CONTENTS

SPECIAL BULLETINS / INTERIM REPORTS

SUMMARIES OF AIRCRAFT ACCIDENT ('FORMAL') REPORTS

None

AAIB FIELD INVESTIGATIONS

COMMERCIAL AIR TRANSPORT

FIXED WING

ROTORCRAFT

None

GENERAL AVIATION

FIXED WING

None

ROTORCRAFT

None

SPORT AVIATION / BALLOONS

None

AAIB CORRESPONDENCE INVESTIGATIONS

COMMERCIAL AIR TRANSPORT

GENERAL AVIATION

AAIB CORRESPONDENCE INVESTIGATIONS (Cont)

SPORT AVIATION / BALLOONS

MISCELLANEOUS

ADDENDA and CORRECTIONS

None

(ALL TIMES IN THIS BULLETIN ARE UTC)

AAIB Special Bulletins / Interim Reports

AAIB Special Bulletins and Interim Reports

This section contains Special Bulletins and Interim Reports that have been published since the last AAIB monthly bulletin.

ACCIDENT 1

Aircraft Type and registration:	EC225 LP Super Puma, G-REDW
Date & Time (UTC):	10 May 2012 at 1114 hrs
Location:	20 nm east of Aberdeen

ACCIDENT 2

Aircraft Type and registration:	EC225 LP Super Puma, G-CHCN
Date & Time (UTC):	22 October 2012 at 1425 hrs
Location:	Approximately 32 nm southwest of Sumburgh, Shetland Islands
Information Source:	AAIB Field Investigations

Introduction

This Special Bulletin contains information on the progress of the investigation into the emergency lubrication systems and the Crash Position Indicators (CPI) for the accidents to G-REDW on 10 May 2012 and to G-CHCN on 22 October 2012. This follows the publication of previous Special Bulletins S2/2012, S3/2012, S5/2012, S6/2012 and S7/2012.

Emergency Lubrication

Background

On both G-REDW and G-CHCN the bevel gear vertical shaft fractured, leading to associated warnings of loss of Main Gear Box (MGB) oil pressure on the Central Warning Panel (CWP). Both crews actioned the '*Total Loss of MGB (Main Gear Box) Oil Pressure*' checklist, which required the activation of the MGB emergency lubrication system. However, in both cases, approximately 30 seconds, later the MGB EMLUB caption illuminated on the CWP indicating that the emergency lubrication system had failed, resulting in the subsequent ditching of the helicopters. These are the only two known occasions in which the emergency lubrication system has been activated in operational flight. Strip examinations of the MGBs revealed the presence of glycol throughout and no visual evidence of heat damage, indicating that the system had lubricated and cooled the MGB.

MGB certification requirements

The EC225 LP was certified by the European Aviation Safety Agency (EASA) against the Joint Aviation Regulations (JAR) 29. The regulations require the helicopter to continue safe flight, at prescribed torque and main rotor speeds, for at least 30 minutes following the loss of the MGB lubrication system. This is met on the EC225 LP with an emergency lubrication system that

uses a mixture of glycol and water, called Hydrosafe 620, which cools and lubricates the MGB. Certification included a test on a ground rig in which the oil was drained from a MGB and pressurised air (simulating engine bleed-air) and Hydrosafe 620 were sprayed into the gearbox. The test was run for more than 30 minutes and demonstrated that there was no significant damage to the MGB. Although the emergency lubrication sub-systems were tested individually, no test was carried out on the complete system during certification, either on a test rig or installed on the helicopter.

MGB lubrication system description

The MGB lubrication system includes two mechanically-driven oil pumps and a crew-activated emergency lubrication system (Figure 1). The latter comprises: a bleed-air supply from the left engine, a Hydrosafe 620 supply from an 11 litre reservoir, a series of small pipes around and inside the MGB (to deliver the Hydrosafe 620 in a spray), and monitoring and command systems on a dedicated Printed Circuit Board (PCB).

A MGB EMLUB caption will illuminate if low pressure is detected by either of the two pressure switches, one in the Hydrosafe 620 line and the other in the bleed-air line. It will also illuminate if there is an erroneous signal detected by the PCB. The caption is inhibited for approximately 30 seconds after the emergency lubrication system is activated, to allow the system to reach a steady-state. The MGB EMLUB caption is not latched.

The low pressure signal is generated by either the Hydrosafe 620 or bleed-air pressure switches if the

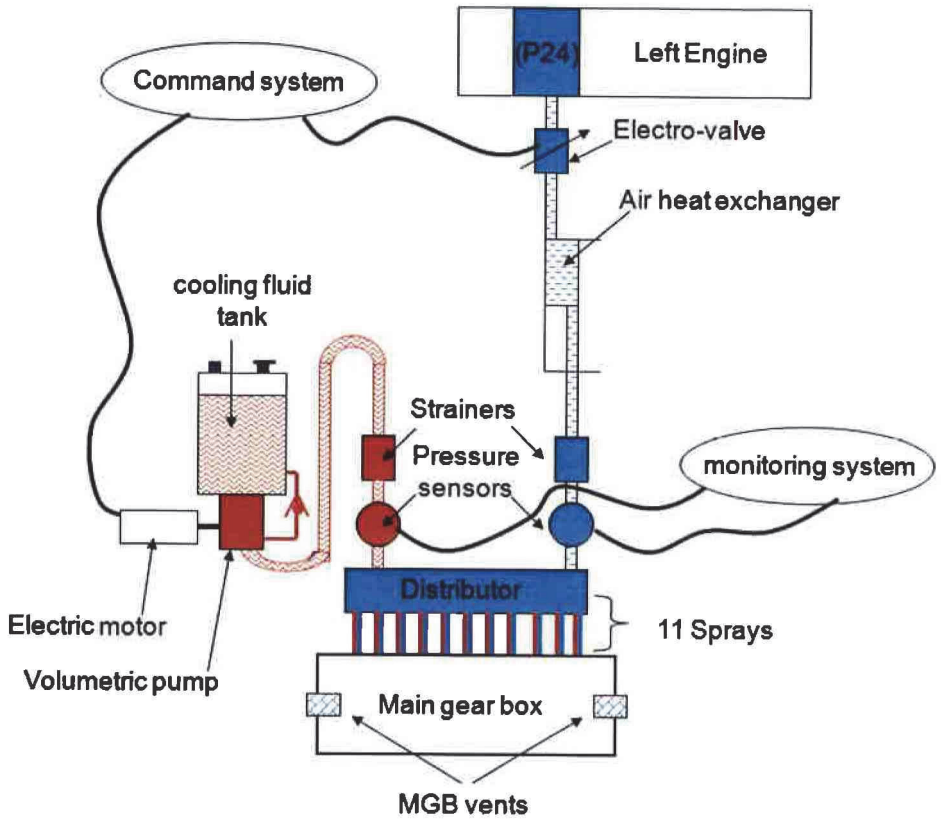

Figure 1

Schematic of the Emergency Lubrication System

pressure does not exceed a specified threshold, p_{on}, when the system is activated, or if the pressure subsequently falls below a specified threshold, p_{off}.

The specified range for p_{on} for each pressure switch is between 0.6 and 1.0 bar (relative to ambient).

Emergency Lubrication System - wiring for the pressure switches

The pressure switches have three output pins, which are electrically connected to the PCB. The original standard pressure switches were constructed such that the wire from Pin 1 is common, the wire from Pin 2 carries the high pressure signal and the wire from Pin 3 the low pressure signal. However, following a modification in 2010 (MOD 0752520) the internal wiring of the switches was changed, owing to an error in the specification sent to the switch manufacturer. This resulted in the transposition of connections to Pin 1 and Pin 3 within the pressure switches. The wiring and internal schematic for the switches before and after MOD 0752520 is shown in Figure 2. The schematic is valid for both the Hydrosafe 620 and bleed-air switches.

Both G-REDW and G-CHCN had MOD 0752520 embodied. For helicopters with MOD 0752520, the MGB EMLUB caption will illuminate after a 30 second delay following activation of the emergency lubrication system, if there is:

- A pressure above the switch threshold which will result in an erroneous signal being detected by the PCB
- A pressure below the switch threshold which will result in detection of a low pressure condition
- An erroneous signal to the PCB for other reasons

In summary, the MGB EMLUB caption will illuminate for any of the three possible states - high pressure, low pressure or an erroneous signal - when the system is activated.

Emergency Lubrication System - bleed-air and Hydrosafe 620 pressure switches

The two pressure switches from both helicopters were tested. All four switches conformed to their respective acceptance tests, with activation thresholds (p_{on}) in the range of 0.61 to 0.68.

Emergency Lubrication System - Hydrosafe 620

Both Hydrosafe 620 pumps were tested and operated to specification. Thus there was evidence that the pumps were operating normally from the time the system was activated until the helicopter ditched.

Bench tests were carried out on an MGB with a failed bevel gear vertical shaft. The Hydrosafe 620 and bleed-air supplies were activated and temperatures were measured at the Hydrosafe 620 pressure switch housing and MGB casing. It was found that after about 10 minutes the Hydrosafe 620 pressure had started to decrease to around 0.7 bar relative. This value is higher than the threshold for the pressure switches fitted to the accident helicopter, but lower than the maximum specification for these components.

Emergency Lubrication System - Engine tests

The engine and helicopter manufacturers tested the bleed-air output from several Makila 2A and Makila 2A1 engines. These included bench tests of the engines from G-REDW and G-CHCN, ground tests on in-service helicopters, and flight tests by the helicopter manufacturer. These tests revealed that the bleed-air pressure depends on the altitude, power setting and engine modification state, and under certain conditions

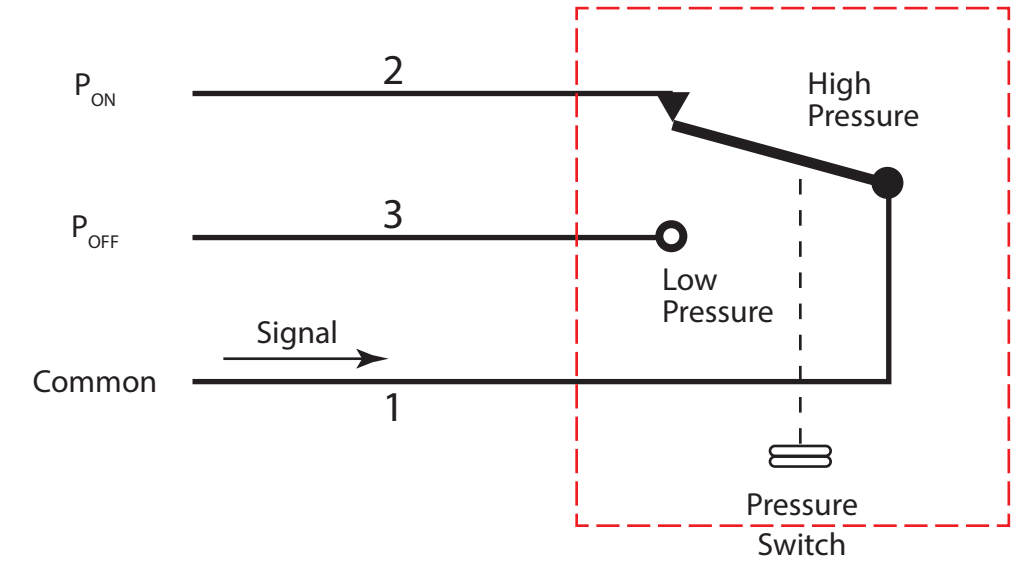

Figure 2

Schematic of wiring and pressure switches pre and post MOD 0752520

was lower than the pressure used in the design and certification of the system.

