

Lindstrand LBL 105A Hot Air Balloon, G-BUZZ

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Aircraft Type and Registration: Lindstrand LBL 105A Hot Air Balloon, G-BUZZ

No & Type of Engines: Burners: Double Shadow Cameron

Year of Manufacture: 1993

Date & Time (UTC): 5 August 2000 at 0609 hrs

Location: Winford, 2nm east of Bristol Airport

Type of Flight: Public Transport

Persons on Board: Crew - 1 - Passengers - 3

Injuries: Crew - None - Passengers - Minor

Nature of Damage: Damage to balloon canopy and burner frame

Commander's Licence: Commercial Pilot's Licence (Balloons)

Commander's Age: 27 years

Commander's Flying Experience: 421 hours total
Last 90 days - 62 hours

Information Source: Balloon Safety Report Form submitted by the pilot and further enquiries

The balloon was the first of several to lift early in the morning from Ashton Court, 5 nm north east of Bristol International Airport. The balloon lifted off at 0520 hours with three passengers on board, giving a calculated lift underload of 177 kg. At 0530 hours the pilot made radio contact with Bristol Air Traffic Control (ATC) and reported that the balloon would be travelling in a direction of 160° at approximately 10 kt, at up to 2,000 feet altitude. The balloon envelope was of dark colour being blue and black.

At 0555 hours an Airbus A310 aircraft was receiving radar vectors for an ILS approach for Runway 27 at Bristol. ATC advised the aircraft that there were several balloons operating in the area, drifting in a southerly direction and that if they should cross the extended centreline they would be below 1,000 feet amsl. At 0608 hours the A310 was established on the ILS approach at 5 nm and commenced a descent from 2,200 feet amsl to Runway 27; threshold elevation 603 feet amsl. At the same time the balloon pilot reported that he was "ABEAM ON YOUR EXTENDED CENTRELINE FIVE KILOMETRES EAST OF THE FIELD AT 500 FEET QNH 1025". ATC responded to this position report with the information "THERE IS AIRBUS TRAFFIC JUST GOING OVER THE TOP OF YOU ON THE ILS NOW". In fact the A310 at 5 nm from the airfield still had 3nm to go before passing over the top of the balloon.

The A310 crossed over the balloon at 0609 hours at an altitude of 1,300 feet amsl, 2 nm inbound on the ILS approach. The terrain in this area is between 400 and 500 feet amsl, 100 to 200 feet below the elevation of the runway. The balloon reported operating at an altitude of 500 feet amsl (100 feet agl) thus, with the canopy extended some 80 feet above the basket, the separation between the two craft was about 700 feet. The A310 pilots were aware of the presence of balloons but did not see this one at any time.

The balloon pilot saw the aircraft pass overhead and started the burner to arrest a sink which had developed. Once the aircraft had passed he estimated that the balloon was either level or climbing slightly when he noticed a ripple in the canopy. Very soon after this the balloon envelope was violently forced downwards such that it was below the basket which had itself tipped to approximately 30 degrees. The pilot, with the burner at full deflection, could not direct the flame into the mouth of the envelope. A few seconds later the envelope swung violently upwards causing all the occupants of the basket to be flung to the floor. The pilot recovered his feet and attempted to direct the burner flame into the mouth but was unsuccessful because it remained closed. The balloon continued to be knocked about by turbulence and the pilot then burned through the material to get air into the envelope. He managed to regain some control, put out a PAN call to ATC and made an emergency landing in a field. The passengers suffered minor injuries in the original upset, the subsequent landing was gentle. The retrieve crew were quickly on the scene and the emergency services arrived soon afterwards.

Two pilots witnessed the incident from their aircraft which was positioned at the holding point for Runway 27 at Bristol. They described seeing the balloon rising after the A310 aircraft had passed it and they discussed between themselves the possibility of turbulence. They then saw the balloon being buffeted and reported to ATC that the balloon was in difficulty due to wake vortex.

The controlled airspace around Bristol Airport in which the balloons were operating was nominated as Class D. In such airspace Instrument Flight Rules (IFR) traffic is separated by ATC only from other IFR traffic. To enter Class D airspace all pilots are required to make radio contact with ATC and to receive a clearance. ATC pass information to all pilots on Visual Flight Rules (VFR) traffic with separation remaining the responsibility of the pilots.

The pilot initially reported travelling in a direction of 160° at 10 kt, which would have led to his crossing the extended centreline at 5 nm. He next reported his position as north-east Barrow Tanks (a local reservoir) and descending to operate below 1,000 feet. He made another report overhead Barrow Tanks below 1,000 feet. The actual track thus achieved by the balloon was 200° which would take it within 2 1/2 miles of the airport. The pilot next reported his position "on your extended centreline 5 km east". Hot air balloons would not usually be visible on a radar screen so the pilot's reported position was the sole means by which the controller could determine its location. The controller stated in his report that the balloon had reported his position as 5 nm east of the airport.

The United Kingdom (UK) Aeronautical Information Publication requires pilots making position reports to use nautical miles as units of distance. Because of the low speeds and small distances that balloons travel, balloon pilots nearly always use Ordnance Survey (OS) 1:50,000 maps onto which aeronautical information has been transposed, although an aeronautical 1:500,000 chart would also be carried. The OS maps have a 1 km square grid overlay which greatly facilitates the assessment of distances. Therefore, when communicating by R/T with each other or their retrieve crews balloonists commonly use metres or kilometres.

The Airbus A310 aircraft has an ICAO weight turbulence categorisation of 'Heavy'. Bristol Airport has a limited number of 'Heavy' aircraft operations; at the time of the accident there was one regular movement per week. The ICAO recommended spacing minima distance to be applied when a 'Light' category aircraft is crossing behind a 'Heavy' aircraft at the same altitude, or less than 1,000 feet below, is 6 nm and the CAA minimum is 8 nm. There are no published minima for the operation of balloons with regard to wake turbulence separation. CAA publication 'General Aviation Safety Sense Leaflet 15B Wake Vortex' states that the lighter the aircraft the more vulnerable it would be to a turbulence upset.

The light wind and stable atmospheric conditions suitable for balloon flights are also those most likely to give rise to persistent wake vortices. There were no records of any previous wake turbulence encounters between balloons and aircraft on the UK database. There are only a few areas in the UK where balloons operate in the vicinity of large aircraft, although potentially any aircraft could cause an upset. In the event of such an encounter being anticipated early there are some options a balloon pilot could take to avoid the wake vortex. He may have the opportunity to climb to pass above the aircraft track or, under favourable conditions, to land in a safe area until the danger has passed.

There has been little information available to balloon pilots regarding wake turbulence although such encounters appear to be rare. The British Balloon and Airship Club have drawn attention to this matter in their September 2000 edition of the 'Pilot's Circular'. There is also an article to remind pilots of the importance of using standard phraseology when giving position reports to ATC.