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# ***AAIB Bulletin***

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# ***2/2014***

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Farnborough House  
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Tel: 01252 510300  
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Press enquiries: 0207 944 3118/4292  
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Published 13 February 2014

Cover picture courtesy of Stephen R Lynn  
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ISSN 0309-4278

Published by the Air Accidents Investigation Branch, Department for Transport  
Printed in the UK on paper containing at least 75% recycled fibre

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**AAIB Field Investigation reports**



**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	Britten-Norman Islander BN-2B-26, VP-MNT	
<b>No &amp; Type of Engines:</b>	2 Lycoming O-540 piston engines	
<b>Year of Manufacture:</b>	1987 (Serial no: 2186)	
<b>Date &amp; Time (UTC):</b>	16 October 2012 at 1340 hrs	
<b>Location:</b>	John A Osborne Airport, Montserrat	
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 1	Passengers - 6
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Federal Aviation Administration Commercial Pilots Licence with Air Safety Support International validation	
<b>Commander's Age:</b>	31 years	
<b>Commander's Flying Experience:</b>	700 hours (of which 348 were on type) Last 90 days - 92 hours Last 28 days - 31 hours	
<b>Information Source:</b>	AAIB Field Investigation	

**Synopsis**

The aircraft developed a nose wheel shimmy during landing. Considering the risk of an overrun and mindful of the hazardous terrain at the end of the runway the pilot elected to steer the aircraft onto grass at the runway edge. The aircraft was undamaged and there were no injuries.

**The Regulations and procedures**

The Governor of Montserrat, under the *Montserrat Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2007*, is required to carry out an investigation and appoint persons as Inspectors of Air Accidents for the investigation of accidents or incidents occurring in Montserrat. The extent of investigations and the procedure to be followed is determined by the Governor for the purpose of the prevention of accidents and incidents. The Governor of Montserrat has, since February 2009, appointed the Chief Inspector of the UK Air Accidents Investigation Branch (AAIB) to be the Chief Inspectors of Accidents for Montserrat. The AAIB has trained and approved a locally based Accident Investigation Manager (AIM) to manage accidents and incidents pending the arrival of AAIB inspectors from the UK.

## The investigation

The Montserrat AIM was notified of the incident soon after it occurred and alerted staff at the AAIB's headquarters in the UK. The AAIB deployed an inspector, who was already in Antigua conducting a separate investigation, to Montserrat.

## History of the flight

The aircraft was on a scheduled commercial air transport flight from VC Bird Airport, Antigua, to John A Osborne Airport, Montserrat. This was the aircraft's third sector of the day; it had flown from Antigua to Montserrat and back previously. The pilot flew as a passenger from Antigua to Montserrat on the first sector and then operated the second and third sectors.

The weight and balance document showed that the pilot, six passengers and 160 lbs of baggage were on board. The fuel load on landing was calculated to be 60 USG, and the landing weight of 6,289 lbs was below the authorised maximum landing weight. The fuel quantity on board was sufficient for the next scheduled flight to Antigua.

Weather conditions at John A Osborne were fine, with good visibility and no low cloud. Runway 10 was in use and the surface wind, transmitted by the air traffic controller as the aircraft made its approach, was from 130° at 7 kt. The pilot recalled that at the time of landing, the runway was 'a bit wet' from previous rain showers; other witnesses recalled that the runway was dry.

The aerodrome had no instrument approach procedures, and the approach was conducted visually. The pilot reported that because the wind was relatively calm he configured the aircraft for landing early, selecting full flap and the propellers fully fine, and that he completed the landing checks. He stated that during the approach he kept the aircraft's groundspeed, displayed on the GPS receiver, at between 60 and 65 kt<sup>1</sup>. He recalled that the indicated airspeed during the approach was between 65 and 70 KIAS; he did not recall the touchdown speed.

The pilot, and other witnesses, recalled that the aircraft touched down within the normal touchdown zone; the tower controller reported that touchdown occurred 'just beyond the APAPI' (Abbreviated Precision Approach Path Indicators). The pilot reported that, after touchdown on the main landing gear, he started applying brakes before lowering the nosewheel onto the runway. He recalled that as the nosewheel came into contact with the runway, an 'awful shimmying' began. He released the brakes and raised the nosewheel clear of the runway. He re-applied the brakes gently and lowered the nosewheel again. The shimmy returned, reportedly worse than previously. The pilot attempted to maintain a pitch input to keep weight off the nosewheel.

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## Footnote

<sup>1</sup> The pilot's guide published by the GPS manufacturer did not state how the displayed groundspeed was derived; some units display a groundspeed value which has been averaged over a period of time, meaning that the displayed speed would not react instantly to changes in the aircraft's true groundspeed.

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The pilot then perceived that the aircraft would not stop before the end of the runway. So he elected to manoeuvre it off the runway to avoid running over the cliff beyond the runway end. He turned the aircraft to the right onto the grass south of the runway stop-end (Figure 1).

Once the aircraft came to a halt, the pilot shut down the engines, retracted the flaps, and asked his passengers whether they were OK. He then led the passengers away from the aircraft.



**Figure 1**

The aircraft at rest after the runway excursion

### **Landing technique**

In discussion about landing technique on the Islander aircraft, the pilot stated that he habitually endeavoured to keep the nosewheel off the runway after landing until the brakes were applied, after which he would lower the nosewheel gently. He also described that, during an approach, the groundspeed was 'most important' and he paid attention to the groundspeed rather than the indicated airspeed. He said that, although he had experienced nosewheel shimmy previously, on this occasion it was 'uncontrollable'; he had not been able to 'touch the pedals'.

### **The aircraft flight manual**

The flight manual for the aircraft did not contain any advice or procedures concerning actions in the event of nosewheel shimmy on takeoff or landing. With respect to approach speeds, the flight manual stated:

*'Final approach*

*After selection of flaps DOWN (56 deg), the speed may be progressively reduced to the appropriate threshold speed quoted in section 5.'*

Interpolation of the graph provided in section 5 showed that the threshold speed appropriate for the landing weight was 58 KIAS.

**Nosewheel shimmy**

Nosewheel shimmy is an oscillation in the nosewheel assembly which is felt as vibration through the airframe and, in aircraft such as the Islander, rudder and brake pedals. It occurs typically during landing or takeoff, usually within a speed range. According to one American aircraft manufacturer, factors which affect the onset of shimmy include:

- the design and geometry of the landing gear
- tyre pressure
- tyre centring
- aircraft groundspeed
- roughness of the surface over which the aircraft is moving
- looseness or slack in the landing gear system
- pilot technique
- the effect of any shimmy damper fitted to the aircraft

The manufacturer of the Islander stated that it had found no evidence of a history of nosewheel shimmy affecting Islander aircraft.

**Engineering investigation***Aircraft description and maintenance history*

The Islander is a high-wing twin-engined aircraft with fixed landing gear. The nose landing gear has a single wheel; each main landing gear has two wheels. The main landing gear wheels are equipped with conventional hydraulically-operated brake units, one per wheel. Pressure applied on toe pedals, which are mounted above the rudder pedals, operates the wheel brakes in pairs (left and right main landing gear respectively). No anti-skid system is fitted.