Emergency Lubrication System - Bleed-air system

The components of the bleed-air systems from the accident helicopter were tested along with similar tests carried out on new components, in particular to understand the pressure losses in the system. The bleed-air supply was also tested on a ground rig, with and without the Hydrosafe 620 supply operating. From these tests and the engine tests, it was concluded that a bleed-air pressure switch with a p_{on} at the top end of the specified tolerance (1.0 bar) could generate an MGB EMLUB caption, even if all the parts of the emergency lubrication system were operating within their specifications.

Emergency Lubrication System - Printed Circuit Board

The PCBs, which controls and monitors the emergency lubrication system, were functionally tested and operated in accordance with the factory inspection test. The time delays for the PCBs from G-REDW and G-CHCN, during which a failure warning is inhibited, were measured and were consistent with the period of time between the crew's activation of the system and the illumination of the MGB EMLUB caption, derived from the Cockpit Voice Recorders.

Discussion

An error in the specification issued to the pressure switch manufacturer resulted in all EC225 LPs, with MOD 0752520 embodied, having a pressure switch configuration that results in illumination of the MGB EMLUB caption once the system is activated and after the 30 second delay. This was the most likely cause of the MGB EMLUB caption during the accident flights for G-REDW and G-CHCN.

The system was introduced on the EC225 LP to meet the 30 minute requirement in JAR 29. With the erroneous pressure switches, the MGB EMLUB caption will always illuminate after activation of the emergency lubrication system, requiring the crew to land immediately.

Eurocopter issued an Alert Service Bulletin (ASB) 05A032 on 22 February 2013, to modify the wiring on the helicopter, to be compatible with the pressure switches. The EASA issued Airworthiness Directive 2013-0037 on 22 February 2013 to mandate the ASB.

In October 2012 the AAIB made the following Safety Recommendation:

Safety Recommendation 2012-034

It is recommended that the European Aviation Safety Agency requires Eurocopter to review the design of the main gearbox emergency lubrication system on the EC225 LP Super Puma to ensure that the system will provide the crew with an accurate indication of its status when activated.

Since the Safety Recommendation was issued, it has been established that, in some areas of the operational envelope, the Hydrosafe 620 and the bleed-air pressure is such that the pressure switches, which are within specification, could generate a low pressure signal when the emergency lubrication system is operating normally. This would result in an erroneous MGB EMLUB caption.

The helicopter manufacturer is planning to introduce replacement pressure switches with lower thresholds and tighter tolerances, as well as improved maintenance procedures, that will provide the crew with an accurate indication of the status over the entire operating envelope of the helicopter.

Crash position indicator system

CPI system description

Both helicopters were equipped with an externally-mounted, deployable Type 15-503 crash position indicator (CPI). On G-REDW, the CPI was mounted on the lower left side of baggage hold at the rear of the main cabin. On G-CHCN the CPI was mounted on the left side of the tail boom, just aft of the main cabin.

The CPI system consists of the CPI beacon, a beacon release unit, a system interface unit, a cockpit control panel, a water activated switch and an aircraft identification unit (Figure 3). These components are located in various positions around the helicopter, and are connected by wiring which is integrated with the rest of the helicopter's wiring looms, and is therefore not specifically protected against water ingress. The electrical connectors in the CPI system however conform to an industry standard specification[1] which ensures good performance when submerged in water at shallow depths.

The CPI system can receive power from the helicopter or from an internal battery within the system interface unit, which allows activation of the system for up to two hours after helicopter power is lost.

Deployment of the CPI is achieved by any one of the following:

(1) A g-switch detecting an acceleration of more than 6 g in any direction

(2) Manual operation of the DEPLOY switch on the cockpit control panel

(3) Immersion of the water activated switch

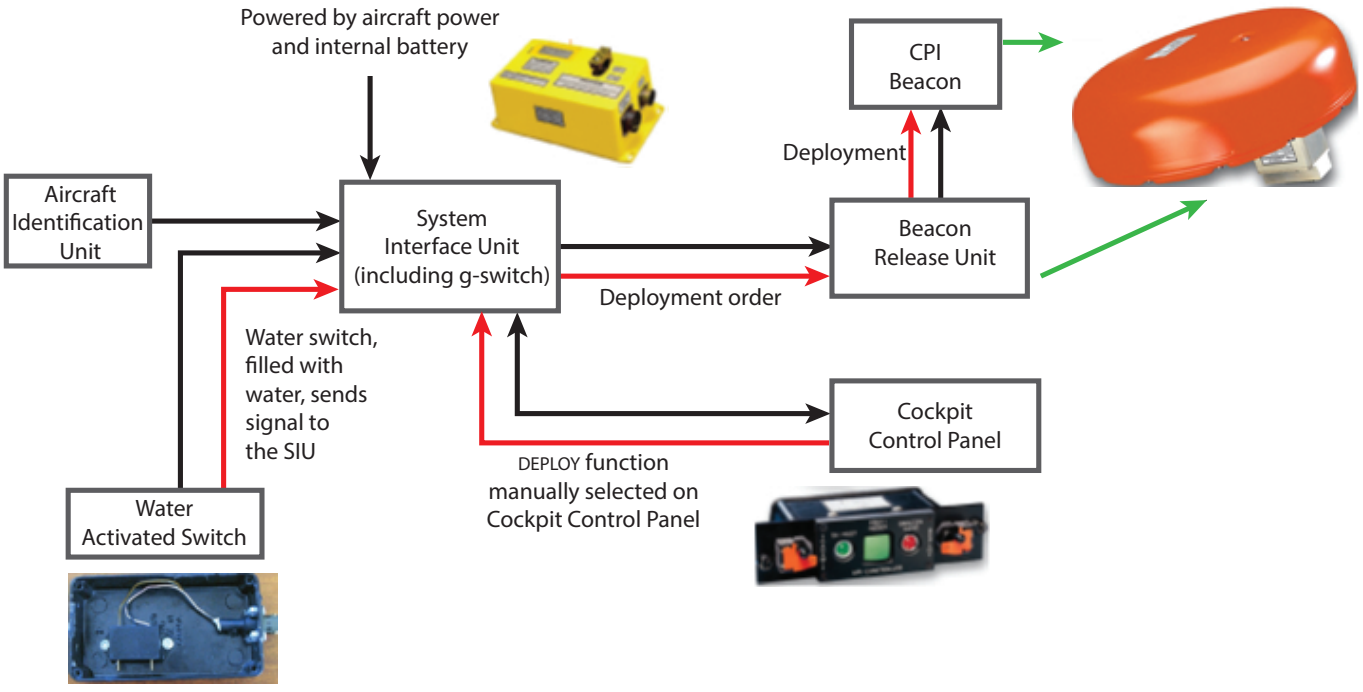

Figure 3

Schematic of Crash Position Indicator system

Footnote

[1] Military Specification Mil-C-26482, Electrical Connectors.

Regardless of the deployment method, automatic transmission of the beacon commences once the system has been triggered. The beacon release unit uses a small actuator and compressed spring to project the CPI away from the helicopter. The CPI is designed to then float and transmit on 406.025 MHz and 121.5 MHz.

The water activated switch is mounted in a box containing two exposed electrical contacts, a capacitor and a relay. Two holes in the bottom of the box allow water to enter when it is immersed; this allows the contacts to complete an electrical circuit to the beacon release unit. After a short delay, typically 5 to 10 seconds, for the capacitor to charge and operate the relay, the beacon release unit functions and deploys the CPI. If the connection between the contacts is interrupted during this period, due to fluctuations in the water level, the delay period resets. On both G-REDW and G-CHCN the water activated switch was mounted just above cabin floor level behind the cabin trim, and slightly aft of the left main cabin door aperture.

The CPI may be manually switched to a TRANSMIT function (without deployment) by the crew, via the cockpit control panel. Once selected to TRANSMIT, the CPI will not automatically deploy either by means of the g-switch or the water activated switch, unless a system reset, by pressing the TEST / RESET button on the cockpit control panel, has first been performed. The helicopter manufacturer was unaware of this feature of the CPI operation and as such no relevant information was included in the EC225 LP Flight Manual. Nor was this information included in the Type 15-503 CPI Operating Manual published by the CPI manufacturer.

Once activated, the CPI beacon transmits coded identification signals on 406.025 MHz, which are detected by the international Cosmicheskaya Sistyema Poiska Avariynich Sudov / Search and Rescue Satellite (COSPAS/SARSAT) distress alerting system. The transmitted signal from the CPI beacon takes the form of short pulses spaced at approximately 50 second intervals.

The system uses geostationary (GEO) satellites to detect the initial emergency transmission, whilst low earth orbit (LEO) satellites receive a signal and enable the approximate position of the point of origin of that signal to be established. A period of time is required since at least two LEO satellites need to be in receipt of an unobstructed signal for triangulation to take place. Although the satellites are capable of receiving and relaying a GPS position message, neither the G-REDW nor G-CHCN CPIs were GPS-enabled.

The EC225 LP CPI system met the requirement in JAR-OPS 3.8202, Automatic Emergency Locator Transmitter, paragraph (b), which was valid at the time of certification of the EC225 LP and which states:

> *'An operator shall not operate a helicopter in Performance Class 1 or 2 on a flight over water in a hostile environment as defined in JAR-OPS 3.480(a)(12)(ii)(A) at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed, on a flight in support of or in connection with the offshore exploitation of mineral resources (including gas), unless it is equipped with an Automatically Deployable Emergency Locator Transmitter (ELT(AD)).'*

Footnote

[2] JAR-OPS 3 has been superseded by EC Regulation (EU) No 965/2012 of 5 October 2012. Paragraph CAT.IDE.H.280 *Emergency Locator Transmitter,* specifically replaces JAR-OPS 3.820, however there is no substantial change to the wording in the new regulation.

G-REDW CPI

The CPI on G-REDW did not deploy and remained attached to the helicopter. Photographic evidence shows that the water level in the cabin whilst the helicopter was floating was above the level at which the water activated switch was mounted. The crew did not activate the CPI beacon, either by selecting TRANSMIT or DEPLOY on the cockpit control panel, prior to the emergency evacuation. As such, no distress signal was detected from the helicopter during the accident.

G-CHCN CPI

The CPI on G-CHCN was manually selected to TRANSMIT by the flight crew during the final preparations for the ditching. At 1424 hrs a 'Detect-only' alert was received by the Aeronautical Rescue Coordination Centre (ARCC) at Kinloss, from a GEO satellite signal. This alert did not provide any positional information, but did contain the 15-digit hexadecimal code unique to G-CHCN. At 1432 hrs an unresolved position alert was then received, and at 1453 hrs a further LEO satellite alert was received, which confirmed the position of G-CHCN. The CPI beacon remained attached to the helicopter and continued to transmit until it was recovered to land. Photographic evidence and water damage within the cabin indicated that the water level was above that of the water activated switch, while the helicopter was floating.

Tests and Research

A review of the G-REDW and G-CHCN Flight Data Recorder (FDR) data confirmed that the accelerations experienced during both ditching events were insufficient to trigger the g-switches.

The G-REDW CPI system components, with the exception of the cockpit control panel and the aircraft identification unit, were removed from the helicopter and taken to the CPI manufacturer for examination and testing; they were found to be fully functional. There was no evidence of water ingress in the system interface unit or the beacon release unit. The beacon release unit was found to be in an undeployed state and as such there was no activation code stored in the system memory.

Testing of the water activated switch from G-REDW by submersion in water resulted in activation of the beacon release unit and subsequent transmission of the distress signal. No defects were identified with the tested components, which would have prevented the CPI from deploying during the accident.

Although the G-CHCN CPI beacon correctly transmitted distress signals following the manual selection of the TRANSMIT function, all of the CPI system components were removed for testing. The cockpit control unit contained seawater and had suffered extensive internal deterioration due to corrosion, which rendered it incapable of operating. All of the other components were installed on the test bench and functioned correctly, leading to successful operation of the beacon release unit and deployment of the CPI. A visual examination of the water activated switch showed minor corrosion on one of the contacts, but no evidence of salt water deposits which may have indicated complete immersion in sea water. However, the external electrical connector was corroded, indicating that the water had reached at least that level. The activation code stored in the CPI system memory confirmed the manual TRANSMIT selection of the CPI during the accident. It was therefore concluded that there were no defects with these components that would have prevented the automatic deployment of the CPI beacon, had a manual TRANSMIT not been selected.

