeller	
Propeller type	3-blade hydraulic constant speed propeller
Propeller manufacturer and model	MT Propellers MTV-6-A/187-129
Serial	110567

Last 100-hours inspection was one month prior to the accident, in September 2021 at 1005 engine hours.

2.4.2 The engine

The engine Centurion 2.0 is inline-four diesel engine that is liquid-cooled, turbocharged, and employ a single-lever power control (SLPC) associated with a full authority digital engine control (FADEC).

Operational data and limits:

Oil pressure:

Normal operating pressure..... 2.3 - 6 bar
min. 1.0 bar / max. 6.5 bar

Oil temperature:

Optimum operating temperature .....ca. 90 - 110°C
min. 50°C / max. 140°C

Coolant temperature:

Optimum operating temperature .....ca. 85 - 100°C
min. 60°C / max. 105°C

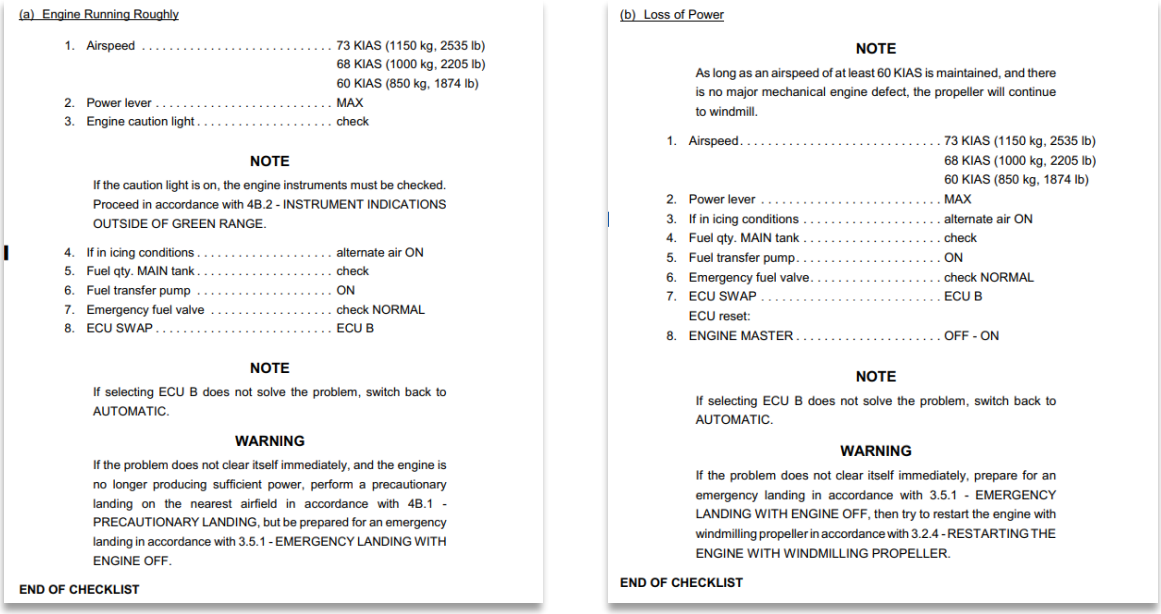
Gearbox temperature:

Optimum operating temperature .....ca. 70 - 100°C
min. -30°C / max. 120°C

Figure 5 : data from the Operations & Maintenance Manual

The FADEC system consists of two identical and independent FADEC-halves, which continually monitor each other's status. In normal operation, the manual Force B switch should be switched to the "A" position. This means that FADEC A (Engine Control Unit A) is actively controlling the engine, and FADEC B is in stand-by mode. If the FADEC system detects a problem with channel A, the FADEC A light begins to flash and the system automatically switches over to FADEC B. If the FADEC system detects a problem with channel B, the FADEC B light begins to flash, and the system automatically switches to whichever channel is the healthiest. If the Force B switch is in the "B" position, only FADEC B will be allowed to actively control the engine. In this position, the FADEC system cannot switch automatically between channel A and B.
This position is necessary only if the FADEC system does not switch automatically to the healthiest channel in the event of abnormal engine behavior.

2.4.3 Emergency Procedures



(a) Engine Running Roughly

1. Airspeed . . . . . 73 KIAS (1150 kg, 2535 lb)
   68 KIAS (1000 kg, 2205 lb)
   60 KIAS (850 kg, 1874 lb)
2. Power lever . . . . . MAX
3. Engine caution light . . . . . check

NOTE

If the caution light is on, the engine instruments must be checked. Proceed in accordance with 4B.2 - INSTRUMENT INDICATIONS OUTSIDE OF GREEN RANGE.