An optional Garmin GPS 350 was fitted to the instrument panel on VP-MNT. The aircraft was not equipped with a Flight Data Recorder or Cockpit Voice Recorder; neither was required by regulations.

The maintenance log and worksheet showed that before the aircraft departed Montserrat on the morning of the incident flight the main oleo pressure was confirmed to be correct.

### *Examination of the aircraft*

An airworthiness inspector from the Eastern Caribbean Civil Aviation Authority (ECCAA) was appointed to assist the investigation and examined the aircraft before it was moved. A licensed engineer, who carried out line maintenance for the operator, assisted the airworthiness inspector.

The aircraft had come to rest south of the Runway 10 stop end. There were two sets of skid marks on the runway which transitioned to wheel tracks at the runway edge, ending at the main wheels of the aircraft.

Both sets of brakes were examined and appeared to be in a satisfactory condition. Both brake reservoirs were inspected and also found to be satisfactory. There were no leaks evident at either the brake units or the reservoirs. The rest of the aircraft was examined for damage but none was found. The aircraft was then pushed off the grass on to the runway surface and pulled by hand to the apron.

The tyres were examined for wear or flat spots and appeared to be satisfactory. The nose of the aircraft was supported on a trestle and the nose landing gear examined for play; none was apparent. Hydraulic fluid had leaked from the oleo assembly onto the 'Fescolized' portion<sup>2</sup> of the nose landing gear strut, as shown in Figure 2. It was not possible to determine if the leak had resulted from the incident but there was no evidence that the fluid had been blown back by airflow as might occur in flight. The operator's engineer, who had conducted checks on the aircraft that morning, recalled that there was no evidence



**Figure 2**

The nose landing gear oleo

of such a leak during his checks. The aircraft brakes operated satisfactorily when checked.

The operator decided to replace the nose landing gear assembly, but facilities for that task were not available on Montserrat. Following taxi trials, during which the aircraft behaved normally, it was flown to the operator's contracted maintenance facility where the work was carried out. The pilot who flew the aircraft to the maintenance facility reported that it behaved normally, with no shimmy apparent. The maintenance organisation did not report any abnormality discovered during the component change.

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#### **Footnote**

<sup>2</sup> An electroplated portion of the oleo.

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## The aerodrome

### *History*

John A Osborne Aerodrome was opened in 2005 following volcanic eruptions that covered Montserrat's previous aerodrome in pyroclastic flow. The consequences of those eruptions, and the possibility of further volcanic activity, also rendered approximately two thirds of the island uninhabitable. The island's topography meant that few possible locations for a new aerodrome remained after the eruption. The site of John A Osborne was chosen for the new aerodrome following surveys which established that the location was the only viable one<sup>3</sup>, although the runway length and aerodrome size were restricted by the terrain.

The aerodrome has a small terminal building, air traffic control tower, and fire station. The aerodrome's regular traffic is Islander aircraft operating to and from other Caribbean islands, notably Antigua, which is Montserrat's nearest neighbour. The largest aircraft accommodated is the de Havilland Twin Otter. The aerodrome also supports helicopter operations.

### *Runway dimensions and surroundings*

The aerodrome's only runway, Runway 10/28, is 596 m long, and has a 28 m displaced threshold at each end. It satisfied the criteria for an ICAO Code 1 runway, which was not required to have Runway End Safety Areas (RESAs).

Code 1 runways are required to have surrounding runways strips extending 30 m from the runway centreline. A runway strip is provided:

*'to reduce the risk of damage to aircraft running off a runway; and to protect aircraft flying over it during take-off or landing operations.'*

The aerodrome has a runway strip which complied with the regulations, though in places embankments had been constructed that might pose a hazard to an aircraft following a runway excursion<sup>4</sup>. The terrain falls away steeply beyond the ends of the strip. The ends of the runway are shown in Figure 3 and Figure 4.

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### Footnote

<sup>3</sup> One other site was identified but the development would have been prohibitively expensive in the context of the island's economy.

<sup>4</sup> The AAIB report on the serious incident to VP-MON, reference EW/C2011/05/04 in Bulletin 5/2012, considers these matters in greater detail.



**Figure 3**

The western end of the runway viewed from below



**Figure 4**

The eastern end of the runway

## Analysis

### *Operational matters*

The incident occurred at the conclusion of a routine, and until after touchdown, unremarkable flight. The aircraft was serviceable and the pilot appropriately qualified.

The weather conditions were good, and the wind presented a light quartering headwind component on landing. It was not possible to determine whether the runway was wet or dry, but the skid marks left by the aircraft indicated that the runway was not significantly affected by standing water.

The incident began when, as the nosewheel contacted the runway, shimmy occurred. No technical cause for the shimmy was identified and, following maintenance action, no recurrence has been reported. Following the onset of the shimmy, the pilot could have abandoned the landing.

In the absence of a decision to abandon the landing, the pilot's priority was to decelerate the aircraft. However, when the nosewheel was again lowered to the runway surface, the shimmy returned, reportedly worse than before.

The pilot's decision to steer the aircraft off the runway was prompted by his concern that an excursion beyond the runway's end could have serious consequences. Aggressive braking and the decision to steer off the runway led to a safe outcome without damage to the aircraft or harm to the passengers. It was not possible to determine whether the aircraft would have stopped in the remaining runway length available if the pilot had not steered it onto the grass at the runway's side.

The pilot's account of conducting the approach by reference to groundspeed suggested an unusual technique. Flying an approach using GPS groundspeed as the primary reference could result in the aircraft reaching indicated speeds too low for safe operation in a tailwind, or unnecessarily high in a headwind. The pilot's recollection of the indicated speed being in the range 65 to 70 KIAS suggests that in this case the indicated speed was within usual parameters. However, excessive touchdown speed would contribute to a landing using more runway length than normal. It is also possible that shimmy may occur if the groundspeed is higher than encountered in routine takeoffs and landings. An unusually high speed on touchdown could explain nosewheel shimmy on the incident landing.

Witness accounts, including that of the pilot, indicated that the aircraft touched down at an appropriate point on the runway. Although the aircraft flight manual contained no advice regarding landing technique, it is probable that holding the nosewheel off the runway surface for a prolonged period would cause a longer than normal landing roll, as the aircraft's weight would not be transferred fully to its wheels, and deceleration from the wheel brakes would be lessened. Any beneficial aerodynamic braking effects were likely to be slight at the airspeeds involved. Delaying lowering the nosewheel into contact with the runway would also mean that any shimmy would not be identified until later in the landing than would otherwise be the case, and this would reduce the time and runway distance available for

the pilot to take action in response. Witness information did not identify where, along the runway's length, nosewheel touchdown occurred.

The shimmy began with the nosewheel in contact with the runway surface. Releasing the brakes and rotating the aircraft to bring the nosewheel off the runway surface added to the actual landing distance and, because this procedure was different from normal operating techniques, rendered any landing performance calculations invalid. A prompt decision to execute a balked landing might have resulted in a safe climb away and given the pilot an opportunity to consider another approach or a diversion to a longer runway. There was sufficient fuel on board for a diversion to Antigua with reserves for a further diversion.