The helicopter wiring for the CPI system installation on both helicopters was satisfactorily tested for continuity and insulation resistance.

Previous incidents

On 18 February 2009 an EC225 LP G-REDU struck the surface of the sea during a night visual approach to an oil and gas platform in the North Sea. The AAIB investigation, published in AAIB Report 1/2011, determined that the failure of the CPI to deploy contributed to the delay in locating and rescuing the survivors. The investigation further determined that the CPI on G-REDU should, under the circumstances of the accident, have released automatically and commenced broadcasting on the COSPAS/SARSAT frequency, together with the VHF distress/homing frequency of 121.5 MHz. The reason for the failure of the CPI to deploy on G-REDU was not fully determined, however a number of possibilities were considered in the report. As a result of the findings of the investigation, Safety Recommendation 2011-071 was made:

Safety Recommendation 2011-071

It is recommended that the European Aviation Safety Agency reviews the location and design of the components and installation features of Automatically Deployable Emergency Locator Transmitters and Crash Position Indicator units, when required to be fitted to offshore helicopters, to ensure the reliability of operation of such units during and after water impacts.

Safety actions

The EASA responded to Safety Recommendation 2011-071 as follows:

'A rulemaking task was initiated in May 2012 (Reference: RMT.0120 (former 27&29.008)), which aims to undertake a broad review of helicopter ditching, water impact events and subsequent occupant survivability. A determination will be made on how certification rules and guidance material can best be developed to further enhance helicopter safety. The installation and functioning of all types of Emergency Locator Transmitters following water impact events is an integral part of this task. Both future and retroactive certification requirement are being considered.'

EASA have formed a working group to support this rulemaking task; the first meeting took place in early 2013.

CPI system modification

The Type 15-503 CPI installation on G-REDW, G-REDU and G-CHCN included the 503-21 standard of beacon release unit. Following the G-REDU accident, a new standard of beacon release unit (503-21-1) was developed by the CPI manufacturer which incorporates an integral water activated switch, in addition to the cabin-mounted water activated switch. The integral water activated switch is independent of the aircraft wiring, and will act to automatically deploy the CPI if the beacon release unit, mounted behind the CPI, becomes submerged. Thus automatic deployment of the CPI may occur, even if TRANSMIT has previously been selected.

Beacon release unit 503-21-1 is compatible only with system interface unit 503-24 with modification state -3 and above. It is designed to ensure that the CPI Beacon will deploy without dependency on the system interface unit, for example if the system interface unit was damaged, or if none of the other system interface unit triggers had been activated. The beacon release unit will remain functional for up to 15 minutes after power is removed from the system interface unit, after which an automatic 'power down' switches the beacon release unit to OFF.

Discussion

The accidents to G-REDU, G-REDW and G-CHCN are among three survivable off-shore accidents, investigated by the AAIB since the provision of an Automatically Deployable Emergency Locator Transmitter (ADELT) has been a mandatory requirement. The fitment of the CPI on the EC225 LP was intended to satisfy that requirement.

The preliminary findings of the G-REDW and G-CHCN investigations, with respect to the CPI system, have therefore been reported in this Special Bulletin in order to support the current EASA rulemaking task on this subject, which was initiated, in part, in response to Safety Recommendation 2011-071 arising from the G-REDU investigation.

The CPI is a primary radio location aid, to alert search and rescue authorities, and assist location of the helicopter and survivors in the event of an aircraft distress situation, such as ditching.

The CPI on G-REDW did not release automatically; photographs show the water level in the cabin was above the level of the water activated switch. Whilst further work is required to support any final conclusions, issues relating to the continuity of the helicopter wiring when submerged, the design of the water activated switch and the location of the water activated switch relative to the water level following the ditching are being investigated as possible causes for the non-deployment of the CPI.

For G-CHCN, the CPI correctly transmitted the appropriate distress signals following manual selection of the TRANSMIT function by the crew. However, had the helicopter not remained upright, the CPI would have stayed attached to the helicopter, due to the system design which renders the water activated switch, and thus the beacon release unit, redundant, following a manual TRANSMIT selection. This would greatly reduce the possibility of successful detection of the beacon transmission by satellites. As no information relating to this feature of the CPI system operation was included in the EC225 LP Flight Manual, the operators of G-REDW and G-CHCN were not aware of this feature.

As a result of the findings of this investigation the manufacturer of the CPI system has amended the Type 15-503 CPI Operating Manual to reflect that the CPI system must be reset following a manual TRANSMIT selection, in order to restore full automatic functionality. In addition, Eurocopter has undertaken a safety action to amend the Flight Manual for all Eurocopter helicopters equipped with a Type 15-503 CPI system, to incorporate this information and issued an Information Notice 2567-S-25 to promulgate this information to operators.

The Type 15-503 CPI system is also fitted to several other aircraft types which are not addressed in the aforementioned safety actions. In addition, other ADELT devices may exhibit a similar inhibition of the automatic deployment function following a manual selection to transmit. Therefore, in order to ensure that the Flight Manuals of all other aircraft equipped with a Crash Position Indicator system, or similar ADELT, contain information about any features which could prevent full automatic functionality of the system, the following two Safety Recommendations are made:

Safety Recommendation 2013-006

It is recommended that the European Aviation Safety Agency requires the manufacturers of aircraft equipped with a Type 15-503 Crash Position Indicator system, or similar Automatically Deployable Emergency Locator Transmitter, to review and amend, if necessary, the respective Flight Manuals to ensure they contain information about any features that could inhibit automatic deployment.

Safety Recommendation 2013-007

It is recommended that the Federal Aviation Administration requires the manufacturers of aircraft equipped with a Type 15-503 Crash Position Indicator system, or similar Automatically Deployable Emergency Locator Transmitter, to review and amend, if necessary, the respective Flight Manuals to ensure they contain information about any features that could inhibit automatic deployment.

Ongoing investigation into the failure of the bevel gear vertical shaft

Since the update published in AAIB Special Bulletin S7/2012 on 29 November 2012, the investigation has continued to review the material properties and the dynamic loads in the bevel gear vertical shaft.

The coupon testing undertaken by QinetiQ to confirm the material properties and the material's susceptibility to cracking is nearing completion. An independent review of the fracture mechanics to establish why the shafts failed during normal operations is also being carried out. In order to ensure that the dynamic flight loads acting on the shaft are consistent with the design assumptions, the aircraft manufacturer is running a shaft, equipped with 32 strain gauges, through a series of dynamic tests.

The results of this activity will be reported in subsequent bulletins.

Published 18 March 2013

AAIB Field Investigation reports

SERIOUS INCIDENT

Aircraft Type and Registration:	LET L-410 UVP-E Turbolet, OK-ASA
No & Type of Engines:	2 Walter M601E turboprop engines
Year of Manufacture:	1990 (Serial Number: 902439)
Date & Time (UTC):	5 November 2012 at 1554 hrs
Location:	Isle of Man (Ronaldsway) Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 2 Passengers - 10
Injuries:	Crew - None Passengers - None
Nature of Damage:	Internal damage to left engine
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	40 years
Commander's Flying Experience:	3,221 hours (of which 2,827 were on type) Last 90 days - 157 hours Last 28 days - 51 hours
Information Source:	AAIB Field Investigation

Synopsis

The aircraft was just airborne from Runway 26 at Isle of Man Airport when there was a sudden, very loud noise. Suspecting an engine failure, the commander closed the throttles and landed ahead on the remaining runway. Examination after the incident revealed that the left engine had sustained damage to the gas generator and power turbine stages, caused by a broken balance plug released from the centrifugal compressor disc.

History of the flight

The aircraft was operating a scheduled flight between Isle of Man and Blackpool; the commander was the pilot flying. The weather conditions were fine and dry, with a surface wind from 340° at 5 kt. At 1546 hrs the flight crew called ATC to request taxi clearance, and received instructions to taxi to holding point A1 for Runway 26. At 1551 hrs the aircraft was cleared to line up and wait on Runway 26 and at 1553 hrs ATC issued the takeoff clearance.

The aircraft was configured with 18° flap. At the V_1/V_R speed of 81 kt the co-pilot called "V one rotate" and the commander started to raise the nose of the aircraft. As he did so, both pilots heard a loud noise. The commander checked the engine instruments for an indication of a failure, but did not see anything unusual and there was no yaw or abnormal aircraft behaviour. By now the aircraft had become airborne. He retarded both power levers to idle, lowered the nose and landed ahead on the remaining runway. The co-pilot advised ATC that they

were aborting the takeoff. The maximum groundspeed recorded was 101 kt. The aircraft touched down close to the intersection of Runway 03/21 and slowed to taxi speed before vacating at the end of Runway 26. The noise was still present, but much reduced at the lower power settings. The aircraft was taxied back to the parking area and a normal shutdown was carried out.

During the incident ATC instructed one other aircraft to go around. The runway was inspected once OK-ASA had vacated; no debris was found and the runway was re-opened.

Aircraft information

The LET 410 UVP-E is a 19-seat passenger aircraft powered by two Walter M601E turboprop engines. Following a routine maintenance inspection carried out at 0630 hrs, the aircraft flew six sectors prior to the incident and no abnormalities were reported by the crew.

On board were nine passengers and one infant, as well as the two pilots. There was no flight attendant and none was required. The actual takeoff weight of the aircraft was 5,943 kg; the maximum takeoff weight is 6,400 kg.

Airport information

Isle of Man Runway 26 has an asphalt surface which is 2,110 m in length. The runway is 46 m wide, except for starter strips at each end which are 30 m wide. The Takeoff Run Available (TORA) for Runway 26 is 1,909 m. The Runway End Safety Area (RESA) for Runway 26 measures 240 m x 150 m.

The airport at the time of the incident had a surface movement radar system under test. Recorded data obtained from this system was used for the investigation.

Pilot information

The majority of the commander's flying experience was on this type of aircraft. He had been based in the Isle of Man for several months and was familiar with the airport. After the incident he commented that the event was unlike any he had experienced previously while flying or during training. In particular, he remarked on the very high level of noise and the absence of any yaw.

The co-pilot had flown 785 hours on this aircraft type. He described the sound he heard during takeoff as "a terrible noise"; he did not recollect experiencing any vibration. He too commented that the event was unlike anything he had previously experienced.

Engineering information

The aircraft was inspected at Isle of Man Airport the day after the incident. The left engine did not show any external evidence of damage or leaks, however when the propeller was turned by hand a metallic rubbing noise was heard emanating from the power turbine section of the engine. No other aircraft defects were identified.

The left engine was removed from the aircraft and sent to the engine manufacturer for detailed examination, which revealed that a balance plug had broken and had released from the centrifugal compressor disc (Figure 1). Balance plugs are used to balance the compressor disc and are screwed into the disc beneath the compressor blade roots. They are secured to the disc by thread-locking adhesive in addition to centre-punch indentations at the edge of the balance plug holes. The balance plug had travelled along the gas path through the engine, causing damage to the centrifugal compressor, the gas generator and power turbine nozzle guide vanes and turbine blades (Figure 2), as well as damaging nine Intermediate Turbine Temperature (ITT) thermocouples.