4. If in icing conditions . . . . . alternate air ON
5. Fuel qty. MAIN tank . . . . . check
6. Fuel transfer pump . . . . . ON
7. Emergency fuel valve . . . . . check NORMAL
8. ECU SWAP . . . . . ECU B

NOTE

If selecting ECU B does not solve the problem, switch back to AUTOMATIC.

WARNING

If the problem does not clear itself immediately, and the engine is no longer producing sufficient power, perform a precautionary landing on the nearest airfield in accordance with 4B.1 - PRECAUTIONARY LANDING, but be prepared for an emergency landing in accordance with 3.5.1 - EMERGENCY LANDING WITH ENGINE OFF.

END OF CHECKLIST

(b) Loss of Power

NOTE

As long as an airspeed of at least 60 KIAS is maintained, and there is no major mechanical engine defect, the propeller will continue to windmill.

1. Airspeed . . . . . 73 KIAS (1150 kg, 2535 lb)
   68 KIAS (1000 kg, 2205 lb)
   60 KIAS (850 kg, 1874 lb)
2. Power lever . . . . . MAX
3. If in icing conditions . . . . . alternate air ON
4. Fuel qty. MAIN tank . . . . . check
5. Fuel transfer pump . . . . . ON
6. Emergency fuel valve . . . . . check NORMAL
7. ECU SWAP . . . . . ECU B
   ECU reset:
8. ENGINE MASTER . . . . . OFF - ON

NOTE

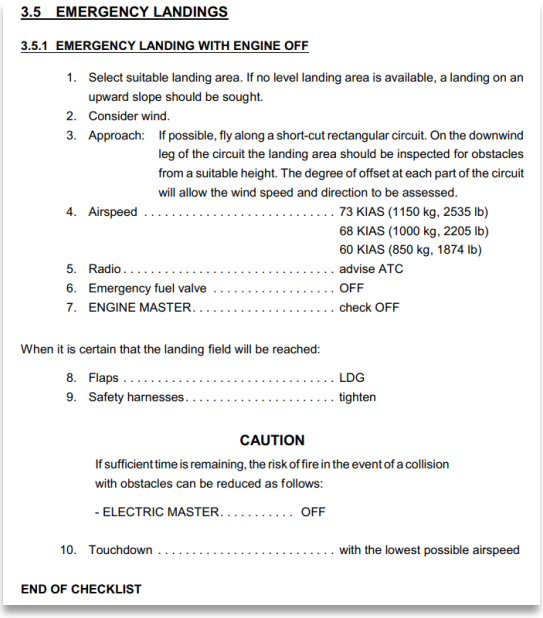
If selecting ECU B does not solve the problem, switch back to AUTOMATIC.

WARNING

If the problem does not clear itself immediately, prepare for an emergency landing in accordance with 3.5.1 - EMERGENCY LANDING WITH ENGINE OFF, then try to restart the engine with windmilling propeller in accordance with 3.2.4 - RESTARTING THE ENGINE WITH WINDMILLING PROPELLER.

END OF CHECKLIST

Figure 6 : Published emergency procedures for engine problems in flight



3.5 EMERGENCY LANDINGS

3.5.1 EMERGENCY LANDING WITH ENGINE OFF

1. Select suitable landing area. If no level landing area is available, a landing on an upward slope should be sought.
2. Consider wind.
3. Approach: If possible, fly along a short-cut rectangular circuit. On the downwind leg of the circuit the landing area should be inspected for obstacles from a suitable height. The degree of offset at each part of the circuit will allow the wind speed and direction to be assessed.
4. Airspeed . . . . . 73 KIAS (1150 kg, 2535 lb)
   68 KIAS (1000 kg, 2205 lb)
   60 KIAS (850 kg, 1874 lb)
5. Radio . . . . . advise ATC
6. Emergency fuel valve . . . . . OFF
7. ENGINE MASTER . . . . . check OFF

When it is certain that the landing field will be reached:

8. Flaps . . . . . LDG
9. Safety harnesses . . . . . tighten

CAUTION

If sufficient time is remaining, the risk of fire in the event of a collision with obstacles can be reduced as follows:

- ELECTRIC MASTER . . . . . OFF

10. Touchdown . . . . . with the lowest possible airspeed

END OF CHECKLIST

Figure 7 : published procedure for emergency landing with engine off

The glide ratio is 8.8; i.e., for every 1000 ft (305 meters) of altitude loss the maximum horizontal distance travelled in still air is 1.45 NM (2.68 km). During this the propeller will continue to windmill.

