

SHERIFFDOM OF GLASGOW AND STRATHKELVIN

Court Ref: GLW-B1473-18

CONSOLIDATED LIST OF ISSUES

in the

INQUIRY INTO THE DEATHS OF

GARY LOUIS ARTHUR
ANTHONY LYNDON COLLINS
JOSEPH ROBERT CUSKER
COLIN GIBSON
ROBERT JAMES JENKINS
JOHN MCGARRIGLE
SAMUEL BELL MCGHEE
KIRSTY MARY NELIS
MARK EDWARD O'PREY and
DAVID IAIN TRAILL

1. When and where each of the deaths occurred.
2. When and where the aircraft crash occurred.
3. The cause or causes of each of the deaths.
4. The cause or causes of the helicopter crash, including:-
 - 4.1. how fuel was managed on the aircraft and in particular why both transfer pumps were switched OFF, rendering unusable the otherwise usable fuel in the main tank;
 - 4.2. whether the *Pilot's Checklist* was available to the pilot;
 - 4.3. whether it was within the competence of a helicopter pilot qualified to fly G-SPAO on police duties to comply with the requirements of the *Pilot's Checklist*;
 - 4.4. at what stage in flight did the LOW FUEL warnings likely occur;
 - 4.5. why, having acknowledged the LOW FUEL warnings, did the pilot

- not complete the actions detailed in the *Pilot's Checklist*;
- 4.6. whether the timing and/or the initially intermittent character of the LOW FUEL warnings contributed to the *Pilot's Checklist* procedure not being completed;
 - 4.7. whether there have been other instances of LOW FUEL warnings not being followed;
 - 4.8. whether the pilot believed the fuel transfer pumps were operating, notwithstanding the LOW FUEL warnings, because he believed he had switched the fuel transfer pumps back ON, and if so whether the design or layout of the switches contributed to such errors occurring;
 - 4.9. whether the pilot believed the transfer pumps were operating, notwithstanding the LOW FUEL warnings, as a result of erroneous fuel indications being displayed on the CAD;
 - 4.10. what the root cause or causes were of any such erroneous fuel indications and whether they were adequately investigated and acted upon prior to the accident;
 - 4.11. whether there was a failure of any part of the CAD prior to the accident;
 - 4.12. what steps were open to a helicopter pilot qualified to fly this helicopter after both engines flamed out;
 - 4.13. whether the designed time-interval between engine flame-outs was compromised by the design of the fuel tank system and, in particular, the undivided volume above the supply tanks, which, depending on the attitude of the helicopter, might have allowed fuel to migrate from one supply tank to another;
 - 4.14. why autorotation, flare recovery and landing were not completed successfully;
 - 4.15. whether the ability to carry out autorotation, flare recovery and landing was compromised by the design of the cockpit layout.
5. The precautions, if any, which could reasonably have been taken, and which, had they been taken, might realistically have resulted in the helicopter crash being avoided, including whether the crash might realistically have been avoided:-

- 5.1. by including within the fuel contents indication system a caution or warning that both transfer pumps were switched OFF;
 - 5.2. by including within the fuel contents indication system a caution or warning that a fuel pump, having been switched OFF, has since been submerged in fuel;
 - 5.3. by designing the fuel tank system and fuel contents indication system in such a way that the fuel transfer pumps did not require to be switched ON or OFF during flight;
 - 5.4. by including within the fuel contents indication system a caution or warning, in the case of anomalous or implausible combinations of outputs from the sensors;
 - 5.5. by designing the fuel tank system, and in particular the differential capacities of the supply tanks, in such a way as to ensure that the design objective of creating an interval of 3-4 minutes between engine flame-outs, or such other interval of time as would be represented by 4.5kg of fuel, or any other safe interval of time, was achieved;
 - 5.6. by ensuring that power to the RADALT and steerable landing light was automatically maintained in the event of a double engine flame-out.
6. The defects, if any, in any system of working which contributed to the deaths or the accident, including:-
- 6.1. whether any aspect of the system of maintenance of G-SPA0, including its washing regime, contributed to the contamination of the fuel and/or the fuel tank system with water;
 - 6.2. whether any aspect of the pre-flight check procedures contributed to the accident occurring;
 - 6.3. whether any aspect of the training of pilots, in particular, with regard to fueling, pre-flight checks, the pilot handover procedure, the operation of the fuel contents indication system, erroneous fuel indications, the appropriate response to fuel cautions and warnings, and the execution of an autorotation at night, contributed to the accident occurring;

6.4. whether the practice of the "day-shift" pilot handing the aircraft over already fueled to the "night-shift" pilot contributed to the accident occurring.

7. any other facts which are relevant to the circumstances of the deaths, including:-

7.1. whether, and the extent to which, the Safety Recommendations of the AAIB in their Report 3/2015 have been adopted and implemented;

7.2. whether, and the extent to which, the operator, helicopter manufacturer and engine manufacturer have taken necessary and appropriate safety actions following the accident, including those considered by the AAIB in their Report 3/2015;

7.3. whether, and the extent to which, any recommendations should be made by this Court.