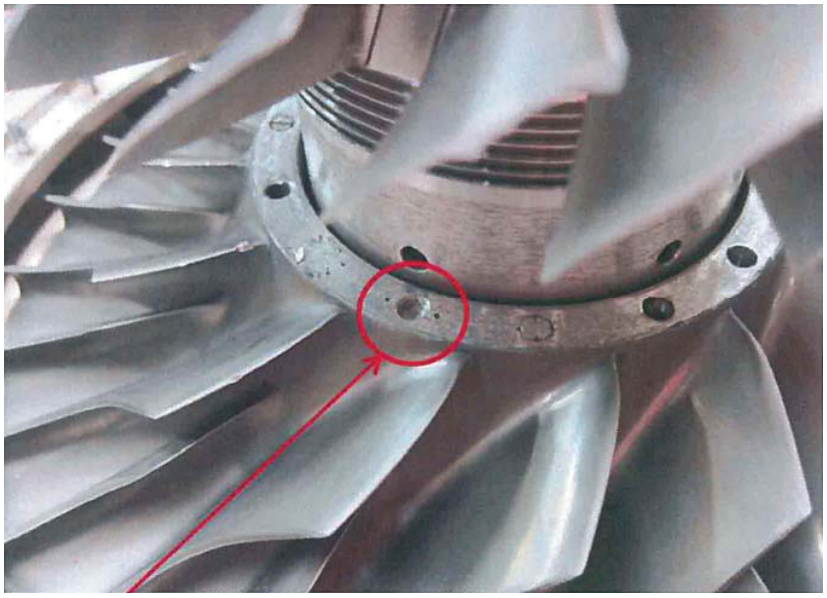

Figure 1

Location of the detached balance plug

Figure 2

Damage to gas generator turbine (top) and power turbine (bottom)

The damage to the engine was contained within the engine casing and was insufficient to cause a significant loss of power.

Following an investigation by the engine manufacturer, it was concluded that the broken balance plug had failed due to a fatigue crack originating from the thread root of the plug's uppermost screw thread. The fatigue crack's fracture surface exhibited crack initiation from multiple sites, consistent with intensive cyclical loading of the balance plug, caused by the plug becoming loose from the centrifugal compressor disc. Metallurgical examination of the broken balance plug showed that it was manufactured from the required grade of steel and that no anomalies were evident in the material's heat treatment, hardness or microstructure.

The engine manufacturer identified either insufficient assembly torque or ineffective securing of the plug after installation as possible causes for the balance plug becoming loose. The type of balance plug that failed in this incident has been withdrawn from use and the manufacturer is currently evaluating possible design changes to the remaining types of balance plug used in the M601-series of engines, in addition to changes to thread-locking adhesive compositions and plug tightening procedures.

Recorded data

The aircraft was fitted with a CVR and an FDR. The FDR was of Czech origin and a type not familiar to the AAIB. The operator provided an avionics engineer with the manufacturer's interface equipment and software. The download process yielded data from 76 flights, but not the accident flight. The CVR recording had captured the events, but suffered from a fault on the cockpit area microphone channel, which attenuated the recording. The operator committed to resolving the flight recorder problems. EASA is currently assessing requirements associated with the checking of flight recorders.

Summary

The source of the noise heard by the crew during the takeoff was traced to damage in the gas generator and power turbine stages of the left engine, caused by a broken balance plug released from the centrifugal compressor disc. The damage sustained by the engine was not sufficient to cause a significant loss of power and therefore the usual cues for the flight crew of an engine failure, loss of power and associated yaw, were missing. The flight crew were also startled by the level of noise, as it was outside of any of their previous experience.

The commander suspected a failure of the left engine but was not certain as to what had happened. Realising that there was sufficient runway ahead to land the aircraft safely, he decided to close the power levers and abort the takeoff.

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:	Airbus A321-131, D-AIRX
No & Type of Engines:	2 IAE V2530-A5 turbofan engines
Year of Manufacture:	1998 (Serial no: 0887)
Date & Time (UTC):	21 October 2012 at 0710 hrs
Location:	On approach to London Heathrow Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 6 Passengers - 139
Injuries:	Crew - None Passengers - None
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	42 years
Commander's Flying Experience:	11,950 hours (of which 1,700 were on type) Last 90 days - 160 hours Last 28 days - 40 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and additional AAIB enquiries

Synopsis

Whilst on the approach into London Heathrow a strong smell became apparent on the flight deck, which resulted in eye and throat irritation being experienced by both pilots. Having established that there was a similar problem in the cabin, both pilots donned oxygen masks and, following an expedited clearance, landed the aircraft without further incident. Despite medical examinations of the affected crewmembers and an investigation, by the operator, of the engines and air conditioning system, no explanation for the odour or symptoms experienced by the crew could be found.

History of the flight

After passing Flight Level 120 on the approach to London Heathrow the co-pilot noticed a strong smell, which was accompanied by eye and throat irritation. The commander used the interphone to call the purser, who confirmed that there was also an odour in the cabin and that she was experiencing the same symptoms as the co-pilot. The co-pilot was by now feeling dizzy and nauseous; both crew then donned their oxygen masks and requested priority landing clearance.

After an uneventful approach the aircraft landed within 10-15 minutes of the onset of the smell. The aircraft was halted on a parallel taxiway and the engines and air conditioning were shut down. The commander then informed the crew, passengers, ground control and the

Fire Service of the situation and the aircraft was towed to its parking location. After shutting the engines down, the situation in the cabin improved, although a few passengers reported light throat irritation.

The co-pilot continued to feel nauseous and dizzy and the other crewmembers still complained of eye and throat irritation. As a result the entire crew were sent to a local hospital for examination. They were released after several hours, by which time their condition had improved and the results of blood tests, taken earlier, produced no medical findings. The crew returned to their base in Frankfurt where they immediately went to a hospital for further examination. Once again, the test results revealed nothing abnormal.

The investigation

Whilst at Heathrow, the engines were subjected to a comprehensive inspection that checked for oil traces and residues. The most recent oil uplift, for both engines, was on 12 October 2012, 9 days prior to the incident. The only finding was some droplets of "dirty rainwater"within the high pressure compressor and in the reverser cowl. Subsequent laboratory analysis indicated the presence of salts that possibly could have come from de-icing fluids. The relevant records indicated that the aircraft had not been de-iced since 14 April 2012. Sulphur was also found, although there was no indication, or even speculation in the laboratory report, as to its likely origin.

Inside the aircraft the flight deck and cabin lights were checked for function and traces of odour, with no findings. The circulation fans were checked and the recirculation and avionic filters were inspected and replaced. The recirculation filter was later subjected to gas chromatography analysis: although some engine oil traces were found, these were similar in quantity to those found in the filter from another aircraft in the fleet with similar flying hours but which had no history of unusual odours or crew incapacitation. Finally, checks were conducted on equipment in the galley and toilet areas, - all with no findings.

During the subsequent ferry flight from Heathrow to Frankfurt, several configurations of the environmental control system were tested under different engine power settings. During the tests the cabin air quality was assessed by an electronic analyser; the results revealed no evidence of engine oil or any other abnormalities. (Note: as the auxiliary power unit was turned off at the time of the incident, it did not form part of this investigation.)

After arriving in Frankfurt the engines were inspected again, including a check on the low-pressure shafts for signs of oil residue or carbon build-up, and a similar inspection, using a borescope, of the sump and fan module areas; nothing was found. The high pressure compressors of both engines were also inspected with a borescope, with "old birdstrike debris" being found in stages 3 and 4 on the No 2 engine. This was not thought to be linked to the odour observed during the incident.

Discussion

The investigation was inconclusive in that a source of the apparent contamination of the cabin and flight deck air was not found, despite the detailed analysis of residues and the medical examinations of the affected members of the crew. This event thus joins a growing number of cases in which there has been a similar lack of conclusive evidence as to the cause(s) of aircraft cabin air quality issues.

Over the years there have been numerous reviews, studies and research projects on air quality events,

conducted in a number of countries. There is a general acceptance that cabin air can be contaminated by compounds released in pyrolysed oil from engines and auxiliary power units. As an example, some events on early models of Rolls-Royce RB211-535C-powered Boeing 757 aircraft were attributed to overfilling with engine oil. Modern lubricants contain synthetic additives, including organophosphates, which can have adverse effects on the nervous system. Additional contamination can result from substances such as hydraulic oil, de-icing fluids, smog and industrial pollution being ingested by the engines before being distributed around the aircraft by the air conditioning system.

In the United Kingdom, a Civil Aviation Authority analysis of Mandatory Occurrence Reports[1] (MORs) indicated that 'fume events' occur on approximately 0.05% of all commercial passenger and cargo flights. In most cases the effects on aircrew take the form of 'acute' symptoms, such as eye and throat irritation, as experienced by the crew of D-AIRX, although long term health issues have been recorded. However, inconsistent reporting is thought to have affected the quality of the evidence. It is also worth noting that in tests where measurements of contaminants have been taken, the concentration is invariably well below internationally agreed levels for occupational exposure.

Footnote

[1] References and extensive supporting literature can be found in numerous sources, including the 2010 Australian Civil Aviation Safety Authority (CASA) Expert Panel on Aircraft Air Quality (EPAAQ) Final Report, and in the summary report, Health Effects of Contaminants in Aircraft Cabin Air, by Prof Michael Bagshaw, Ocober 2012.

ACCIDENT

Aircraft Type and Registration:	Vickers Supermarine Spitfire Mk XIX, G-RRGN
No & Type of Engines:	1 Rolls-Royce Griffon RG 30 SM-S piston engine
Year of Manufacture:	1945 (Serial no: 6S-594677)
Date & Time (UTC):	7 January 2013 at 1519 hrs
Location:	East Midlands Airport
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to propeller, lower engine cowling, both radiator fairings, left flap, left aileron, underside of left wing
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	46 years
Commander's Flying Experience:	9,273 hours (of which 89 were on type) Last 90 days - 217 hours Last 28 days - 62 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft had landed on Runway 27 at East Midlands Airport and was taxiing to vacate the runway when the undercarriage retracted, causing the wooden propeller to strike the runway and shatter. The pilot stated that he had intended to retract the flaps but inadvertently selected the undercarriage to UP: the levers are on different sides of the cockpit (Figure 1). It is apparently a usual practice to retract the flaps a soon as possible after landing to minimise the effect they have on cooling radiator airflow. There is no weight-on-wheels protection circuit.

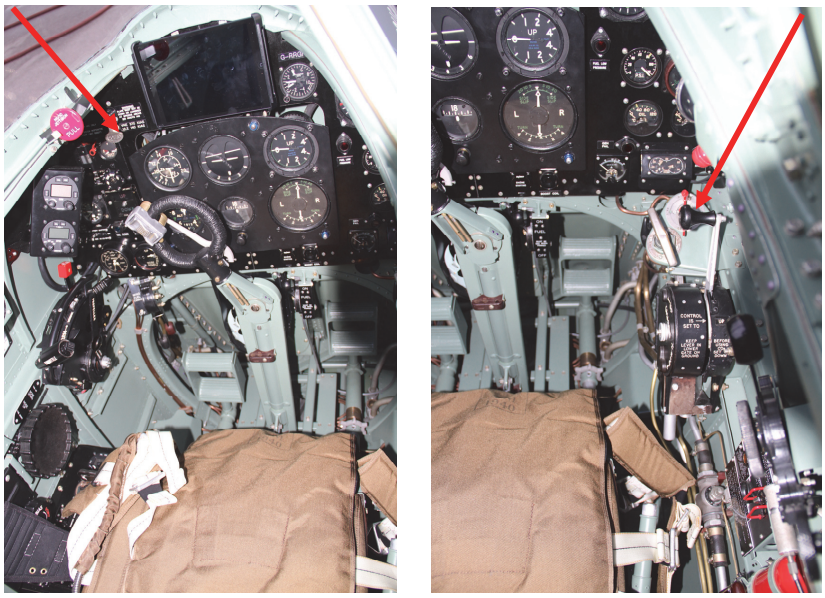

Figure1

Spitfire Mk XIX cockpit showing flap lever (arrowed left) and undercarriage selector (arrowed right)

ACCIDENT

Aircraft Type and Registration:	Beech BE76 Duchess, G-GDMW
No & Type of Engines:	2 Lycoming O-360-A1G6D piston engines
Year of Manufacture:	1980 (Serial no: ME-316)
Date & Time (UTC):	6 February 2013 at 1330 hrs
Location:	Bournemouth Airport
Type of Flight:	Training
Persons on Board:	Crew - 2 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Damage to engines and propellers, and right wing skin
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	51 years
Commander's Flying Experience:	10,000 hours (of which more than 3,000 were on type) Last 90 days - 183 hours Last 28 days - 78 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot, report by the aircraft repair organisation and earlier accident reports

Synopsis

During takeoff, the aircraft's landing gear partially retracted. The most likely cause was that the landing gear selector lever had been inadvertently selected to UP, which may have arisen through contact with the pilot's knee as he made rudder inputs in a brisk crosswind. A safety switch linked to airspeed prevented actual retraction until the airspeed rose above the triggering value during takeoff. A detent system designed to prevent inadvertent operation of the gear lever was not effective.