2.5 Meteorological information

The following meteorological information was retrieved in METARs (Meteorological Terminal Air Report) from surrounding airports at 12:20 UTC:

Ostend airport, EBOS, (37 km to the West)
Wind speed: 4 kt
Wind Direction: 130 degrees variable between 040 and 170 degrees
CAVOK: Ceiling and Visibility are OK,
Temperature: 17 °C
Dew point: 10 °C
QNH: 1028 hPa

Antwerp Airport, EBAW, (72 km to the East)
Wind speed: 3 kt
Wind Direction: 100 degrees variable between 060 and 160 degrees
CAVOK: Ceiling and Visibility OK
Temperature: 17 °C
Dew point: 09 °C
QNH: 1028 hPa

Brussels Airport, EBBR, (80 km to the South East)
Wind speed: 3 kt
Wind Direction: 080 degrees variable between 010 and 170 degrees
CAVOK: Ceiling and Visibility OK
Temperature: 16 °C
Dew point: 08 °C
QNH: 1028 hPa

2.6 Recorded data

The airplane is not equipped with flight data recorders, nor is it required to.

The engine is controlled by a FADEC system which also record some parameters like revs (rpm), load (%), oil pressure (mbar), barometric pressure (mbar), oil temperature (°C),..

The pilots made use of the SkyDemon-app to log their flight.