### *Engineering*

The engineering investigation did not identify any malfunctions or abnormalities to account for the nosewheel shimmy. The seals in the nosewheel oleo appeared normal. The fluid evident on the nosewheel oleo may have been an artefact of the shimmy, if the motion between the piston and cylinder disrupted the sealing of the oleo to the extent that fluid escaped.

### **Conclusion**

Severe nosewheel shimmy disrupted an otherwise routine landing. In order to avoid a possible overrun, the pilot steered the aircraft onto the grass at the side of the runway. No cause of the shimmy was established.





## **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**

<b>Aircraft Type and Registration:</b>	Jetstream 4100, G-MAJA
<b>No &amp; Type of Engines:</b>	2 Garrett AiResearch TPE331-14 turboprop engines
<b>Year of Manufacture:</b>	1994 (serial no: 41032)
<b>Date &amp; Time (UTC):</b>	24 September 2013 at 1010 hrs
<b>Location:</b>	Wick Airport
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)
<b>Persons on Board:</b>	Crew - 3                      Passengers - 3
<b>Injuries:</b>	Crew - None                  Passengers - None
<b>Nature of Damage:</b>	None
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence
<b>Commander's Age:</b>	48 years
<b>Commander's Flying Experience:</b>	9,399 hours (of which 7,193 were on type) Last 90 days - 137 hours Last 28 days - 50 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

Whilst on final approach to Wick Airport, the crew lost visual reference with the runway and commenced a go-around. During the missed approach momentary blanking of the electronic flight instrument system (EFIS) displays occurred but the standby instruments continued to operate normally. During the subsequent approach a similar event occurred, but only the co-pilot's displays were affected.

The crew diverted to Aberdeen Airport where the weather was better. During the diversion VHF communication difficulties were experienced, but the aircraft landed without further incident.

The operator, in consultation with the aircraft manufacturer, determined that the right EFIS display blanking was caused by a loss of electrical power to the right essential busbar. The right power distribution unit was removed and sent to the manufacturer for investigation.

The aircraft manufacturer considers that the transient blanking of the left EFIS displays was caused by an unrelated failure of the 'transzorbs'. (These are installed in the windscreen heat system to protect avionics equipment from the effects of windscreen static.)

The VHF communication difficulty was explained by a separate fault on the left communication unit. The right communication unit was unpowered as a result of the right essential busbar failure.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Avions Pierre Robin CEA DR300/180R, G-BLGH	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-360-A4M piston engine	
<b>Year of Manufacture:</b>	1971 (Serial no: 570)	
<b>Date &amp; Time (UTC):</b>	18 September 2013 at 1758 hrs	
<b>Location:</b>	Wycombe Air Park, Buckinghamshire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Crack in right lower forward fuselage	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	20 years	
<b>Commander's Flying Experience:</b>	332 hours (of which 132 were on type) Last 90 days - 158 hours Last 28 days - 52 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

The pilot was landing on Runway 24 at Wycombe Air Park after a local flight; the wind was from the north at 6–8 kt. The aircraft touched down on its main landing gear and the pilot slowly lowered the nose. As the nosewheel made contact with the runway, however, he experienced violent nosewheel shimmy. He applied a burst of power and applied back pressure on the control column to decrease the load on the nosewheel, which arrested the shimmy. He noticed no further abnormalities until he had taxied back to the hangar.

After disembarking the pilot noticed a longitudinal crack in the lower right side of the fuselage, running from the engine firewall to the wing front spar. He concluded that the crack was most probably a result of the shimmy, since his landing had been normal on the main gear and fully 'held off'. He considered it possible that, with this tug aircraft being flown by various pilots, damage may have been caused by a previous, and unreported, hard landing.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Cassutt Racer IIIM, G-BFMF
<b>No &amp; Type of Engines:</b>	1 Continental Motors Corp O-200-A piston engine
<b>Year of Manufacture:</b>	1982 (serial no: PFA 034-10147)
<b>Date &amp; Time (UTC):</b>	19 October 2013 at 1149 hrs
<b>Location:</b>	North of Halfpenny Green Airfield, West Midlands
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1                      Passengers - None
<b>Injuries:</b>	Crew - None                  Passengers - N/A
<b>Nature of Damage:</b>	Damage to fin and propeller
<b>Commander's Licence:</b>	Private Pilot's Licence
<b>Commander's Age:</b>	65 years
<b>Commander's Flying Experience:</b>	303 hours (of which 15 were on type) Last 90 days - 7 hours Last 28 days - 1 hour
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

**Synopsis**

The aircraft was engaged in circuit practice when, on base leg of the first circuit, the engine lost power. Unable to reach the runway, the pilot landed the aircraft in a ploughed field short of the runway threshold. It pitched over inverted and he was trapped in the cockpit until rescued by the Airfield Fire Service. He believes that he may have inadvertently selected the mixture control to fully lean on the downwind leg instead of applying the carburettor heat.

**History of the flight**

The pilot intended to carry out circuit practice. He completed the normal pre-takeoff checks, including magneto and carburettor heat checks. Everything was normal as the aircraft climbed to the circuit height of 1,000 ft but, a few seconds after turning onto base leg for Runway 16, the engine started to run down. The pilot found that he could keep it running in bursts by pumping the throttle, but this was insufficient to maintain altitude and he declared an emergency to the control tower.

He initially thought that he might be able to reach the runway but soon realised that he could not. He informed the tower and, about 10 seconds later, touched down in a soft and muddy ploughed field at a speed about 5 mph above the stall. The aircraft rolled for about 50 ft before pitching over inverted some 250 to 300 m before the runway threshold. The pilot

was trapped in the cockpit because he could not open the canopy. He radioed the tower, who advised him that the fire crew were on their way. Upon their arrival, the aircraft was righted and the pilot exited the aircraft normally.

### **Additional information**

The pilot is of the opinion that he may have inadvertently pulled the mixture lever instead of the carburettor heat. Upon vacating the aircraft he noted the mixture control was pulled fully lean but could not be sure that this had been done before the aircraft inverted. He advised that the mixture control on the Cassutt was in a similar place to the carburettor heat control on the Taylor Titch aircraft he had flown for a period of five years. Another possible factor was that, on the downwind leg, he had a number of exchanges with the tower concerning other circuit traffic and may have been distracted at the point where he normally selected the carburettor heat.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Cessna 172S Skyhawk, G-YFZT
<b>No &amp; Type of Engines:</b>	1 Lycoming IO-360-L2A piston engine
<b>Year of Manufacture:</b>	2004 (Serial no: 172S9587)
<b>Date &amp; Time (UTC):</b>	2 September 2013 at 1450 hrs
<b>Location:</b>	White Waltham Airfield, Berkshire
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1                      Passengers - 1
<b>Injuries:</b>	Crew - None                  Passengers - None
<b>Nature of Damage:</b>	Damage to front floor panels, firewall and propeller
<b>Commander's Licence:</b>	Private Pilot's Licence
<b>Commander's Age:</b>	67 years
<b>Commander's Flying Experience:</b>	226 hours (of which 122 were on type) Last 90 days - 6 hours Last 28 days - 3 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

The aircraft was landing on grass Runway 29, with the wind from the northwest at less than 8 mph. The pilot reported that, following a "good" final approach at 70 kt with full flap selected, the aircraft bounced on touchdown. Thereafter, the pilot was unaware of any anomalies with the aircraft beyond the fact that the elevator controls felt stiff.