Description of the event

The aircraft commenced takeoff from Runway 08 at Bournemouth Airport for an instrument flying exercise. The left seat pilot was undergoing instrument training and his instructor occupied the right seat; the left seat pilot was handling the aircraft for takeoff. There was a northerly surface wind at 20 kt and the aircraft yawed to the left due to the crosswind, causing the left seat pilot to apply right rudder to correct the deviation. Shortly afterwards, the aircraft's nose pitched down onto the runway and its right wing sank to the ground. The aircraft was brought to a rest on the runway with a collapsed nose gear and partially collapsed main gear. All occupants egressed without difficulty or injury.

The aircraft maintenance and repair organisation reported that the circumstances were consistent with the aircraft's landing gear moving through a normal retraction cycle, although the landing gear control lever was found in the DOWN position. The landing gear was found to operate normally after the accident. It was noted that the landing gear lever on some of the operator's fleet of Duchess aircraft had been fitted with a guard to physically prevent an inadvertent UP selection, but G-GDMW had not been so modified by the time of the accident.

The aircraft commander was aware of past Duchess occurrences in which the landing gear lever had inadvertently been selected to UP while the aircraft was on the ground, and he noted that the detent intended to prevent such movement was sometimes worn and not effective. He considered it most likely that the landing gear lever was inadvertently moved to the UP position during the takeoff roll, quite possibly by the left seat pilot's knee during the rudder inputs just before the gear commenced retraction.

Landing gear operation

Landing gear position on the Beech Duchess 76 is controlled by a two-position lever on the left sub-panel. The handle, which is an electrical switch, must be pulled outwards to clear a safety detent before it can be moved to the opposite position. Hydraulic power to retract and extend the landing gear is provided by an electrically driven hydraulic pump, which provides power to actuators in each wheel well. Inadvertent gear retraction on the ground is prevented by a speed sensing safety switch located in the pitot system, which deactivates the hydraulic pump when airspeed is below 59 to 63 kt (if the landing gear is inadvertently retracted on the ground above this speed, the retraction sequence will cease when the airspeed falls below the threshold).

Previous occurrences

On 11 June 2009, a Beech Duchess 76 (registration G-MULT) suffered a partial landing gear retraction during a touch-and-go landing at Bournemouth Airport. The AAIB report[1] into the accident describes the aircraft making a normal landing before the nose and right landing gears collapsed. The instructor noticed his student's knee in the vicinity of the landing gear lever just before the collapse, which had moved to the UP position. It was later established that the student's knee could contact the lever during rudder pedal movement or even while adjusting his position within the seat.

On 4 June 2009, a Beech Duchess 76 (registration EI-BUN) suffered a partial landing gear retraction during landing at Weston Airport, Co Kildare in Ireland. The Air Accident Investigation Unit (AAIU) established[2] that the student pilot's knee was within 5 cm of the landing gear lever when he was seated normally at the controls, and that it was possible for his knee to come into contact with the selector lever as his feet slid upwards to operate the wheel brake pedals. It was also noted that the safety detent was ineffective, and it was possible for his knee to knock the lever to the UP position without first pulling it to clear the detent. The AAIU report included a photograph depicting this situation, which is reproduced at Figure 1.

The AAIU made the following safety recommendation to the Hawker Beechcraft Corporation:

> ***Safety Recommendation IRLD2010001:***
>
> *Hawker Beechcraft Corporation should review the design and location of the Beech Duchess 76 landing gear selector switch so as to eliminate the possibility of inadvertent selection to the UP position.*

Footnote

1 AAIB report reference: EW/G2009/06/05.
2 AAIU Report No 2010-001, published 18 January 2010.

Figure 1

Extract from AAIU report: proximity of student's knee to landing gear selector lever

The Hawker Beechcraft Corporation's response is reproduced below:

Hawker Beechcraft Corporation Engineering has reviewed the landing gear switch installation in the Model 76 Duchess. The landing gear switch is a two position switch. The switch handle is spring loaded to be held in position at each furthest end of its travel (i.e. landing gear retracted, landing gear extended) in a detent. To be moved from one position to the other (up or down), the switch handle must first be pulled out (aft) to release the handle from the detent. This dual action required to activate the switch minimizes the possibility of inadvertent actuation.

With the switch in the down position, while not normal, it is possible for the pilot's leg/knee to contact the switch handle. The angle of movement of the pilot's leg and in relation to the axis of the switch handle in addition to the shape of the handle would likely result in a force that is perpendicular to the axis of the handle or a force forward. Since the detents prevent the switch from being moved without pulling the handle aft in line with the axis of the handle, it is unlikely that the switch could be moved from the down position to the up position as a result of contact with the pilot's knee.

The statement above assumes that the detents of the switch functioned properly. Airplanes that are used for flight training will have a significantly greater number of landing gear cycles than airplanes not used for training. If the down (landing gear extended) detent was worn significantly or the spring had lost its ability to hold the handle in the detent, the likelihood of the switch being moved from the down position to the up position as a result of contact with the pilot's knee is increased.

HBC has no record of this type of incident prior to M-371 and M-396 (G-MULT).

The Beechcraft Duchess 76 Maintenance Manual recommends a landing gear operational check be performed every 100 hours of airplane operation. The Maintenance Manual specifies that maintenance personnel check the retraction system for proper operation of all components through at least two cycles. This includes proper operation of the landing gear switch. Current Maintenance Manual and inspection procedures are adequate to determine proper operation of the landing gear switch detents and spring.

ACCIDENT

Aircraft Type and Registration:	Cessna 180, G-BEOD
No & Type of Engines:	1 Continental Motors Corp O-470-L piston engine
Year of Manufacture:	1955 (Serial no: 32092)
Date & Time (UTC):	18 November 2012 at 1515 hrs
Location:	Runway 03, Lydd Airport, Kent
Type of Flight:	Private
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to right wing, landing gear, propeller and tailplane
Commander's Licence:	Private Pilot's Licence
Commander's Age:	76 years
Commander's Flying Experience:	518 hours (of which 22 were on type) Last 90 days - 1 hour Last 28 days - 1 hour
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft was taking off from Runway 03 at Lydd Airport to practise circuits; the wind direction was reported as 090º at a speed of about 4 kt. The pilot reports that he started the takeoff run with the first stage of flap selected and, as the tail lifted and full power was applied, he applied right rudder to counteract the engine torque. At an indicated 60 mph the aircraft lifted off with the end of the runway coming into sight. However, the aircraft suddenly veered to the left and, in trying to correct with right rudder and aileron, the pilot was unable to prevent the right wingtip from striking the ground. The aircraft came to a halt with the right main landing gear strut detached and further damage to the right wingtip, tailplane and propeller.

ACCIDENT

Aircraft Type and Registration:	Diamond Aircraft DA 40 D Diamond Star, G-OCCL
No & Type of Engines:	1 Thielert TAE 125-02-99 piston engine
Year of Manufacture:	2006 (Serial no: D4.237)
Date & Time (UTC):	16 December 2012 at 0950 hrs
Location:	Wolverhampton (Halfpenny Green) Airport
Type of Flight:	Training
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Propeller destroyed, probable damage to clutch and gearbox. Damage to tail and tail rotor system of parked helicopter
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	59 years
Commander's Flying Experience:	4,015 hours (of which 172 were on type) Last 90 days - 24 hours Last 28 days - 6 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft taxied to the airfield fuel bay with a flying instructor and his student on board. Forward visibility was reduced by moisture on the windscreen and the effects of a low sun. The flying instructor, who was taxiing the aircraft, did not see a light helicopter which was already parked at the fuel bay. The aircraft collided with the helicopter at low speed.

History of the flight

An R44 helicopter was parked at the airfield fuel bay for refuelling. The DA 40 Diamond Star (G-OCCL), with a flying instructor and his student on board, taxied to the fuel bay and collided with the helicopter.

The flying instructor had been tasked to oversee a solo consolidation exercise. The aircraft had been hangared overnight, but had been pulled outside before his arrival at the airfield at 0910 hrs. The air temperature was 2°C. After completing the daily inspection, the instructor briefed his student for the exercise and then the pair boarded the aircraft. With the engine running, air was directed to the windscreen but it was slow to demist, so the instructor cleared the inside of the screen with the back of his glove. He also reached through the DV (direct vision) window and cleared moisture from the outside of the screen immediately in front of him.

The student then commenced taxiing towards the fuel bay. The route involved a section of taxiway followed by right then left turns into the bay, to pass between a fuel bowser and a fire service vehicle. As the aircraft emerged from the shadow of a hangar, the student informed the instructor that he could not see to taxi (the taxi route was into sun, which was still low in the sky). The instructor could see ahead, so took control and continued taxiing. As the aircraft approached the fuel pumps, the sun was directly ahead and visibility was poor, particularly to the left. The instructor failed to see the helicopter parked at the fuel pumps and the aircraft taxied into its tail at low speed. The instructor shut down the aircraft, made it safe and both occupants vacated. The helicopter, which was unoccupied, suffered damage to its tail and tail rotor system.

The instructor reported that the primary cause of the accident was his failure to clear the windscreen thoroughly. He considered that contributory causes were the low sun directly ahead and the distraction posed by the need to taxi carefully through the relatively narrow space between the fuel bowser and fire vehicle.

ACCIDENT

Aircraft Type and Registration:	Piper PA-28-161 Cherokee Warrior II, G-BRBA
No & Type of Engines:	1 Lycoming O-320-D3G piston engine
Year of Manufacture:	1979 (Serial no: 28-7916109)
Date & Time (UTC):	2 February 2013 at 1150 hrs
Location:	Full Sutton Airfield, York
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to propeller and nosewheel
Commander's Licence:	Private Pilot's Licence
Commander's Age:	57 years
Commander's Flying Experience:	521 hours (of which 426 were on type) Last 90 days - 1 hour Last 28 days - 0 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot was performing a full-stop landing at Full Sutton Airfield following three 'touch-and-go' landings. As on the previous approaches, he encountered strong turbulence on short finals and added power as a precaution against sink. The aircraft failed to stop on the damp grass runway and overran, damaging the nose landing gear and propeller.

History of the flight

The pilot had travelled to Full Sutton Airfield to practise circuits. He reported that it was a cold, dry day with very good visibility; the wind was 330° at 15 kt and Runway 22 was in use. This is a grass runway with a landing distance available of 772 metres and on the day was reportedly "very damp".

He experienced strong turbulence on his first final approach and carried out a low go-around, making a mental note to increase his approach speed to 75 kt and limit flap to two stages. He performed two successful touch-and-goes at that speed and in this configuration. On his fourth approach, the pilot elected to perform a full-stop landing. He again encountered strong turbulence on short finals and added power to guard against sink and maintain stability. On touchdown he allowed the aircraft to roll freely to check directional stability before applying gentle braking. He noticed that there was a lack of deceleration and so increased the braking effort to "moderate", but could sense the wheels skidding. He tried to use a cadence braking technique to prevent the wheels locking and also started turns to

the left and right to try and lose speed. He could feel the aircraft starting to skid, so he made these turns very gentle and eventually allowed the aircraft to run straight toward the end of the runway.