2.7 Execution of forced landings

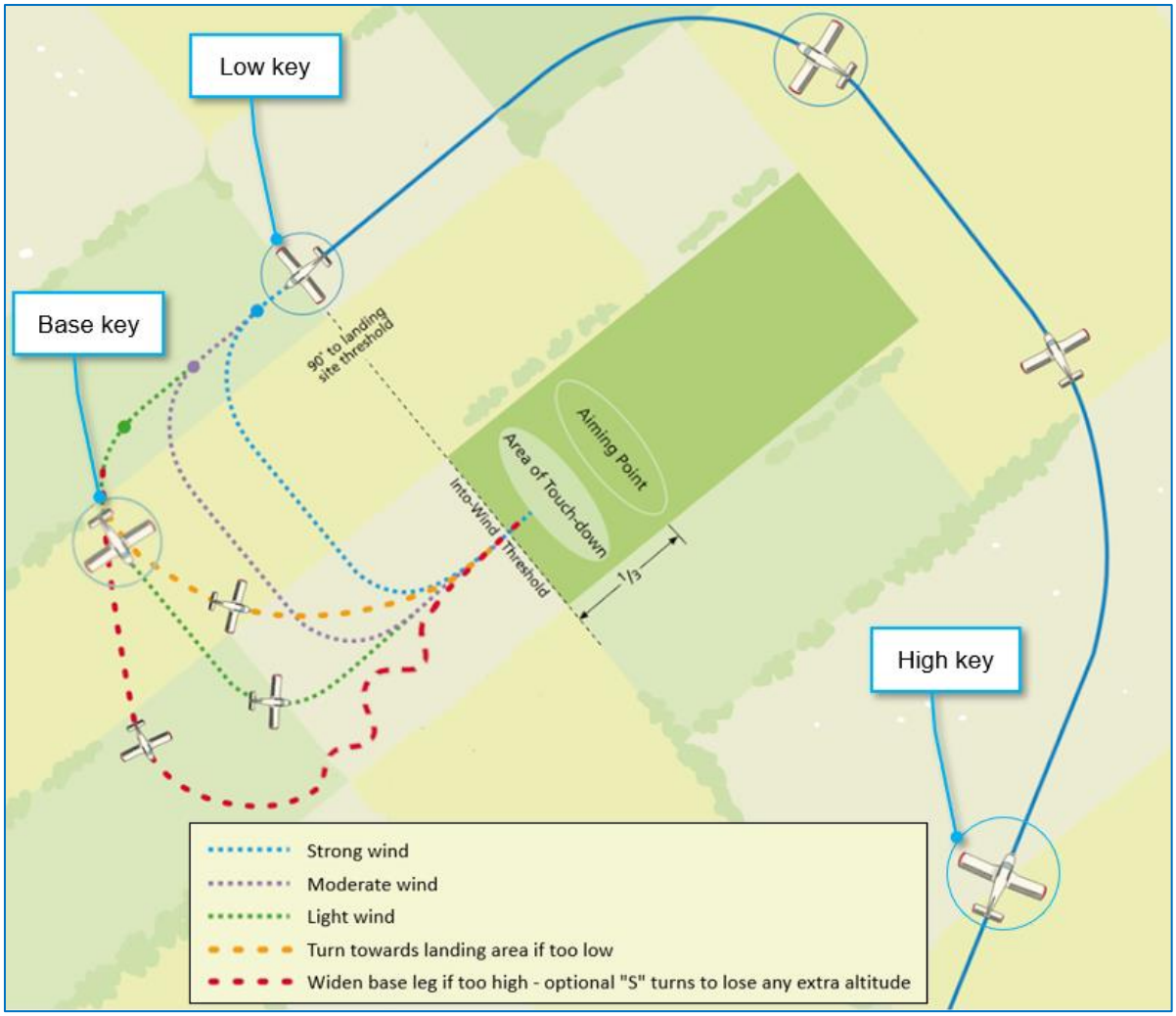


Figure 8 : typical forced landing pattern

The 'High Key'/'Low Key' technique, as illustrated in Figure 8, is a structured method used during forced landings to ensure a safe and controlled approach to a chosen landing site at best glide speed in the event of engine failure. This technique helps pilots effectively manage their altitude and position using a 360-degree overhead approach. However, this full procedure can only be executed when flying at a sufficient altitude.

After trimming for best glide speed, a suitable landing site must be selected nearby. Considerations include size, surroundings (obstacles), surface, slope, and wind direction.

When the airplane is directly above or slightly off to one side of the intended touchdown spot, aligned with the final approach direction, it is at the High Key position. For single-engine aircraft, this is typically between 2000-2500 feet AGL.

The Low Key position is the next key point in the descent, allowing for further adjustments before the final approach. This is approximately between 1000 and 1500 feet AGL, abeam the landing site threshold. This position allows the pilot to begin the final descent and adjust for a stable landing approach.

Depending on the source, there is also mention of the 'Base Key' (or 'Final Key'). The 'Base Key' is 90 degrees of turn away from the 'Low Key', with 90 degrees of turn left to line up on final approach. From this position, minor adjustments in the angle of bank can be made to ensure the selected field is reached without overshooting or undershooting. If slightly high, the base leg can be widened, and a slip or S-turns can be executed. If too low, the final turn towards the selected landing area should be made earlier.

As stated above, such a complete 360° approach assumes a fairly reasonable height when the engine failure occurs. If it is flying lower at that moment, there is less time available and not all those steps can be completed. So other considerations must be taken into account, depending on the height range in which the aircraft is. This is illustrated in the Figure 9.

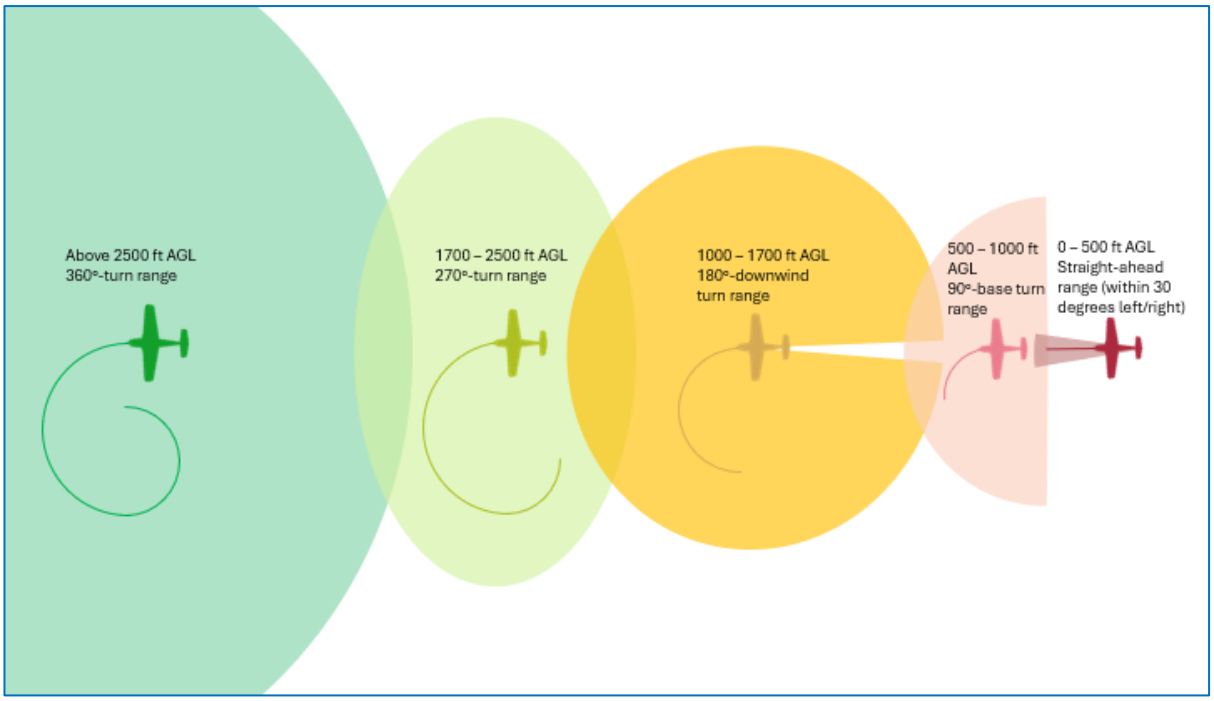


Figure 9 : typical height ranges to consider the options in case of an engine failure in flight for a general four-seater aircraft

