Rockwell Commander 114, G-LIMA, 9 January 1996

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Aircraft Type and Registration: RockwellCommander 114, G-LIMA

No & Type of Engines:1 Lycoming IO-540-T4B5D piston engine

Year of Manufacture:1978

Date & Time (UTC):9 January 1996 at 1520 hrs

Location: Beckton, London

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - None

Injuries: Crew - None Passengers - N/A

Nature of Damage: Propeller, engine mounts, landing gear and wingtips

Commander's Licence: Private Pilot's Licence

Commander's Age:47 years

Commander's Flying Experience:333 hours (of which 55 were on type)

Last 90 days - 6 hours

Last 28 days - 3 hours

Information Source:AAIB Field Investigation

History of Flight

The pilot was not the owner of the aircraftbut he had flown it before. On the day of the accident he hiredit through an aircraft management company for a trip to Liverpool. The aircraft had been prepared for him and during his pre-flightinspection he visually inspected the fuel tank contents. Theaircraft was parked on a slope and one tank appeared to containsignificantly more fuel than the other but the pilot consideredthe combined contents sufficient for his trip which would takebetween 2.5 and 2.75 hours flying time.

The aircraft departed Biggin Hill at 0803hours and landed at Liverpool airport at 0920 hours. It was notrefuelled at Liverpool and departed from there at 1400 hours forthe return flight to Biggin Hill with only the pilot on board. In the Luton area the pilot noticed that the fuel gauges wereindicating lower than expected contents but at the time he attributedthis anomaly to the effect of air turbulence

on the fuel gaugingsystem. Shortly afterwards the aircraft was at 2,400 feet nearBrookmans Park where the ATC service was transferred from LutonRadar to Thames Radar. After being informed that the weatherat Biggin Hill was good with broken cloud at 1,000 feet, the pilotwas offered the choice of an IFR or VFR clearance. He requestedan IFR clearance and was given radar advisory service and vectorsfor the ILS approach to Biggin's runway 21. At the time the aircraft'sheading was 170° and the pilot was instructed to turn leftonto 160°.

At 1513 hrs in the vicinity of London CityAirport the pilot was instructed to descend to 1,800 feet on theLondon QNH and informed that he was nine miles from Biggin Hill. One minute later the pilot transmitted "ER WE HAVE A MAYDAYW'ERE - W'ERE OUT OF FUEL THIS IS MIKE ALPHA". Immediatelythe Thames Radar controller replied "MIKE ALPHA ROGER YOU'RETHREE MILES SOUTH EAST OF CITY AIRPORT WHICH RUNWAY WOULD YOUPREFER, YOU'RE EIGHT MILES FROM BIGGIN THREE MILES SOUTH EASTOF CITY." There then followed a series of messages betweenThames Radar and the pilot during which the pilot made clear hisintention to attempt a landing at London City airport. The pilotwas given a vector of 290° for the airport by the controllerwhilst the controller's assistant contacted London City ATC toinform them of the emergency. The pilot could see the approachlights of the airport but he was unable to glide to it becausehis height was 1500 feet and his range three miles. (From 1500feet the aircraft's maximum gliding distance is 2.5 nm). TheThames Radar controller lost radar contact with the aircraft whenit was 1.5 miles east of London City Airport but by this timethe it had been spotted by the airport's ATC staff to the northeast at very low altitude. The controller realised that a crashlanding off the airfield was inevitable and so he initiated afull emergency. The airport's fire service were informed andthey set off towards the controller's estimate of the crash position.

The pilot was surrounded by urban development. When he realised that he would not make it to the airport heselected an open area on the north bank of the River Thames.The forced landing occurred in daylight on a piece of waste ground,a disused gasworks, approximately one quarter of a mile north-eastof City airport's Runway 28 threshold. On touchdown the nosegear sank into the soil and the leg was bent rearwards disruptingthe engine mounting assembly. One propeller blade was bent rearwardsat mid-span but the other was grazed at the tip only. Minor damagewas inflicted on the leading edges of both wings near the tipsbut the cockpit, fuselage and empennage were undamaged. The undersidesof the wings remained clear of the ground and there was no damageto the fuel tanks or ground contact with the fuel tank drain cocks.

The emergency services, including the police,airport fire service and the London Hospital's air ambulance helicopterarrived at the scene to discover that the pilot was uninjured. The engineer who disassembled the aircraft at the site reportedthat the contents of the fuel tanks was approximately one pintof AVGAS and that, in his opinion, there was no doubt that theengine had stopped due to fuel exhaustion.

Fuel calculations

The aircraft was based at Biggin Hill andthe last time it was refuelled fuel there was on 30 November 1995when the tanks were filled to full capacity. According to theaircraft's logbook, the next two flights took place on 4 Januaryfor a combined total of one hour. (ATC's records confirm thaton that day the aircraft flew twice for a total of 64 minutes). The pilot stated that he normally cruised at 2,400 RPM and24 inches manifold pressure with a fuel flow of 14 US gallonsper hour which produced a cruise speed of 130 to 140 KIAS. Onthe day of the accident the aircraft's flight times are consistentwith cruising in that speed band and analysis of the RTF recordingof Thames Radar's frequency confirmed the engine speed of 2,400RPM. Full fuel tanks contain 70 US gallons.

Allowing 1 US gallonfor ground running on each of 4 flights and 14 US gallons perhour whilst airborne, the aircraft's fuel tanks should have containedabout 52 US gallons when it took off from Biggin Hill. which shouldhave been sufficient for approximately 3.5 hours flight. However,the aircraft flew for only 2.5 hours on the fuel remaining. Consequently,about 14 US gallons of fuel had been used or lost at some stagebetween 30 November and 9 January.

Safety Recommendation 96-16

Whenever operationally practicable, single-enginedIFR aircraft inbound to Biggin Hill requiring radar positioningto the airport's ILS should be vectored to intercept the localiserfrom the east to ensure the minimum exposure to the risks of overflyingthe urban areas of greater London.