Introduction

1. This paper constitutes the Ministry of Defence’s supplementary evidence to the House of Commons Science and Technology Committee’s inquiry into Quantum Technologies. In August 2018 the Committee requested further information about the following questions:
   - What assessment has been made of the potential for quantum sensors to detect submarines?
   - What timeframe does the MOD expect such quantum sensors to be developed over?
   - Is there any capability to mitigate quantum sensing that has been identified and what work is being undertaken to develop this capability?

What assessment has been made of the potential for quantum sensors to detect submarines?

2. The MOD is undertaking significant research into potential applications for quantum science through its core Science & Technology (S&T) programme. This includes exploiting quantum properties to enhance positioning, navigation and timing solutions, as well as for novel sensing. There are potential opportunities to exploit this research in the land and air domains, as well as for underwater capability delivery.

What timeframe does MOD expect such quantum sensors to be developed over?

3. Much of the MOD’s research is still at a relatively early stage and, in many cases, significant barriers remain to developing these technologies into effective real-world capabilities. Initial applications for quantum technologies in the underwater domain (including submarines) are most likely to be enhancements to navigation capabilities. As enabling technologies mature, quantum sensors may provide an effective anti-submarine capability. However, given the challenges of wide-area sensing in open-ocean conditions, it is unlikely that such capabilities will provide a radical change in capability in the medium term.

Is there any capability to mitigate quantum sensing that has been identified and what work is being undertaken to develop this capability?

4. The MOD S&T programme continues to identify, develop and assess technologies which can be used to both find and hide submarines, with information on these sensor and signature control technologies being used more widely across the MOD to provide risk assessments for current and future submarine platforms. With the MOD’s close relationship with the National Quantum Technologies Programme, the MOD maintains a keen awareness of developments in the capability which may have an impact in this environment. The MOD will continue to assess future technologies (including quantum sensing) with funding concentrated on those areas which are expected to deliver the greatest level of capability benefit and impact.

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