The above figures are only guidelines and for illustration purposes. They should not be interpreted as absolute numbers. The cross-section of the different ranges shows that there can be some overlap and variation depending on the type of aircraft and the skills of the pilot.

These figures are based on:

- A rate of descent of 800-1000 feet per minute during a power-off glide, a range in which most standard four-seater single-engine-piston planes fall[4].
- Standard rate-one turns, meaning 3 degrees per second, or 1 minute for a 180 degree-turn.

With the above, a height loss of 400-500 ft per 90 degree-turn is obtained. To also account for reaction time, wind factors, the time needed to find a suitable field, as well as the fact that the pattern is not always followed as an ideal circle but sometimes as a rectangular pattern, several

[4] With a glide ratio of 8.8 and a best glide speed of 73 kt, this means a theoretical rate of descent of 840 feet per minute for the DA40D

hundred feet are added to ultimately arrive at the above figures. It is important that the final approach can be flown with the wings level from approximately 300-500 ft, so that it does not end in a controlled flight into terrain.

The above values also correspond to the guidelines that must be considered in the event of an engine failure after take-off.

3 ANALYSIS

3.1 Operational: the flight

The engine was running smoothly during the flights preceding the accident flight. There was no apparent precursor sign that would alert the pilots about the possible engine failure.

The recorded ECU (A) data revealed an increase in oil pressure variation as well as a slight increase in oil temperature already some minutes before the throttle was set to idle for the practiced forced landing (see Figure 10Figure 10). However, it is highly unlikely that this change would have been visible in the cockpit.

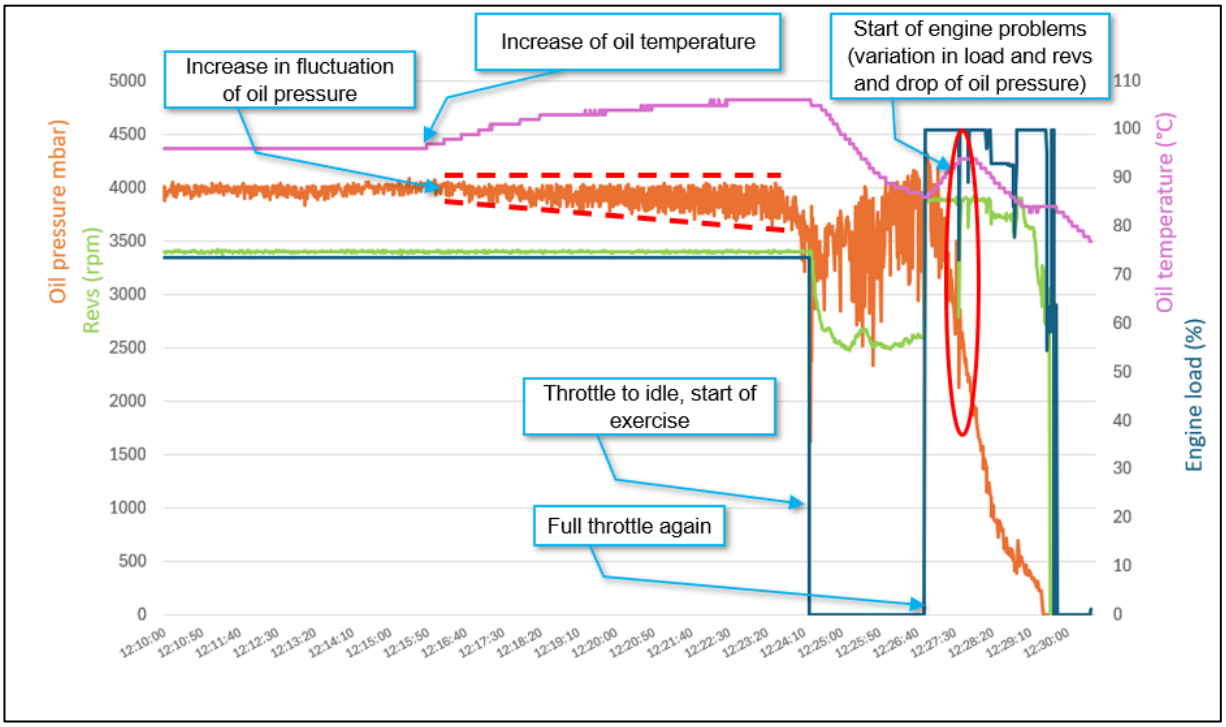


Figure 10 : ECU A data showing that there was already some fluctuation of oil pressure and slight increase in oil temperature before the start of the exercise and before the engine problems became apparent.