After parking, he performed a walk-round inspection of the aircraft and was satisfied that there was no damage. Later, an engineer found rippling of the floor panels and firewall, which accounted for the stiff elevator controls, and evidence that the propeller had struck the runway.

The pilot was of the opinion that he should have flown the final approach at a slightly slower speed (recommended final approach speed is 65 kt, with full flap) and that he may have flared too early. He also thought that the uneven nature of the runway surface may have played a part.

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Piper PA-28R-180 Cherokee Arrow, G-AVWO	
<b>No &amp; Type of Engines:</b>	1 Lycoming IO-360-B1E piston engine	
<b>Year of Manufacture:</b>	1967 (Serial no: 28R-30205)	
<b>Date &amp; Time (UTC):</b>	14 November 2013 at 1725 hrs	
<b>Location:</b>	Shoreham Airport, West Sussex	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - None	Passengers - N/A
<b>Nature of Damage:</b>	Damage to left landing gear leg and left wing upper surface	
<b>Commander's Licence:</b>	Private Pilot's Licence with IMC and Night ratings	
<b>Commander's Age:</b>	59 years	
<b>Commander's Flying Experience:</b>	373 hours (of which 251 were on type) Last 90 days - 10 hours Last 28 days - 2 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

## Synopsis

The aircraft landed heavily at Shoreham following a night flight from Biggin Hill. During the subsequent return flight, the landing gear would not lock into the UP position. The pilot continued the flight with the gear down and made an uneventful landing. A subsequent inspection revealed damage to the left wing upper surface and to the gear itself. The pilot attributed the heavy landing to a false height perception due to the relatively narrow width of the runway at Shoreham.

## History of the flight

After a flight from Biggin Hill lasting approximately 45 minutes the pilot received instructions from Shoreham ATC for a right base join for Runway 02. The wind was reported as 320° at 10 kt. The descent and approach were normal but the pilot later stated that he misjudged the flare and landed the aircraft "very heavily" on the asphalt surface of the runway. The aircraft handled normally on the ground and the pilot did not consider that any damage had occurred.

After parking the aircraft the pilot paid the landing fees and booked out for the return trip to Biggin Hill. The pre-flight check included a visual inspection of the landing gear by torchlight, with no damage being observed.



The aircraft took off normally and the pilot operated the gear retraction lever. However, although the 'gear in transit' light illuminated as usual, the landing gear would not lock into position. The gear was recycled a number of times but to no avail. The pilot therefore elected to continue the flight with the gear down and an uneventful landing was made at Biggin Hill.

An inspection of the aircraft conducted by a maintenance organisation reported that there was visible damage to the upper surface of the left wing, with additional damage to a wing rib and web within the landing gear well.

The pilot attributed the heavy landing to a false height perception brought about by the significant difference in runway width at Shoreham (18 m) and Biggin Hill (45 m), despite the fact that he had noted this during his pre-flight preparations and had made previous night training flights to Shoreham.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Pitts S-1S Special, G-BOXH	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-360-A4A piston engine	
<b>Year of Manufacture:</b>	1974 (Serial no: MP4)	
<b>Date &amp; Time (UTC):</b>	24 October 2013 at 0905 hrs	
<b>Location:</b>	Peterborough/Conington Airport, Cambridgeshire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - None	Passengers - N/A
<b>Nature of Damage:</b>	Damage to propeller, both wings and cowling, engine shock-loaded	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	55 years	
<b>Commander's Flying Experience:</b>	1,044 hours (of which 57 were on type) Last 90 days - 11 hours Last 28 days - 1 hour	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

On touching down on asphalt Runway 28, the aircraft experienced violent tailwheel shimmy and, after about 100 m of ground roll, it veered to the left. The pilot applied full right rudder but this had no effect and the aircraft left the runway, heading towards a fence some 25-30 m from the edge of the paved surface. He applied full power and right rudder and the aircraft seemed to respond but the left lower wing struck a fence post, yawing it in towards the fence. The propeller and cowling struck the fence followed by the right lower wing as the aircraft reversed direction and came to a halt. After checking with the control tower that he had been seen, the pilot switched off fuel and electrical power and exited the aircraft.

Upon inspection, it was found that the right-hand tailwheel steering link had broken, leaving the spring on the left side to pull the wheel in that direction. The pilot believes that a combination of wear and shimmy had caused the link to fracture.

**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	Slingsby T67C Firefly, G-RAFG
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-D2A piston engine
<b>Year of Manufacture:</b>	1989 (Serial no: 2076)
<b>Date &amp; Time (UTC):</b>	18 September 2013 at 1222 hrs
<b>Location:</b>	Approximately 3 nm west of Wellesbourne Mountford Airfield, Warwickshire
<b>Type of Flight:</b>	Training
<b>Persons on Board:</b>	Crew - 1                      Passengers - 1
<b>Injuries:</b>	Crew - None                  Passengers - None
<b>Nature of Damage:</b>	Cockpit canopy perspex shattered
<b>Commander's Licence:</b>	Commercial Pilot's Licence
<b>Commander's Age:</b>	48 years
<b>Commander's Flying Experience:</b>	4,010 hours (of which 74 were on type) Last 90 days - 168 hours Last 28 days - 53 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further inquiries by the AAIB

**Synopsis**

Whilst climbing prior to demonstrating an aerobatic manoeuvre, the cockpit canopy suddenly opened shattering the perspex. The frame remained attached to the aircraft which made a safe landing without further incident. Non-incorporation of a modification to improve ease of checking for correct engagement of the latch mechanism or maladjustment of the mechanism are considered as possible factors in this incident.