The aircraft overran the runway end to the left. Just prior to stopping, the nose landing gear caught a lip, compressing the oleo and causing the propeller to strike the ground. The nosewheel also sank into the soft ground and twisted sideways, bending the leg. The pilot vacated the aircraft normally, having radioed the situation to the Air/Ground Service.

The pilot feels that, with hindsight, he should have gone around on encountering the turbulence. His preoccupation with adding power and persisting with the landing meant that, together with the runway condition and the possibility of a slight tailwind component, he had eroded his chances of stopping successfully.

ACCIDENT

Aircraft Type and Registration:	Reims Cessna F152, G-BGFX
No & Type of Engines:	1 Lycoming O-235-L2C piston engine
Year of Manufacture:	1978 (Serial no: 1555)
Date & Time (UTC):	21 December 2012 at 1358 hrs
Location:	Fairoaks Airport, Woking, Surrey
Type of Flight:	Training
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Propeller, nose gear, firewall and right wingtip
Commander's Licence:	Student pilot
Commander's Age:	61 years
Commander's Flying Experience:	28 hours (of which 28 were on type) Last 90 days - 7 hours Last 28 days - 3 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The student pilot had flown several dual circuits with his instructor and was now practising solo circuits. On touching down for the fourth time, he felt the nose drop and the propeller struck the ground. The nose landing gear had collapsed and the aircraft veered to the left onto the grass at the side of the runway, coming to rest on its nose and left wingtip. The pilot was "shocked but uninjured".

Neither the pilot, nor his instructor who had been watching from the control tower, could offer an explanation for the failure.

ACCIDENT

Aircraft Type and Registration:	Taylor Monoplane, G-BDAD
No & Type of Engines:	1 Volkswagen 1700 piston engine
Year of Manufacture:	1976 (Serial no: PFA 1453)
Date & Time (UTC):	12 January 2013 at 1345 hrs
Location:	Near Breighton Airfield, North Yorkshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damaged canopy, possible further damage pending assessment
Commander's Licence:	Private Pilot's Licence
Commander's Age:	56 years
Commander's Flying Experience:	612 hours (of which 6 were on type) Last 90 days - 5 hours Last 28 days - 5 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft's engine started normally and ran without problem, both before takeoff from Runway 11 at Breighton and during the initial part of the flight, with carburettor heat being applied at intervals. The weather conditions reported at nearby Church Fenton were: partly cloudy, temperature 4°C, dewpoint 2°C and a wind from 110° at 10 kt.

About 25 minutes after takeoff, the pilot flew a low-level pass along the runway at Breighton. On climbing out through about 400 ft, with full power set and about 60 kt airspeed, the engine briefly misfired then stopped. The pilot selected a field approximately ahead and carried out a forced landing into wind. The touchdown was uneventful in the ploughed field, but the aircraft pitched nose down as it came to a stop and inverted, breaking the canopy. The pilot, who was wearing a full harness, escaped from the aircraft by breaking pieces of the remaining canopy and digging to create an escape route.

When the aircraft was subsequently recovered, the pilot was able to turn the engine by hand. He observed that the engine had performed well until the stoppage, which he thought was due to carburettor icing.

ACCIDENT

Aircraft Type and Registration:	Titan T-51 Mustang, G-MUZY
No & Type of Engines:	1 Rotax 912 ULS piston engine
Year of Manufacture:	2009 (Serial no: LAA 355-14831)
Date & Time (UTC):	30 October 2012 at 1318 hrs
Location:	Wellesbourne Mountford Airfield, Warwickshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Damage to propeller and panels on underside of fuselage
Commander's Licence:	Private Pilot's Licence
Commander's Age:	52 years
Commander's Flying Experience:	1,420 hours (of which 4 were on type) Last 90 days - 15 hours Last 28 days - 10 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further inquiries by the AAIB

Synopsis

Whilst in the circuit to land, the pilot found the throttle had jammed in the fully open position. When approaching on finals, his efforts to free the jam resulted in the throttle becoming stuck at idle. The landing gear would not extend and the pilot landed wheels-up on the grass. It was found that an exhaust pipe weld had fractured, releasing hot gases into the engine bay and causing damage to several components.

History of the flight

The aircraft was returning from a local flight and was downwind to land on Runway 18. The pilot attempted to throttle back but found that the throttle had jammed on full power. He informed ATC of his predicament and of his intention to extend the downwind leg and fly a long final leg before cutting the engine completely to land from a glide approach. At about two miles finals, he lowered flap and landing gear to try and slow the aircraft.

The pilot continued to attempt to free the throttle lever but he found that it suddenly snapped back into the idle setting and would now not move forwards. He was uncertain whether he could make the airfield and raised the flaps and landing gear to reduce drag, whilst he considered other forced landing options. As he drew nearer to Wellesbourne he realised that he could land there and selected the landing gear down. ATC radioed to tell him that the landing gear was visibly not down; he recycled it but still to no avail and, since he did

not have sufficient power to go around, he committed to a wheels-up landing on the grass to the side of the runway. This was successful and the pilot exited the aircraft normally.

Investigation

The Titan T-51 is a ¾ scale replica of the North American P51D fighter. It has two seats, is kit-built with an all-metal construction and is available with a number of engine options. The Light Aircraft Association (LAA) advise that G-MUZY was one of two aircraft of this type with current UK Permits to Fly (the other aircraft has a different engine) and they are aware of a further three under construction.

Upon examination, it was found that an exhaust pipe welded to the expansion box under the engine cowling had failed at the weld (Figure 1) and the hot gases thereby released had damaged several components in the area, including the throttle cable, and had partially melted the battery. It was clear that the throttle problems were caused by heat deterioration of the throttle cable and the landing gear system, which is electro-hydraulic, had been unable to function due to the battery damage. It should have been possible to actuate the standby free-fall landing gear extension, but this was not attempted by the pilot.

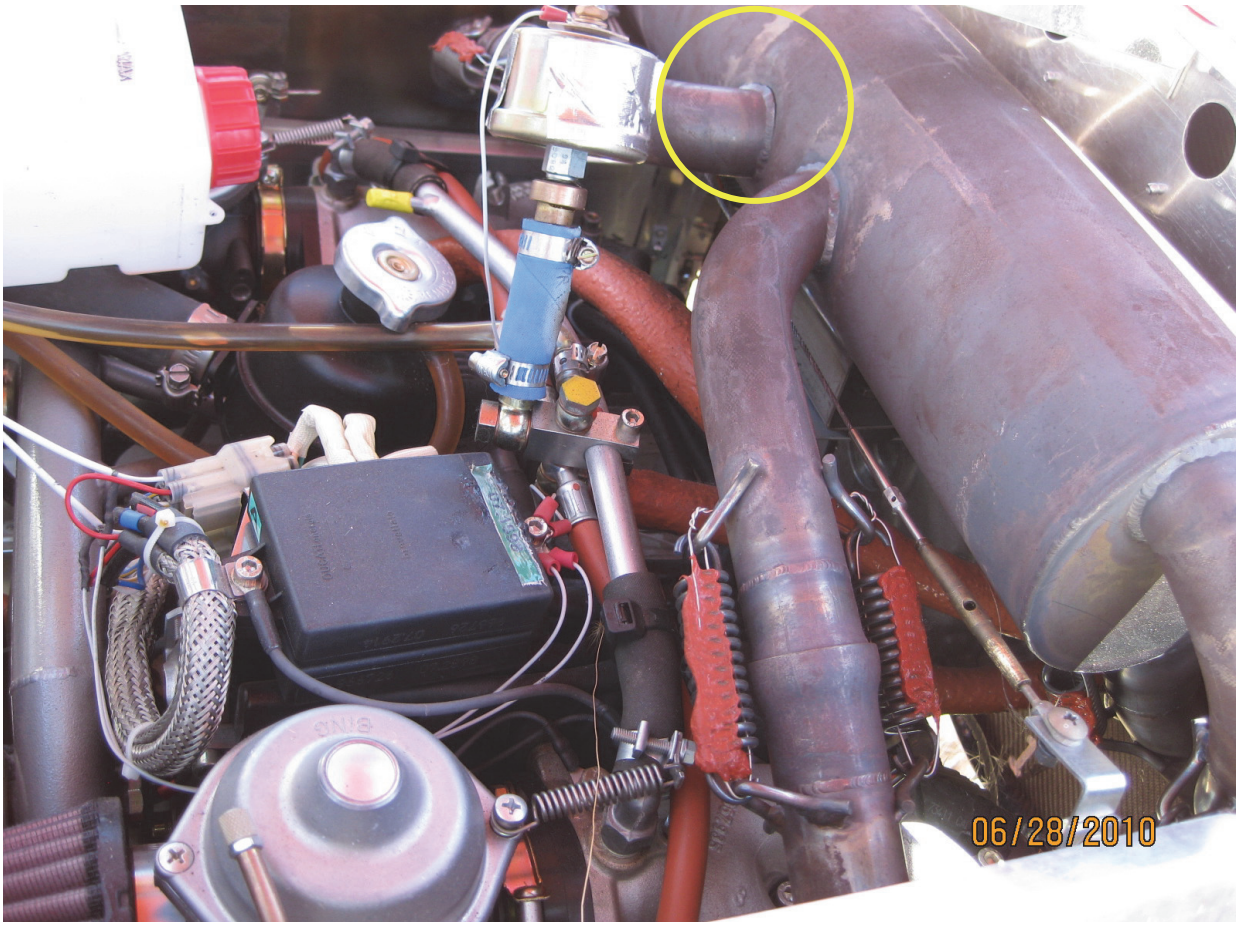

Figure 1

View of the engine compartment of a Titan T51 (not G-MUZY). Note presence of a crack (circled) in the exhaust similar to that thought to be responsible for the failure on G-MUZY

The LAA has advised that they intend to conduct a review of the design of the exhaust system, since it is thought that the failure probably occurred following a period of crack development. which went undetected. For the same reason they will also look at the ease of access to the area for frequent inspections for defects such as this. The LAA give the general advice to pilots about to fly an aircraft with which they are unfamiliar, that they receive a full briefing, and understand all the aircraft systems, before they take to the air.

ACCIDENT

Aircraft Type and Registration:	CFM Metal-Fax Shadow Series CD, G-MWRY
No & Type of Engines:	1 Rotax 503-2V piston engine
Year of Manufacture:	1991 (Serial no: K162)
Date & Time (UTC):	8 December 2012 at 1300 hrs
Location:	Tinnel Farm, Landulph, Cornwall
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Serious) Passengers - N/A
Nature of Damage:	Damage to forward fuselage, nosewheel, main landing gear, slipper tank, propeller, engine and right wing
Commander's Licence:	Private Pilot's Licence
Commander's Age:	57 years
Commander's Flying Experience:	370 hours (of which 127 were on type) Last 90 days - 8 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft was taking off from a farm strip when the pilot sensed a reduction in engine power and realised that he was not going to get airborne before impact with a fence and hedge. The aircraft struck the obstacles whilst still on the ground and in a nose-high attitude. The pilot sustained a serious back injury.

History of the flight

The pilot intended to embark on a short local flight. The weather was dry and sunny, with a very light breeze from the north, and the grass field, which was about 300 metres long and orientated north-east/south-west, was cut short but was soft and wet. The aircraft commenced its takeoff roll in the north-easterly direction and the nosewheel lifted but, just as the mainwheels were about to unstick, the pilot detected a slight change in the engine note and the nosewheel dropped back down. He realised that he could not stop before the fence/hedge at the end of the runway, particularly since the last 40% of the runway had a downslope of 1.5º as well as the wet condition. Because he was concerned about going through the hedge feet-first, he kept the throttle open so that he could raise the nose, which he achieved just before impact - his feet cleared the hedge but the underside of the aircraft and his seat did not. He suffered a compression fracture of the number twelve, thoracic vertebra in the collision but noted that a fence wire had travelled up the screen and over his head, and he was of the opinion that, if the nose had been lower, the wire

would probably have struck him in the head. In view of this, weak links have been incorporated in the fencing at the end of the grass strip at Tinnel Farm. The aircraft was extensively damaged.