Upon noticing the partial power loss, the correct reflex was to head to the nearest aerodrome (Ursel) to execute a precautionary landing as soon as possible.
The complete power loss occurred when already slightly below 1000 ft above the ground. In the most ideal conditions, this could suffice to make a 180° left turn from 'Low Key' to a landing field (Figure 8). But this assumes that a nearby field has already been assessed and chosen, ánd available. However, since it always takes some time to find a suitable field during an engine failure, it is recommended from this height to choose a field straight ahead or at most 90° to the left or right. See also Figure 9.

These were the factors the instructor considered in the final choice of the field, within 60° to the right of the aircraft's heading at that moment. He also indicated that a low-wing aircraft obstructs the view to find a suitable field right next to/underneath it. According to him, with

choosing an area that lies more in front, it is easier to estimate the remaining gliding distance and to adjust the choice of the landing field if, upon approach, the initially chosen field turns out to be less suitable than first thought.

A fortunate aspect was that it happened in a fairly uninhabited area with quite a few meadows, which is typical for the mission of such a training flight.

3.2 Technical: the engine

The engine was disassembled and inspected at the manufacturer's facility, Continental Aerospace Technologies, in Germany. The teardown was followed remotely by investigators of the BFU (Aviation Safety Investigation Authority of Germany) and AAIU, due to COVID-19 restrictions in force at that time.

Figure 11: damaged pistons and casing

The inspection determined that the engine stopped operating further to a mechanical break-up of the n° 2 Piston.

The piston head - cylinder n°2 showed burning /melting marks and a hole on the edge of the piston top. Material from the piston melted due to a hot spot inside the cylinder; there are symmetrical melting mark transfer visible on the engine cylinder head n°2. This hole made an inter-connection between the combustion chamber of the cylinder n°2 and the crankcase and casing of the engine below the piston. This allowed to a portion of the hot combustion gases to leak from cylinder n° 2 inside the crankcase, leading to an overheat of the internal moving parts of cylinder n°2 (piston, rings, connecting rod & head bearings).

The overheat with weakening and deformation of the piston, connecting rod and the connecting rod to crankshaft bearings lead to a final rupture of the moving parts up to final perforation of the carter and ejection of parts from below cylinder n°2. The unbalance caused by the heat deformation & damages on the cylinder n°2 moving parts caused vibrations, buffeting & chaffing, overheat and final rupture on the other cylinders moving parts.

This led to the conclusion that this failure was caused by a blowtorch effect possibly due to a defect in the fuel injection system.

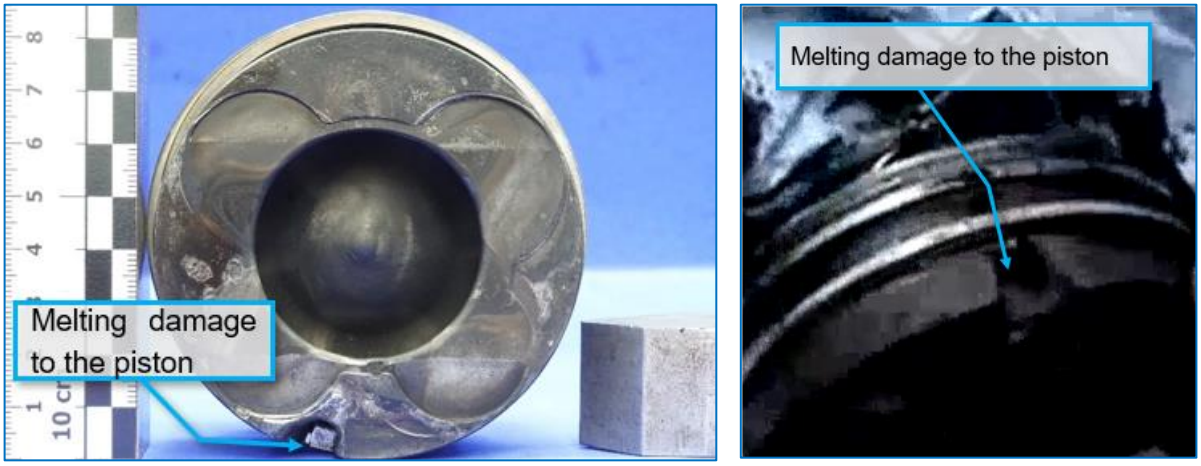


Figure 12: damage to piston N°2

The aircraft maintenance programme (AMP) requires the engine oil be refreshed every 100 FH. During the last 100-hour inspection one month prior, a sample of the removed oil was taken but not analysed. This is in accordance with the AMP, which does not require an oil analysis, only to store a 100 ml sample in a clean container.