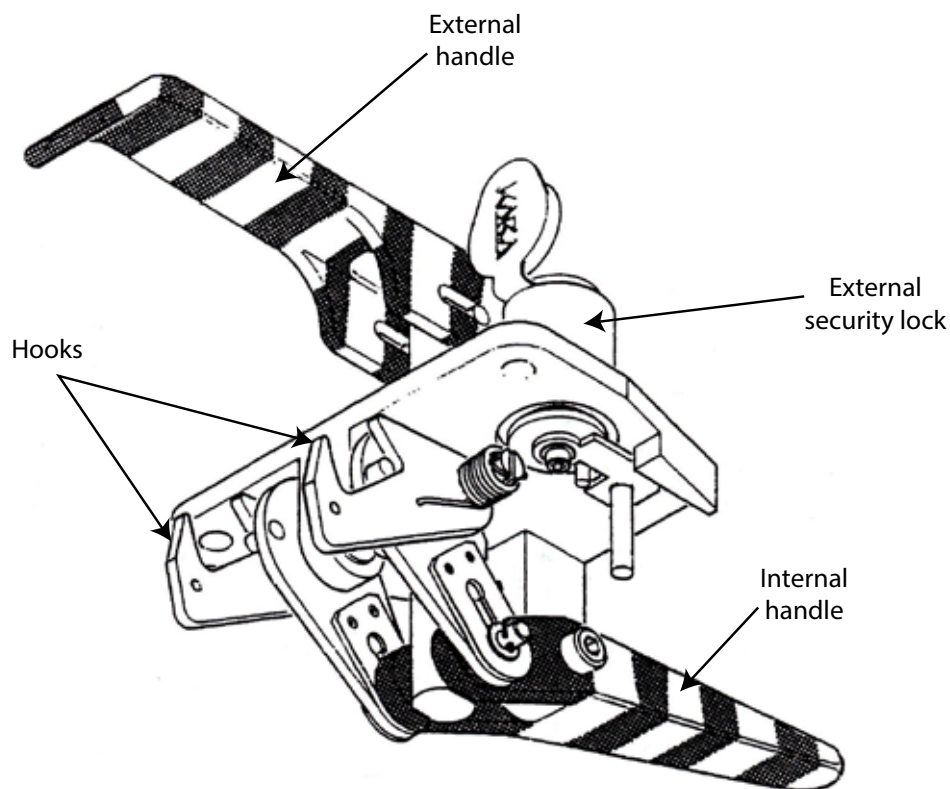
**History of the flight**

The aircraft was engaged on an aerobatic detail to demonstrate an aileron roll to a potential student on a trial lesson. After climbing to a height of about 3,000 ft, the canopy suddenly opened and the aircraft pitched nose-up and slowed considerably before the pilot lowered the nose and returned to Wellesbourne Mountford at low level. On the ground, he could see that, although the carbon fibre frame remained, the Perspex 'bubble' had been almost completely destroyed. The pilot was at a loss to explain the occurrence and stated that he checked the canopy latches before start-up, at the hold for the runway and again before commencing the planned aerobatic manoeuvres.

**Description of the canopy latching mechanism**

The canopy opens by sliding upwards and rearwards and is locked using two hooks, operated by a single internal lever and external lever (see Figure 1). The hook mechanism

is attached to the moving canopy and the pins with which they engage are on the fixed windscreen arch section. As originally designed, the means of visually checking that the hooks were correctly engaged was to ensure that the internal handle was aligned with a line painted on the plastic trim covering the mechanism.



**Figure 1**

Firefly canopy latch mechanism with pins not shown for clarity

In May 2001, Slingsby Aviation issued Service Bulletin (SB) 173 which:

*'improves the ease of visual inspection when checking for correct engagement of the latch hooks with the latch pin.'*

The SB improved visual inspection by advising that parts of the trim around the hook and pin mechanism should be cut away so that pilots could actually see when the hooks were correctly engaged on the pin. G-RAFG did not have this modification embodied, even though it was *'highly recommended'*.

The maintenance company charged with repairing the aircraft fitted a temporary replacement canopy for a ferry flight and reported that, after adjusting the latches to suit the new canopy, they worked normally and exhibited only normal wear and tear. They are of the opinion, however, that it is possible that the latches may have been maladjusted but advise that they will be incorporating SB 173 before returning the aircraft to the owner.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	EV-97 TeamEurostar UK Eurostar, G-CEHL
<b>No &amp; Type of Engines:</b>	1 Rotax 912-UL piston engine
<b>Year of Manufacture:</b>	2006 (Serial no: 2928)
<b>Date &amp; Time (UTC):</b>	22 September 2013 at 1603 hrs
<b>Location:</b>	Gloucestershire Airport, Gloucestershire
<b>Type of Flight:</b>	Training
<b>Persons on Board:</b>	Crew - 1                      Passengers - None
<b>Injuries:</b>	Crew - None                  Passengers - N/A
<b>Nature of Damage:</b>	Propeller, nosewheel, firewall damaged
<b>Commander's Licence:</b>	Student pilot
<b>Commander's Age:</b>	59 years
<b>Commander's Flying Experience:</b>	61 hours (of which 39 were on type) Last 90 days - 7 hours Last 28 days - 3 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

The student pilot was returning from a qualifying cross-country flight. The weather was good, Runway 27 was in use, and the surface wind was south-westerly at 5kt or less. The chief flying instructor, who witnessed the accident, stated that the aircraft's approach appeared normal until the "round-out phase" (flare). The aircraft's attitude then remained slightly nose-down, instead of pitching up into the touchdown attitude, as it neared the runway. Touchdown occurred on the nose landing gear and, following three bounces of increasing magnitude, the nose landing gear collapsed and the aircraft came to a halt. The pilot, unhurt, vacated the aircraft without difficulty. His report stated that he had misjudged his proximity to the ground, and that surprise and some confusion prevented him regaining control of the situation and going around.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Gemini Flash IIA, G-MWWK
<b>No &amp; Type of Engines:</b>	1 Rotax 582-2V piston engine
<b>Year of Manufacture:</b>	1991 (Serial no: 866-1191-7-W661)
<b>Date &amp; Time (UTC):</b>	11 November 2012 at 1620 hrs
<b>Location:</b>	Redlands Airfield, Swindon
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1                      Passengers - None
<b>Injuries:</b>	Crew - None                  Passengers - N/A
<b>Nature of Damage:</b>	Damaged beyond economic repair
<b>Commander's Licence:</b>	National Private Pilot's Licence
<b>Commander's Age:</b>	51 years
<b>Commander's Flying Experience:</b>	68 hours (of which 47 were on type) Last 90 days - 7 hours Last 28 days - 40 minutes
<b>Information Source:</b>	Enquiries by the AAIB

At the time of notification of the accident, the pilot had informed the AAIB that he had been landing behind another aircraft which unexpectedly performed a go-around. On touchdown, G-MWWK had entered the propeller wash of the preceding aircraft and the pilot had lost control of his aircraft which tipped onto its left side.

The pilot states that he was taxiing and practising ground manoeuvres when a gust of wind caught under his right wing and the left wing entered some tall grass at the side of the taxiway. He intended to brake sharply to bring the aircraft to a halt but accidentally depressed the foot throttle, causing the aircraft to tip onto its left side and collapse the left wing. The pilot could not explain his differing accounts of the accident.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Mainair Blade 912S, G-CBVG
<b>No &amp; Type of Engines:</b>	1 Rotax 912ULS piston engine
<b>Year of Manufacture:</b>	2002 (Serial no: 1338-0802-7-W1133)
<b>Date &amp; Time (UTC):</b>	28 September 2013 at 0945 hrs
<b>Location:</b>	East Fortune Airfield, East Lothian
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1                      Passengers - None
<b>Injuries:</b>	Crew - 1 (Minor)      Passengers - N/A
<b>Nature of Damage:</b>	Damage to landing gear and pod
<b>Commander's Licence:</b>	National Private Pilot's Licence
<b>Commander's Age:</b>	43 years
<b>Commander's Flying Experience:</b>	243 hours (of which 172 were on type) Last 90 days - 10 hours Last 28 days - 4 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

The pilot reported that he began his takeoff roll on the 300-metre-long tarmac section of Runway 11 approximately two minutes after another aircraft had departed. The weather was very good with no wind. As his takeoff progressed, one sheep, followed by several more, jumped an adjacent fence and crossed the runway ahead of him. Although he had been just about to rotate, he aborted the takeoff, reducing power to idle and braking. The aircraft passed through the middle of the sheep, just missing them. The pilot realised that there was insufficient runway ahead in which to stop, so switched off the engine. The aircraft impacted a concrete roof truss which had been placed across the runway's end. The pilot vacated the aircraft without difficulty, having suffered only minor injuries. A flying instructor reported that although sheep grazed the airfield, they generally stayed clear of aircraft, and had not been problematic. Nonetheless he understood that the landowner had subsequently decided not to keep sheep on the airfield, but to graze other livestock in enclosed areas instead.

