SUMMARY NOTE of the UK National Quantum Technologies Programme Strategic Advisory Board meeting held on Friday 6 June 2014 at the Department for Business, Innovation and Skills Conference Centre, London SW1.

Members Present:

Strategic Advisory Board Members	
Professor Dave Delpy (Chairman)	Independent
Professor Peter Dobson	University of Oxford/University of Warwick
Mr. Mark Hughes	BT Security
Professor Sir Peter Knight	Imperial College London
Professor Gerard Milburn	University of Queensland, Australia
Baroness Pauline Neville-Jones	UK Parliament, House of Lords
Dr. Angela Strank	BP

UK National Quantum Technologies Programme Staff	
Dr. Sue Armfield	BIS
Dr. Simon Bennett	TSB
Dr. Rachel Bishop	EPSRC
Dr. Derek Gillespie	EPSRC
Miss Sarah Morgan	BIS
Dr. Lesley Thompson	EPSRC

Apologies	
Dr. John Bagshaw	BAE Systems
Dr. Vernon Gibson	UK Ministry of Defence

A nominated representative of the national network of Quantum Technology Hubs will be invited to sit on the Strategic Advisory Board once the Hub network is established.

NOTE: The Strategic Advisory Board agreed that further details of discussions under items (3) and (4) are to be used for the purpose of policy and strategy development and should therefore be exempt from public scrutiny, in accordance with section 36 (conduct of public affairs) of the Freedom of Information Act 2000.

1. HM Government Context and Operation of the Strategic Advisory Board

1.1 The Strategic Advisory Board (SAB) received an overview of the rationale for the UK National Quantum Technologies Programme, including a summary of the community engagement that took place in advance of the announcement of the Autumn Statement 2013 investment.

1.2 The SAB discussed the importance of the UK developing a coherent national strategy to support UK quantum technologies, building on the fact that the UK community is keen to work together in this regard. The SAB recognised that accountability for appropriate investment of public funding remains with the CEOs of EPSRC and TSB, while the SAB have ownership of forming and leading a national strategy in quantum

technology. Suitable performance indicators and milestones will be developed to track progress and outcomes.

1.3 The SAB requested that they have a route to remain updated on the discussions of the Quantum Technologies Programme Operations Group (POG), and noted that potential topics of SAB discussion will be raised with the POG in advance of the SAB agenda being set.

2. Overview of Quantum Technology Programme Activity and Investment

2.1 The SAB noted the progress that has been made since the 2013 Autumn Statement, and commended the partners involved for their cooperation and collaboration. The SAB also discussed the specific requirements for expenditure within the National Programme, and the associated plans currently in place.

2.2 In particular, the SAB explored in greater detail the current progress on the EPSRC-led call for a National Network of Quantum Technology Hubs, and emphasised the importance of these Hubs working together to form the core of a UK quantum technology community that brings economic benefit to the UK. The importance of appropriate strong leadership, and meaningful industrial partnership, to the success of the Hubs was stressed by the SAB.

2.3 The SAB also highlighted the importance of doctoral training – as provided by the EPSRC Centres for Doctoral Training and the Dstl National PhD Programme – to maintain the UK's competitive edge in quantum science and technology. The SAB advised that the Quantum Technology Hubs create and maintain strong links to the appropriate doctoral research community in the UK.

3. UK and International Perspectives on Quantum Technology

3.1 The SAB were introduced to the key issues facing the National Programme at this time – where and why should the UK collaborate internationally, and how does the UK effectively balance 'best-with-best' international collaboration with the maintenance of the UK's competitive edge?

3.2 The SAB reinforced the aims of the National Programme to grow new industries that exploit quantum technologies within the UK. To this end, it was felt to be important that the UK science base continued to collaborate with their international peers on scientific issues, in order that UK researchers remained at the front of the state-of-the-art. It was recommended that the Centres for Doctoral Training, in particular, were excellent targets for international networking and collaboration.

3.3 Collaboration in activities related to technology translation and development should be considerably more targeted. The SAB recognised that there were several very useful mechanisms within the UK public sector – such as the Science & Innovation Network, and UKTI's Innovation Gateway – which could be utilised by the National Programme. However, it was stressed that any such mechanisms should be used in line with a national strategy for quantum technologies as advised by the SAB, and not directed by independent organisational approaches. The SAB discussed and

directed the production of 'guiding principles' for international collaboration and engagement in the National Programme.

3.4 It was acknowledged by SAB members that the UK's national strategy for quantum technologies, as it developed, would need to be understood and adopted by the UK communities working in the field. This would require clear leadership, and SAB members would have to champion the national strategy.

4. European Engagement Summary and Opportunity

4.1 The SAB received and acknowledged a summary of the opportunities available *via* European funding mechanisms, including the Horizon2020 programme. In particular, the SAB discussed the differences between EU FET (Future Emerging Technologies) and KET (Key Enabling Technologies) concepts, and the opportunities presented by European networking.

4.2 In line with the general advice upon international engagement, the SAB advised that the UK should engage strategically (and support funding being made available) with EU quantum activities that aim towards *excellent science*. It was noted by the SAB that it may become important that resources are made available to allow the National Programme to work alongside BIS to meaningfully engage with, and influence, future European policy and funding opportunities.

4.3 The SAB discussed the ongoing activity by European peers to create a new ERA-Net Co-fund that focusses on quantum science and technology – 'QUANT-ERA'. The SAB felt that this activity could be of benefit to the UK quantum community, and advised that the UK should work alongside those parties currently developing the ERA-Net to position the activity towards pre-competitive quantum science research.

5. UK Quantum Technologies Road-Mapping Activity

5.1 The SAB received an overview of the National Programme's intentions for technology road-mapping in quantum technologies, led by TSB and the Knowledge Transfer Network, drawing upon the expertise of the Institute of Manufacturing at the University of Cambridge.

5.2 The SAB endorsed the planned approach, noting the multiple benefits of effective road-mapping, including; strong engagement with the Quantum Technology Hubs; aiding UK SMEs in identifying customers; providing focus for strategy and delivery; setting appropriate deadlines for delivery; and identification of diverse market opportunities for quantum technology.

5.3 The SAB indicated their desire to be kept regularly updated on the progress of the technology road-mapping activity.

6. AOB

6.1 SAB members were reminded that dates for future meetings will be set over the forthcoming weeks. The next meeting of the SAB would most likely be in September/October 2014.

6.2 The SAB discussed the value to be gained by the UK from the national network of Quantum Technology Hubs, including the range of deliverables and what would constitute an appropriate monitoring strategy. These discussions will be taken on board by EPSRC and TSB.

6.3 The SAB requested that a future discussion explored the potential implications of US ITAR policy to UK quantum technology research.

Dr. Derek Gillespie
June 2014