In his post-accident analysis of the events, the pilot believes that a combination of the very light headwind component, the soft ground and a somewhat forward centre of gravity conspired to reduce safety margins.

CAA guidance

CAA Safety Sense Leaflet 7c, *Aeroplane Performance*, provides advice on take-offs. In paragraph 6, *TAKE-OFF - POINTS TO NOTE*, it states:

> *b) **Decision point**: you should work out the runway point at which you can stop the aeroplane in the event of engine or other malfunctions, e.g. low engine rpm, loss of ASI, lack of acceleration or dragging brakes. Do NOT mentally programme yourself in a GO-mode to the exclusion of all else.*

> *If the ground is soft or the grass is long and the aeroplane is still on the ground and not accelerating, stick to your decision-point and abandon take-off. If the grass is wet or damp, particularly if it is very short, you will need a lot more space to stop.*

This leaflet also provides safety factors which are recommended when planning an aeroplane's takeoff performance.

ACCIDENT

Aircraft Type and Registration:	Escapade 912(2), G-CEIL
No & Type of Engines:	1 Rotax 912 piston engine
Year of Manufacture:	2006 (Serial no: BMAA/HB/506)
Date & Time (UTC):	5 March 2013 at 1600 hrs
Location:	St Michaels Airfield, near Preston, Lancashire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Substantial damage to landing gear, propeller, right wing tip and fuselage
Commander's Licence:	Private Pilot's Licence
Commander's Age:	68 years
Commander's Flying Experience:	755 hours (of which 65 were on type) Last 90 days - 5 hours Last 28 days - 3 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot became distracted by a tractor operating near to the start of the landing runway and flew the aircraft to a landing further along the runway than he was used to. The aircraft bounced twice and he initiated a go-around, but the aircraft struck an earth bank at the runway end, coming to rest in the field beyond.

History of the flight

St Michaels is a grass airfield with three runways which all intersect at approximately the same position. The longest runway is 36/18, which is about 450 m long. The intersection point with the other two runways is about 100 m from the start of Runway 18.

Earlier on the day of the accident, the pilot flew as passenger in G-CEIL and he noted that, although the day was sunny with only a light wind, the visibility was poor. With the pilot of the earlier flight, he prepared for a further flight, with the intention of flying a visual circuit first to assess the visibility (later assessed as about 4,000 m). A tractor was operating in the field in the vicinity of the intersection, so the pilot commenced takeoff from a point just beyond.

The visibility proved to be unsuitable for anything other than circuits, so the pilot continued with a circuit to Runway 18. He saw the tractor still operating near to the intersection, and later considered that he became distracted by it and over compensated, landing much

further along the strip than he usually did. The aircraft bounced twice before the pilot decided to go-around. However, one of the main wheels struck the top of an earth bank at the runway end, yawing the aircraft left and leading to an uncontrolled landing in the field beyond the runway end.

Neither the pilot nor his passenger was injured, and both exited the aircraft without difficulty. The pilot observed that an early go-around would have been the best course of action, as soon as it became clear that the aircraft would touch down a long way into the available runway.

ACCIDENT

Aircraft Type and Registration:	Flight Design CT2K, G-CBEX
No & Type of Engines:	1 Rotax 912 ULS piston engine
Year of Manufacture:	2001 (Serial no: 7867)
Date & Time (UTC):	2 March 2013 at 1500 hrs
Location:	Private airstrip near Heckington, Lincolnshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to left wing, landing gear, fuselage and propeller
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	51 years
Commander's Flying Experience:	556 hours (of which 278 were on type) Last 90 days - 8 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft had flown from its base near Newark-on-Trent to the airstrip, about 17 nm away. On arrival, a person on the ground informed the pilot by radio that the landing direction at the east-west orientated grass strip was to the west. The weather was fine, with a light surface wind from north or north-west. The pilot flew a right hand finals turn to a normal landing on the strip, which the pilot described as wet. After a short ground run, the aircraft encountered a bump and became airborne again for a time. When it landed again, the pilot applied the brakes, but this induced a skid and the aircraft veered to the left. The pilot regained control but, having insufficient runway remaining to abandon the landing, attempted a controlled run off onto an adjacent track. However, the left main wheel caught in a dyke and the left wing struck a tree. The aircraft yawed through 360° and came to rest.

The pilot observed that the best course of action would have been to go-around after the initial bounce. He had not landed at the airstrip before and was unaware that the last 100 m of the strip sloped downwards.

ACCIDENT

Aircraft Type and Registration:	Gemini Flash IIA, G-MTTW
No & Type of Engines:	1 Rotax 462 piston engine
Year of Manufacture:	1987 (Serial no: 622-188-5-W411)
Date & Time (UTC):	11 November 2012 at 0955 hrs
Location:	Caernarfon Airport, North Wales
Type of Flight:	Training
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to cockpit, wing, trike, keel and propeller
Commander's Licence:	Student
Commander's Age:	77 years
Commander's Flying Experience:	36 hours (of which 9 were on type) Last 90 days - 5 hours Last 28 days - 1 hour
Information Source:	Aircraft Accident Report Form submitted by the pilot

After a 30-minute checkout with his instructor, the student was despatched for a solo local flight. After being airborne for about 30 minutes, the student rejoined the circuit to land. The instructor, watching from the ground, saw the aircraft round out "perfectly" but, as the wheels touched down, the aircraft veered violently to the left and flipped onto its right side. The student was airlifted to hospital as a precaution but was released later that afternoon.

The student admitted that he forgot to check, as he had been instructed to do, that the nosewheel steering was straight whilst on the downwind leg and final approach. The instructor, who described his student as "very able and competent", attributes the omission to a momentary lapse of concentration by the student.

ACCIDENT

Aircraft Type and Registration:	Jabiru UL-450, G-CCMC
No & Type of Engines:	1 Jabiru Aircraft PTY 2200A piston engine
Year of Manufacture:	2003 (Serial no: PFA 274A-13775)
Date & Time (UTC):	9 August 2012 at 1130 hrs
Location:	Bembridge Airfield, Isle of Wight
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to front wheel spat, propeller tips and fuselage/ firewall at nose leg mounting point
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	67 years
Commander's Flying Experience:	148 hours (of which 18 were on type) Last 90 days - 5 hours Last 28 days - 3 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

Whilst landing at Bembridge, the aircraft's nosewheel struck the ground and the aircraft bounced twice before climbing away and then performing a normal landing. Damage was subsequently found to the propeller tips and nose landing gear.

History of the flight

The pilot had flown from Westonzoyland airfield together with a friend in another aircraft. Arriving at Bembridge, he joined the circuit "left downwind" for Runway 12 and was number two behind his friend. The windsock indicated a windspeed of 5-6 kt from about 150° and the weather conditions were good: he saw his friend land and taxi to the parking area as he continued his approach, which was normal.

However, as he crossed the threshold and started to flare, the pilot felt the aircraft drift to the left of the centreline and, while he corrected this, the nose dropped, the nosewheel hit the ground and the aircraft bounced. It bounced a second time before he could apply full power and climb away on a go-around. He completed another circuit, followed by a normal landing and taxied to the parking area. Here he inspected the aircraft and found that the propeller tips had been damaged and the front spat was broken. A later inspection revealed that there was also damage to the firewall/fuselage in the area of the nose leg attachments.

The pilot concluded that the left drift, as he was starting to flare the aircraft, had been caused by a sudden

freshening of the wind but that, in correcting this, he had flared later than usual causing premature ground contact of the nosewheel.

ACCIDENT

Aircraft Type and Registration:	Pegasus Quik, G-CDKM
No & Type of Engines:	1 Rotax 912 ULS piston engine
Year of Manufacture:	2005 (Serial no: 8091)
Date & Time (UTC):	28 February 2013 at 1600 hrs
Location:	Field adjacent to Wallasey VOR/DME station, Wirral
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Minor) Passengers - N/A
Nature of Damage:	Substantial damage to wing, further damage to trike unit, landing gear and engine frame
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	57 years
Commander's Flying Experience:	620 hours (of which 324 were on type) Last 90 days - 6 hours Last 28 days - 6 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The pilot encountered reducing visibility during a flight from his microlight site at Ince, near Formby, and decided to route directly back there as a precaution. As he flew north along the Wirral Peninsular, the visibility worsened and he decided to carry out a field landing rather than attempt to cross the mouth of the River Mersey in the poor conditions. The pilot chose a large field and landed, but after a short ground run the aircraft encountered a small but very wet area and sank in, turning over onto its side. The pilot, who suffered minor bruising, observed that the chosen field was suitable in all respects, apart from the very small area of wet ground which had not been visible from the air.

ACCIDENT

Aircraft Type and Registration:	Pegasus Quik, G-CEML
No & Type of Engines:	1 Rotax 912-ULS piston engine
Year of Manufacture:	2007 (Serial no: 8260)
Date & Time (UTC):	18 December 2012 at 1400 hrs
Location:	Private airstrip near Warrington, Cheshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Serious) Passengers - N/A
Nature of Damage:	Damage to wing spar and fabric, fuselage pod, propeller and landing gear
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	48 years
Commander's Flying Experience:	188 hours (of which 188 were on type) Last 90 days - 15 hours Last 28 days - 0 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries

Synopsis

The microlight struck a set of power lines while landing at a private airstrip. The pilot was not aware of the presence of the power lines and did not see them prior to the collision. He sustained serious injuries and power to nearby properties was disrupted.

History of the flight

The flexwing microlight took off at about 1300 hrs for a local flight. The weather was fine, with calm wind, no low cloud, and visibility between 5 and 10 km. On returning to the airstrip, the pilot elected to carry out a glide approach for a landing in an easterly direction. The area being used for takeoff and landing on this occasion was not the usual strip, which was rather damp, but an adjacent prepared field which allowed a predominantly east-west takeoff and landing. The pilot was aware that power lines crossed the approach when landing in an easterly direction. He saw these whilst on the approach and successfully avoided them. However, he was unaware that a second set of power lines also crossed near to the start of the landing area, beyond the first set when viewed from the approach. With his attention moving to focus further up the landing area in preparation for the touchdown, the pilot did not see the second set of power lines. As he was about to start his landing flare, the microlight struck them.

The microlight pitched sharply upwards before dropping back to the ground. Although it was extensively damaged, the engine was still running at idle. The pilot shut it down and made the microlight safe before vacating, which was made difficult by his injuries. The microlight had struck a set of three power lines[1], one of which was severed, while the other two remained intact (and still live) but tangled with the microlight. Power to nearby premises was interrupted while the energy distribution company carried out the necessary repairs. The pilot later attended hospital and, in addition to cuts and bruises, was found to have sustained several broken ribs.

Description of the airstrip

The owner of the airstrip explained that two takeoff and landing areas were actually available, with a main grass strip about 1,000 m long. On occasions, this could become waterlogged, in which case a smaller grassed area, adjacent to the site's small hangar, could be used. This area was a prepared field some 200 m long, but with a longer run off area adjacent to the main strip. The area had power lines along the road at its western boundary, and a further set (involved in the accident) running diagonally across the western side of the area, about 40 m inset from the western boundary. One of the supporting poles was at a field boundary, and the other was beyond it.

Causal factors

The pilot explained that he had not flown for a few weeks and had not originally intended to fly that day. However, the fine conditions had prompted him to make a relatively undemanding local flight to regain currency. Although the site had recently become his base, it was still new to him and he had only flown there a few times, always from the main airstrip.

