

INNOVATION TO SAVE LIVES IN ROTORCRAFT OVER AFGHANISTAN

Defence Science and Technology Laboratory (DSTL)

The Defence Science and Technology Laboratory (DSTL), in conjunction with industry partners, has developed the world's first application and demonstration of a technology designed to help helicopter pilots land more safely and efficiently in Afghanistan. Air and Weapons Systems Department of the DSTL, part of the Ministry of Defence (MOD), has led the technical development of a pioneering approach to the problem of a phenomenon known as 'helicopter brownout'. Helicopter brownout occurs when a pilot loses visual references due to dust or sand re-circulating during take-off or landing, which is a major problem in desert conditions. This can present potentially life-threatening issues when performing operational duties on the battlefield with helicopters.

Working in conjunction with Agusta Westland, DSTL analysed the incidents to understand what had happened and identify the causal factors. Over a six month period scientists conducted a rapid technology assessment of as many available solutions as possible. This included a simulator trial of one of the most promising technologies, 3D conformal symbology. Presented on a small helmet-mounted display,

this innovative approach provides a virtual 3D representation of the landing zone that stays fixed to the earth as the pilot approaches.

With this helmet-presented innovation, the pilot views all the relevant information needed to judge the height, speed and drift to replace the real-world cues obscured by dust. The display can also be fitted to night vision goggles to provide a night time capability. As a result, 3D conformal symbology developed by Ferranti Technologies was selected as the most promising short-term solution to address the specific problem in Afghanistan. The DSTL/industry team has conducted flight trials that demonstrated the feasibility of 3D conformal symbology in a Lynx helicopter from the Army Air Corp Development and Trials (D&T) Squadron based at Middle Wallop in Hampshire. These showed that the system worked in a real helicopter.

The team, comprising members of DSTL, Ferranti and Agusta Westland, also conducted a further simulator trial using front-line Merlin helicopter crews to refine the solution and conduct a large number of helicopter take-offs and landings to show that the system did indeed make these safer. Once follow-on development and production work has been

completed, it is anticipated that the technology will be deployed to front-line helicopters in Afghanistan. DSTL built a large-scale dust chamber on their 7,000 acre range at Porton Down to assess sensor technology which might be able to see through the dust and advise aircrew whether there are unseen obstructions. This innovative, temporary test facility used an inflatable hangar. Typical landing site obstructions were put inside the chamber and it was filled with known concentrations of commercially-sourced dust specifically chosen for its similar characteristics to Afghan soil. The team invited eight different companies to demonstrate the performance of their equipment in the facility.



The ability to penetrate the dust and allow pilots to see through dust clouds is one of the areas for future development. The ground-breaking work has earned the team a nomination for a Civil Service award, designed to recognise the very best practice across the civil service. The team's research has been recognised as among the most novel work carried out in Britain this year as low visibility landing team appeared on the shortlist for the innovation award.

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