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Maverick 430, G-ONFL
<b>No &amp; Type of Engines:</b>	1 Rotax 503 piston engine
<b>Year of Manufacture:</b>	1995 (Serial no: PFA 259-12750)
<b>Date &amp; Time (UTC):</b>	5 October 2013 at 1100 hrs
<b>Location:</b>	North Coates Airfield, Lincolnshire
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1                      Passengers - None
<b>Injuries:</b>	Crew - None                  Passengers - N/A
<b>Nature of Damage:</b>	Hole in fuselage, left tail lower bracing cable snapped, large tear under fuselage by tail
<b>Commander's Licence:</b>	Private Pilot's Licence
<b>Commander's Age:</b>	46 years
<b>Commander's Flying Experience:</b>	318 hours (of which 38 were on type) Last 90 days - 3 hours Last 28 days - 2 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

## Synopsis

After landing on Runway 23 at North Coates Airfield the aircraft drifted to the right off the runway and hit a marker, causing damage to the aircraft and the marker. The CAA provides guidance concerning frangible markers in CAP 168 - *Licensing of Aerodromes*, which is also referenced by CAP 793 - *Safe Operating Practices at Unlicensed Aerodromes*. The airfield has since replaced their markers with ones of a different design.

## Description of the event

The pilot was using North Coates Airfield for local flying. The visibility was reported by the pilot as excellent, with a slight northerly wind. At the end of the second flight of the day, the aircraft touched down on the centreline of grass Runway 23 but later in the landing roll it drifted to the right despite the application of left rudder. The pilot reported that he was not overly concerned as there was a large grass area adjacent to the runway. However, the tail dragger configuration of the aircraft obscured the pilot's forward view and so he did not see a runway marker which the aircraft then struck. The impact resulted in a hole and a large gash in the aircraft fuselage and a snapped bracing cable. There were no problems reported with the rudder system serviceability.

The marker consisted of a triangle of plastic signs held up with a metal frame that was embedded in the ground (Figure 1).





**Figure 1**  
Damaged marker

Similar accidents have occurred in the past at various airfields. In 2004, following one such event, the AAIB recommended that the CAA publish advice covering this issue (AAIB recommendation 2004-106) which the CAA accepted. North Coates Airfield is not a licensed airfield but CAA CAP 793 - *Safe Operating Practices at Unlicensed Aerodromes* states in Chapter 4 'Aerodrome Physical Characteristics':

*'The physical characteristics required of a licensed aerodrome are detailed in CAP 168 Licensing of Aerodromes, available via [www.caa.co.uk/cap168](http://www.caa.co.uk/cap168). While the licensing criteria may not be necessary for safe operation of every type of aircraft, they can be used as guidance on which the layout of an unlicensed aerodrome may be based.'*

CAA CAP 168, "Licensing of Aerodromes", paragraph 6.1 states:

*'Any aids to air navigation to be sited within a runway strip should be made as light and as frangible as design and function will permit. In this context a frangible object is one which retains its structural integrity and stiffness up to a desired maximum load, but when subjected to a greater load than desired will break, distort or yield in such a manner as to present the minimum hazard to an aeroplane.'*

Following this accident, the markers at North Coates Airfield have been replaced with markers of a different design.

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	X'air 133(1), G-CCGR
<b>No &amp; Type of Engines:</b>	1 Verner 133M piston engine
<b>Year of Manufacture:</b>	2003 (Serial no: BMAA/HB/284)
<b>Date &amp; Time (UTC):</b>	4 October 2013 at 1100 hrs
<b>Location:</b>	Near Westonzoyland Airfield, Somerset
<b>Type of Flight:</b>	Training
<b>Persons on Board:</b>	Crew - 1                      Passengers - None
<b>Injuries:</b>	Crew - None                  Passengers - N/A
<b>Nature of Damage:</b>	Damage to fuselage and landing gear
<b>Commander's Licence:</b>	Student
<b>Commander's Age:</b>	53 years
<b>Commander's Flying Experience:</b>	29.5 hours (all of which were on type) Last 90 days - 26 hours Last 28 days - 3.5 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot

The student pilot was undertaking solo circuit practice with his instructor observing from the ground. He had performed one takeoff and landing and backtracked to take off again on Runway 22. The weather was good with a slight south-westerly wind. Having performed the normal pre-takeoff checks, the takeoff was normal until, having cleared the airfield and at a height of about 300 ft, the engine vibrated and stopped. The pilot attempted to restart the engine but it would not turn over. He switched off the fuel and electrical power and concentrated on finding a suitable landing site.

The subsequent touchdown in a grass field was successful but, in the last few metres of landing roll, the aircraft struck a small drainage ditch, causing damage to the landing gear and underside of the fuselage. The cause of the engine stoppage has not currently been determined.

## **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](http://www.aaib.gov.uk)).



**BULLETIN CORRECTION**

<b>Aircraft Type and Registration:</b>	Beagle Auster D5 Series 180 Husky, G-ATMH
<b>Date and Time (UTC)</b>	29 September 2013 at 1000 hrs
<b>Location:</b>	Bovington Camp, Dorset
<b>Information Source:</b>	Aircraft Accident Report Form

**AAIB Bulletin No 1/2014 page 40 refers**

The original report stated '*The aircraft was engaged on a glider towing sortie and had been flown by a different pilot without incident an hour or so before the accident flight*'. The pilot has advised that this was a misunderstanding and that the accident flight was, in fact, **the first flight of the day**.

The online version of the January Bulletin was amended prior to publication

**BULLETIN ADDENDUM**

<b>Aircraft Type and Registration:</b>	Champion 7ECA Citabria Aurora, G-EGWN
<b>Date &amp; Time (UTC):</b>	18 July 2013 at 0850 hrs
<b>Location:</b>	RAF Halton, Buckinghamshire
<b>Information Source:</b>	Additional information from flying club

**AAIB Bulletin No 12/2013, page 28 refers****Original synopsis**

The instructor reported that during an aerobatic training sortie the elevator control became restricted; a successful landing was carried out. A foreign object was later found lodged against the elevator control stop.