ANALYSENERGEBNISSE			Aktuelle Probe	
LABORNUMMER			4130237	4130236
GESAMTBEWERTUNG			!	i
Untersuchungsdatum			02.12.2021	02.12.2021
Datum Probenentnahme			01.10.2021	06.09.2021
Datum letzter Ölwechsel			06.09.2021	08.04.2021
Nachfüllmenge seit Wechsel			-	-
Laufzeit seit Wechsel		h	50	107
Laufzeit gesamt		h	1051	1000
Öl gewechselt			Nein	Ja
VERSCHLEIß				
Eisen	Fe	mg/kg	96	101
Chrom	Cr	mg/kg	4	5
Zinn	Sn	mg/kg	26	0
Aluminium	Al	mg/kg	147	19
Nickel	Ni	mg/kg	5	2
Kupfer	Cu	mg/kg	23	3
Blei	Pb	mg/kg	64	0
Mangan	Mn	mg/kg	1	1
PQ-Index	-		< 25	< 25
VERUNREINIGUNG				
Silizium	Si	mg/kg	28	9
Kalium	K	mg/kg	3	4
Natrium	Na	mg/kg	4	3
Wasser	%		< 0.10	< 0.10
IR-Glykol	-		negativ	negativ
Dieselkraftstoff	%		1.9	0.5
Biodiesel	%		< 0.3	< 0.3
Rußgehalt	%		1.3	1.9

Figure 13 : extract of the oil analysis and comparison of the oil samples after the accident (left) and of the 100-hours inspection (right)

After the accident, an analysis was conducted on this sample as part of the investigation, along with a new oil sample. The comparison of both samples (see Figure 13 Figure 13), showed an increase in aluminium, tin, copper and lead, as well as the presence of diesel fuel. This increase in metal content relates to the internal damage found in the engine. Although oil analysis is primarily a trend tool - and thus more historic samples should be compared with each other to draw definite conclusions - the oil analysis of the last 100-hours inspection shows values within normal ranges. It is thus unlikely that a spectroscopic analysis during the last inspection would have raised any alarm bell.

The oil filter cartridge is to be checked for swarf and other signs of abrasion. Reportedly, the inspection made during the last 100-hours inspection did not reveal anomalies, but the filter was discarded right after.. The engine was not yet due for the following scheduled inspection.

The fuel components were further tested.

The HP pump, common rail and injector system have been verified and are operating correctly within the applicable limits.
The valves & injector sealing was correct in the cylinder head n°2 and other cylinders.

The FADEC was recently replaced (07 July 2021) further to reported engine vibrations. After replacement, the engine vibrations disappeared. The FADEC installed on the engine was tested and was found to be working as intended.

The defect of the previously installed FADEC was confirmed on channel A, being a fault in the high-voltage generation controlling the injectors. As a result, injectors do not open. However, this defect affected injector n° 1 and 3, not the injector n° 2 that showed the mechanical failure.

This failure caused the engine vibrations that led to the replacement of the FADEC.

An additional check was conducted to determine whether this defect could influence the fuel injectors of the cylinder n° 2 by increasing the rail pressure. According to the manufacturer, this test showed that there was no influence. The rail pressure is controlled by a pressure control valve and it reacts fast enough to maintain the pressure at its setting.

The investigation could not determine when the internal damage on the piston head n°2 actually occurred. It is likely that it did not occur suddenly during the accident flight.

As seen on Figure 10Figure 10, an increase in oil temperature and a variation of oil pressure and occurred already some minutes before the simulated forced engine exercise. However these stayed within normal operating limits (oil pressure limits between 2.3 and 6 bar, oil temp limits between 90 and 110 °C) right before the problems were noticed by the instructor. The coolant temperature also stayed within limits during the whole time (between 81 and 87°C). This is not indicated on the graph but also retrieved from the ECU data.

Extensive testing of the fuel components showed defects, but these could not be related to the event itself.

4 FINDINGS

4.1 Findings as to causes and contributing factors

- The engine piston n°2 sustained damage caused by a combustion anomaly that created a hot spot.
- The damage to the piston allowed to a portion of the hot combustion gases to leak from cylinder n° 2 inside the crankcase, leading to an overheat of the internal moving parts.
- The cause of the combustion anomaly could not be identified.