In conducting a short notice local flight in fine conditions, the pilot felt he had omitted to pay the same level of attention to local hazards as he would have done had he been visiting another airfield for the first time. He had not seen the power lines before takeoff, despite taking off from the same area. He attributed this to his attention being focussed laterally as he manoeuvred for takeoff in the relatively unfamiliar area. During the approach, his failure to see the wires probably arose from their relative lack of conspicuity (including the lack of obvious supporting poles), and possibly the steeper approach angle associated with a glide approach.

Footnote

[1] The power lines were believed to be 11kV distribution cables.

ACCIDENT

Aircraft Type and Registration:	Pegasus Quik, G-KWIC
No & Type of Engines:	1 Rotax 912-UL piston engine
Year of Manufacture:	2003 (Serial no: 7962)
Date & Time (UTC):	24 November 2012 at 1045 hrs
Location:	Near Bondhay, Worksop, South Yorkshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Minor) Passengers - None
Nature of Damage:	Damage to pod, front wheel forks, propeller, wing leading edge, front strut and base bar
Commander's Licence:	Private Pilot's Licence
Commander's Age:	58 years
Commander's Flying Experience:	1,004 hours (of which 39 hours were on type) Last 90 days - 36 hours Last 28 days - 36 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot took off for a local flight from Netherthorpe Airfield in good visibility but, when he returned, the airfield was obscured by fog. He elected to perform a forced landing in a field but misjudged the touchdown due to misting of his helmet visor and windscreen and landed heavily on the nosewheel.

History of the flight

On the morning of the accident flight, which was for a trial lesson, the pilot consulted the Met Office aeronautical forecast charts and also observed the actual weather at Netherthorpe. He found that the visibility was somewhat misty and first elected to perform a solo weather check flight during which he found that the visibility generally was in excess of 40 kilometres but noted that there was mist or fog in the valleys.

As the area around the airfield was clear, he decided to proceed with the trial lesson. However, after 20 minutes and as he turned to fly over Chesterfield, he noticed that what he thought was low stratus cloud was advancing towards the airfield. He decided to return and, upon arrival, found that the cloud was in fact a fog bank some 200 ft thick so he decided to circle for about 20 minutes in the hope that there might be a break so that he could land. There was no break so he decided to divert to Gamston but found that this, and other nearby airfields, were fogged out. By now a thick mist was

developing and he elected to perform a forced landing; selecting a suitable field some 3 km from Netherthorpe which, although it had power cables at one end, was near a road.

The pilot briefed his passenger and made his approach but, at a height of about 20 ft as he was rounding out in preparation for a soft field landing, he states that the front screen and his helmet visor misted up so suddenly that he was unable to clear either in time before the nosewheel struck the ground heavily and the aircraft came to an abrupt halt. The pilot was taken to hospital with minor injuries but the passenger was uninjured.

ACCIDENT

Aircraft Type and Registration:	Pegasus Xl-Q, G-MTTY
No & Type of Engines:	1 Rotax 462 piston engine
Year of Manufacture:	1988 (Serial no: SW-WQ-0014)
Date & Time (UTC):	19 February 2013 at 1310 hrs
Location:	Private airstrip, near Romsey, Hampshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Minor) Passengers - N/A
Nature of Damage:	Wing damaged beyond repair, slight damage to pod
Commander's Licence:	Private Pilot's Licence
Commander's Age:	35 years
Commander's Flying Experience:	61 hours (of which all were on type) Last 90 days - 1 hour Last 28 days - 0 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The pilot had not flown for some time, so intended practising takeoffs and landings from a farm strip. The weather was fine, with a surface wind from the south-east of 4 to 6 kt. The grass strip was orientated 06/24; the pilot elected to take off and land in the south-westerly direction, giving a crosswind from the left.

The pilot felt the first landing was bumpy, so took off again to practise another. Touchdown on the second landing was smooth but on the left side of the strip. As the pilot attempted to steer the aircraft right towards the centre of the strip, it rolled over onto its left side. He thought the aircraft may have been travelling too fast for the corrective manoeuvre, placing excessive loading on the left main wheel and nosewheel and causing the nosewheel to sink into the soft surface.

ACCIDENT

Aircraft Type and Registration:	Skyranger J2.2(1), G-RAFR
No & Type of Engines:	1 Jabiru Aircraft PTY 2200 piston engine
Year of Manufacture:	2004 (Serial no: BMAA/HB/410)
Date & Time (UTC):	6 January 2013 at 1330 hrs
Location:	Hollym Airfield, East Yorkshire
Type of Flight:	Private
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to propeller and cowlings
Commander's Licence:	Private Pilot's Licence
Commander's Age:	68 years
Commander's Flying Experience:	1,344 hours (of which 16 were on type) Last 90 days - 16 hours Last 28 days - 9 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot was returning to his home airfield at North Moor but found that it, and others in the vicinity, had closed due to poor visibility. He saw that Hollym Airfield was clear but, upon touching down found that there was a lack of braking action and ran into a fence at the end of the runway at slow speed. A combination of very wet runway conditions and a misidentification of the runway he had been recommended to use were probably responsible for the overrun.

History of the flight

The pilot was one of a number who attended a 'fly-in' at North Coates Airfield. The flight to, and arrival at, North Coates was uneventful but when he departed to return to North Moor Airfield, the pilot noticed a build-up of cloud between 500 and 1,000 ft and decided to fly down the Humber river, which was clear of cloud. The wind was light from the southwest. As he approached the Humber Bridge, he realised that he would not be able to make North Moor and he heard other airborne aircraft contacting Humberside Airport for information regarding a possible diversion there. They were informed that the airport was closed due to fog, so the pilot and the other aircraft started to head back to North Coates.

It was established that airfields surrounding North Coates were closed either due to visibility or were waterlogged, but the pilot could see that Hollym, on the coast, was clear and he informed North Coates of his intention to divert there. Other aircraft, on hearing this, decided to do the same.

He contacted Hollym on the radio and informed them that he was downwind for Runway 17 (Figure 1) but, as he approached the cliff edge, he realised that he was too high and decided to go around. He was now concerned about his fuel state and the airfield suggested that he used the "cliff-top" runway as this was the longest. The pilot turned left and approached on what turned out to be Runway 31, touching down just after the threshold, however when he applied the brakes "nothing happened". He tried to steer the aircraft into the long grass at the side of the runway, but the rudder also appeared ineffective and it continued in a straight line before coming to a halt due to contact with a fence at the end of the runway. The slow speed at the moment of contact meant that the damage to the aircraft was minimal and there were no injuries.

The pilot now realises that the term "cliff-top" runway was intended to describe Runway 32 but he states that it was difficult to discern this runway due to a lack of recent mowing and that it appeared closer to the cliff edge than depicted on the airfield chart. He

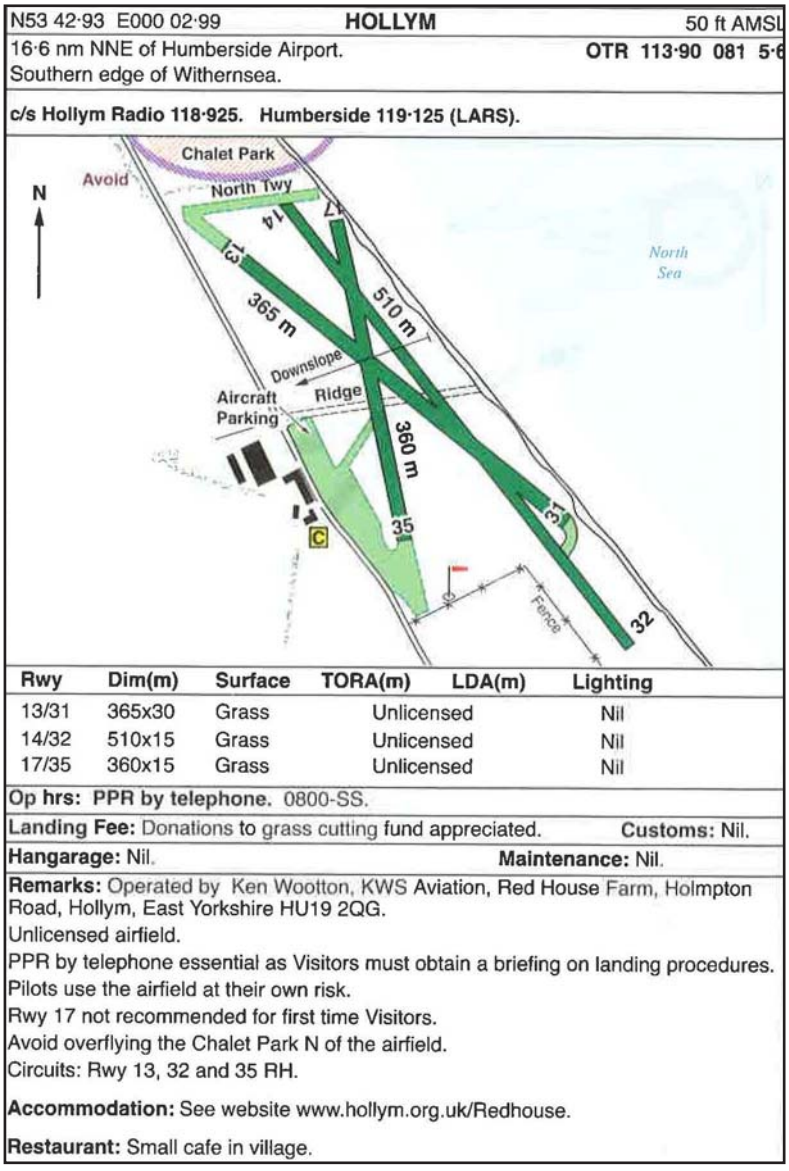

Figure 1

Airfield chart for Hollym

states that other diverting aircraft also had similar problems in establishing which the suggested runway was. He believes that it was the very wet condition of Runway 31 which led to the lack of braking action but is of the opinion that he made the correct decision to divert to Hollym, despite the fact that he had not visited there before because of its location on the cliff top. In retrospect, he realises that he should have checked the forecast at North Moor before departing North Coates.

Miscellaneous

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

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

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

1/2010 Boeing 777-236ER, G-YMMM at London Heathrow Airport on 17 January 2008.

Published February 2010.

2/2010 Beech 200C Super King Air, VQ-TIU at 1 nm south-east of North Caicos Airport, Turks and Caicos Islands, British West Indies on 6 February 2007.

Published May 2010.

3/2010 Cessna Citation 500, VP-BGE 2 nm NNE of Biggin Hill Airport on 30 March 2008.

Published May 2010.

4/2010 Boeing 777-236, G-VIIR at Robert L Bradshaw Int Airport St Kitts, West Indies on 26 September 2009.

Published September 2010.

5/2010 Grob G115E (Tutor), G-BYXR and Standard Cirrus Glider, G-CKHT Drayton, Oxfordshire on 14 June 2009.

Published September 2010.

6/2010 Grob G115E Tutor, G-BYUT and Grob G115E Tutor, G-BYVN near Porthcawl, South Wales on 11 February 2009.

Published November 2010.

7/2010 Aerospatiale (Eurocopter) AS 332L Super Puma, G-PUMI at Aberdeen Airport, Scotland on 13 October 2006.

Published November 2010.

8/2010 Cessna 402C, G-EYES and Rand KR-2, G-BOLZ near Coventry Airport on 17 August 2008.

Published December 2010.

1/2011 Eurocopter EC225 LP Super Puma, G-REDU near the Eastern Trough Area Project Central Production Facility Platform in the North Sea on 18 February 2009.

Published September 2011.

2/2011 Aerospatiale (Eurocopter) AS332 L2 Super Puma, G-REDL 11 nm NE of Peterhead, Scotland on 1 April 2009.

Published November 2011.

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