**Additional information**

The original report noted that the origin of the foreign object, a metal ring, and how it entered the aircraft could not be determined. Further investigation by the flying club has identified that the metal ring was from the aircraft's door emergency release pull. The ring has been replaced and an additional lanyard added to restrain it should it become detached again.

## Extract from the AAIB Annual Safety Report 2013

The complete report can be downloaded from the AAIB Website ([www.aaib.gov.uk](http://www.aaib.gov.uk))

### Statistics

The following pages provide the statistics for 2012, 2011 and 2010, for accidents and serious incidents involving the Air Accidents Investigation Branch.

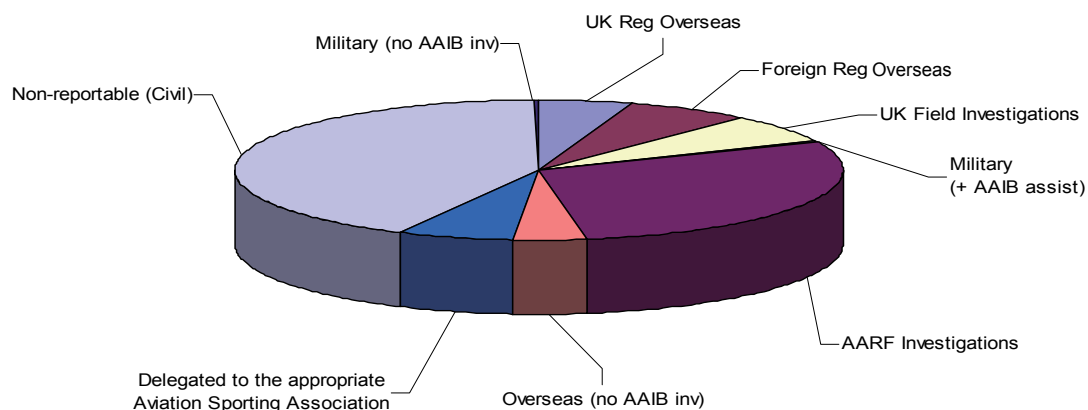
The statistics for 2013 will be published in the Annual Safety Report 2014 which will be available in the autumn.

An explanation of the categories is as follows:

Category	Definition
UK Aircraft overseas	Investigations involving UK registered aircraft, or aircraft registered in one of the UK Overseas Territories or Crown Dependencies, occurring in a Foreign State where the AAIB has participated in the capacity as the Accredited Representative representing the State of Registry in accordance with ICAO Annex 13.
Foreign Aircraft overseas	Accidents and serious incident investigations to Foreign registered aircraft occurring in a Foreign State where the AAIB have participated in the capacity as the Accredited Representative.
UK Field Investigations	Investigations involving the deployment of a 'Field' team within the UK or to one of the UK Overseas Territories or Crown Dependencies and those investigations where a team have not been deployed but Safety Recommendations are made. Also includes investigations which have been delegated to the AAIB by another State.
Military with AAIB Assistance	Where an MoD Service Inquiry is convened following an accident / serious incident to a Military aircraft and an AAIB Inspector is appointed to assist.
AARF Investigations	Investigations conducted by correspondence only using an Aircraft Accident Report Form (AARF) completed by the aircraft commander.
Overseas (no AAIB)	Notifications to the AAIB of an overseas event which has no AAIB involvement.
Delegations to Sporting Associations	Investigations delegated to the relevant UK Sporting Associations.
Non-reportable (Civil)	Occurrences notified to the AAIB involving civil registered aircraft which do not satisfy the criteria of a reportable accident or serious incident in accordance with the Regulations.
Military (no AAIB inv)	Notifications to the AAIB concerning Military aircraft with no AAIB involvement.

## AAIB Notifications 2012

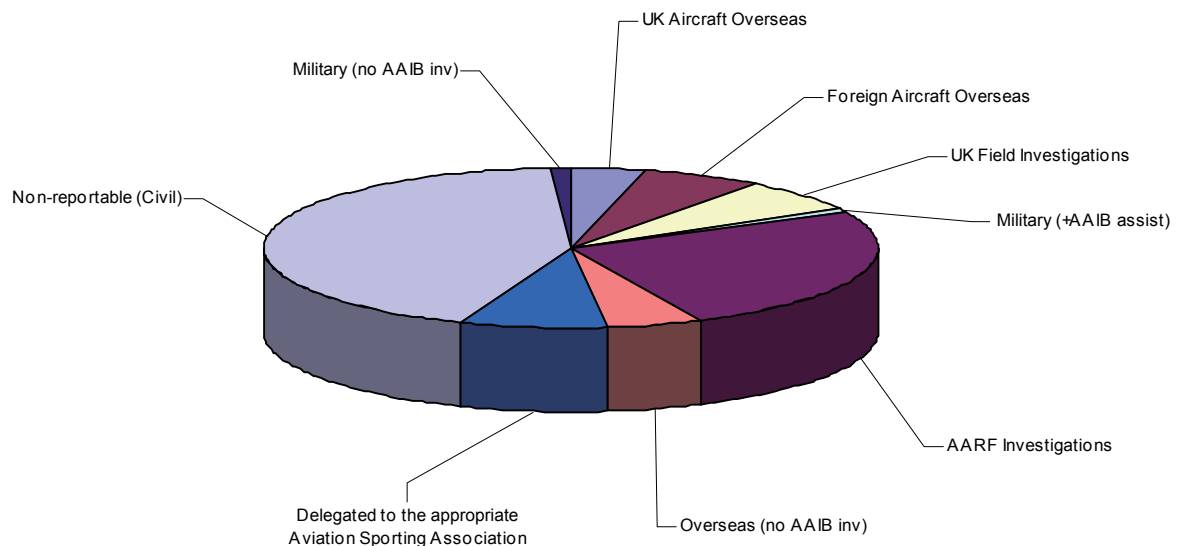
	J	F	M	A	M	J	J	A	S	O	N	D	Total
UK Aircraft Overseas	2	0	2	2	4	8	4	6	2	3	1	3	<b>37</b>
Foreign Aircraft Overseas	2	2	3	4	3	4	5	4	7	9	3	4	<b>50</b>
UK Field Investigations	3	4	5	7	5	1	6	8	3	3	1	1	<b>47</b>
Military (+ AAIB assist)	1	0	0	0	0	0	1	0	0	0	0	0	<b>2</b>
AARF Investigations	11	15	19	14	28	13	29	26	26	16	10	10	<b>217</b>
Overseas (no AAIB inv)	6	2	2	4	6	2	2	2	0	2	2	0	<b>30</b>
Delegated to the appropriate Aviation Sporting Association	3	3	2	5	6	2	6	9	2	5	1	0	<b>44</b>
Non-reportable (Civil)	23	21	35	26	39	26	40	25	30	22	19	8	<b>314</b>
Military (no AAIB inv)	1	0	0	1	0	0	0	0	0	1	0	0	<b>3</b>
<b>Total</b>	<b>52</b>	<b>47</b>	<b>68</b>	<b>63</b>	<b>91</b>	<b>56</b>	<b>93</b>	<b>80</b>	<b>70</b>	<b>61</b>	<b>37</b>	<b>26</b>	<b>744</b>
<b>UK FATAL ACCIDENTS</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>13</b>
<b>No of DEATHS</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>16</b>