4.2 Findings as to risk

- A spectroscopic analysis of an oil sample of the accidented engine revealed a higher deposit of metal (Al, Cu, Zn, Pb).
- The maintenance program (AMP) does not require a spectroscopic analysis of the engine oil (however it is unlikely that in this case a pre-accident flight spectroscopic analysis of the last engine oil sample would have raised alarm bells).

4.3 Other findings

- The oil filter inspected during last 100-hours inspection did not reveal anomalies.
- The event occurred after a first simulated forced landing exercise, but there was no correlation. The engine problems appeared to manifest a few minutes earlier.
- Upon noticing the partial power loss, the correct reflex was to head to the nearest aerodrome (Ursel) to execute a precautionary landing as soon as possible.
- When encountering a complete power loss slightly below 1000 ft AGL, a landing area about 60° to the right of the flight path was chosen. The instructor preferred this over the risk of making low-altitude 90 degree turns in a pattern-like approach over a closer field. This choice ultimately led to a good outcome for both occupants.
- It happened in a fairly uninhabited area with quite a few meadows which also contributed to the positive outcome of the forced landing.
- The emergency landing was spotted by another aircraft that notified ATS.

5 SAFETY ACTIONS AND RECOMMENDATIONS

*A **safety issue** is a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organization or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.*

*A **safety action:** the steps taken or proposed to be taken by an organization or agency on its own initiative in response to a safety issue.*

*A **safety recommendation** is a proposal by the safety investigation authority in response to a safety issue and based on information derived from an investigation and/or study. It's aimed to improve the safety of an organisation and/or system and therefor always addressed to an organisation and/or agency, never to a specific individual. The sole purpose of a safety recommendation is the prevention of accidents or incidents and the reduction of the consequences of such occurrences. It, in no case has the purpose of creating a presumption of blame or liability for an accident or incident. Neither does it reflect the level of contribution to a specific accident or incident.*

*A **safety message:** An awareness which brings to attention the existence of a safety factor and the lessons learned. AAIU can distribute a safety message to a community (of pilots, instructors, examiners, ATC officers), an organization or an industry sector for it to consider a safety factor and take action where it believes it appropriate. There is no requirement for a formal response to a safety message.*

As no permanent safety issues related to an organisation or a system were identified during this investigation, no safety recommendations are issued.

ABOUT THIS REPORT

General	
What?	Safety investigation reports are a technical document that reflects the views of the investigation team on the circumstances that led to the accident or serious incident and is conducted in accordance with Annex 13 to the Convention on International Civil Aviation and Regulation (EU) No 996/2010.
Objective	**The sole objective of safety investigations is the determination of the causes, and to define safety recommendations in order to prevent future accidents and incidents. It is not the purpose of this investigation to apportion blame or liability.** In particular, Article 17-3 of Regulation (EU) 996/2010 stipulates that the safety recommendations made in this report do not constitute any suspicion of guilt or responsibility.
Investigation authority	The Air Accident Investigation Unit of Belgium (AAIU for the rest of this publication). It is the Belgian permanent national civil aviation safety investigation authority as defined in Article 4 of Regulation (EU) No 996/2010 and established in accordance with the Royal Decree of 26 December 2022. This unit is part of the Federal Public Service Mobility and Transport and is functionally independent from the Belgian Civil Aviation Authority and other interested parties.
This investigation	
Investigation initiation	AAIU was notified of the occurrence by Skeyes ACC at 12:36 UTC and on 12:41 UTC by the safety manager of the concerned training organisation. The investigator on duty deployed to the accident site, where he arrived at 14:21 UTC to conduct the on-site examination.
Scope	**Limited** As per ICAO Annex 13 and EU regulation EU 996/2010, decisions regarding whether to conduct a civil aviation safety investigation, and the extent of an investigation, are based on many factors, including the level of safety benefit expected to be drawn from such an investigation. For this occurrence, a limited-scope, fact-gathering investigation and analysis was conducted in order to produce a short summary report. The investigation mainly focussed on the actions and conditions directly relating to the occurrence and might not cover all aspects of the aircraft operation and/or possible underlying safety factors due to the expected safety benefit of it and/or the extent of evidence/resources available.
Other parties involved	• BFU (Bundesstelle für Flugunfalluntersuchung), the German Civil Aviation Safety Investigation Authority, and its advisors from the engine manufacturer. • The Austrian Civil Aviation Safety Investigation Authority
	AAIU would like to thank the mentioned parties above and all other entities and individuals that have contributed to this safety investigation.