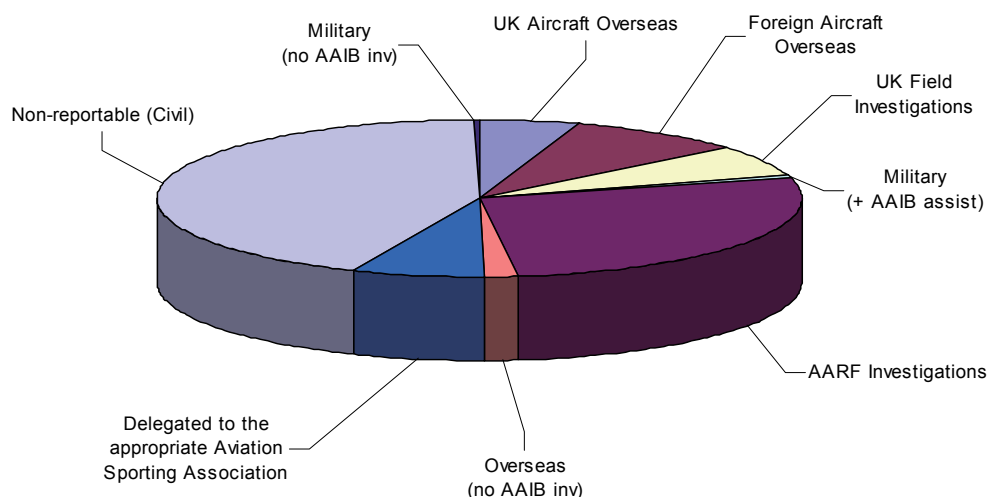
## AAIB Notifications 2011

	J	F	M	A	M	J	J	A	S	O	N	D	Total
UK Aircraft Overseas	0	2	0	1	5	4	5	3	2	2	4	3	31
Foreign Aircraft Overseas	5	8	2	3	7	3	9	3	4	3	2	2	51
UK Field Investigations	6	3	5	6	4	5	10	1	4	2	3	3	52
Military (+ AAIB assist)	1	1	0	0	0	0	1	1	1	0	1	0	6
AARF Investigations	6	11	21	21	14	21	34	20	24	15	10	2	199
Overseas (no AAIB inv)	1	7	3	0	2	2	7	3	1	3	3	8	40
Delegated to the appropriate Aviation Sporting Association	2	1	2	6	7	11	8	7	7	8	1	1	61
Non-reportable (Civil)	13	26	22	42	33	34	38	40	24	30	23	15	340
Military (no AAIB inv)	0	0	0	0	0	1	0	0	1	2	4	0	8
<b>Total</b>	<b>34</b>	<b>59</b>	<b>55</b>	<b>79</b>	<b>72</b>	<b>81</b>	<b>112</b>	<b>78</b>	<b>68</b>	<b>65</b>	<b>51</b>	<b>34</b>	<b>788</b>
<b>UK FATAL ACCIDENTS</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>14</b>
<b>No of DEATHS</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>16</b>



## AAIB Notifications 2010

	J	F	M	A	M	J	J	A	S	O	N	D	Total
UK Aircraft Overseas	3	2	3	1	2	6	5	5	3	1	3	3	<b>37</b>
Foreign Aircraft Overseas	8	2	7	5	8	5	3	9	5	3	6	4	<b>65</b>
UK Field Investigations	3	4	1	6	4	7	3	8	4	3	4	1	<b>48</b>
Military (+ AAIB assist)	0	0	1	0	1	1	0	0	0	0	0	0	<b>3</b>
AARF Investigations	6	8	13	25	21	34	19	17	20	16	13	8	<b>200</b>
Overseas (no AAIB inv)	3	0	0	0	1	0	2	1	2	1	1	1	<b>12</b>
Delegated to the appropriate Aviation Sporting Association	0	0	1	7	7	7	7	9	6	4	1	0	<b>49</b>
Non-reportable (Civil)	25	25	32	19	27	28	37	30	32	22	22	20	<b>319</b>
Military (no AAIB inv)	0	1	0	0	0	0	0	1	0	0	0	0	<b>2</b>
<b>Total</b>	<b>48</b>	<b>42</b>	<b>58</b>	<b>63</b>	<b>71</b>	<b>88</b>	<b>76</b>	<b>80</b>	<b>72</b>	<b>50</b>	<b>50</b>	<b>37</b>	<b>735</b>
<b>UK FATAL ACCIDENTS</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>9</b>
<b>No of DEATHS</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>15</b>



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

- |   |  |
|---|--|
| <p>1/2010 Boeing 777-236ER, G-YMMM<br/>at London Heathrow Airport<br/>on 17 January 2008.<br/>Published February 2010.</p>  | <p>7/2010 Aerospatiale (Eurocopter) AS 332L<br/>Super Puma, G-PUMI<br/>at Aberdeen Airport, Scotland<br/>on 13 October 2006.<br/>Published November 2010.</p>  |
| <p>2/2010 Beech 200C Super King Air, VQ-TIU<br/>at 1 nm south-east of North<br/>Caicos Airport, Turks and Caicos<br/>Islands, British West Indies<br/>on 6 February 2007.<br/>Published May 2010.</p> | <p>8/2010 Cessna 402C, G-EYES and<br/>Rand KR-2, G-BOLZ<br/>near Coventry Airport<br/>on 17 August 2008.<br/>Published December 2010.</p>  |
| <p>3/2010 Cessna Citation 500, VP-BGE<br/>2 nm NNE of Biggin Hill Airport<br/>on 30 March 2008.<br/>Published May 2010.</p>   | <p>1/2011 Eurocopter EC225 LP Super<br/>Puma, G-REDU<br/>near the Eastern Trough Area<br/>Project Central Production Facility<br/>Platform in the North Sea<br/>on 18 February 2009.<br/>Published September 2011.</p> |
| <p>4/2010 Boeing 777-236, G-VIIR<br/>at Robert L Bradshaw Int Airport<br/>St Kitts, West Indies<br/>on 26 September 2009.<br/>Published September 2010.</p>   | <p>2/2011 Aerospatiale (Eurocopter) AS332 L2<br/>Super Puma, G-REDL<br/>11 nm NE of Peterhead, Scotland<br/>on 1 April 2009.<br/>Published November 2011.</p>  |
| <p>5/2010 Grob G115E (Tutor), G-BYXR<br/>and Standard Cirrus Glider, G-CKHT<br/>Drayton, Oxfordshire<br/>on 14 June 2009.<br/>Published September 2010.</p>   |  |
| <p>6/2010 Grob G115E Tutor, G-BYUT<br/>and Grob G115E Tutor, G-BYVN<br/>near Porthcawl, South Wales<br/>on 11 February 2009.<br/>Published November 2010.</p>   |  |

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## GLOSSARY OF ABBREVIATIONS

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

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