



RESEARCH
AND ENGINEERING

THE UNDER SECRETARY OF DEFENSE

3030 DEFENSE PENTAGON
WASHINGTON, DC 20301-3030

JUN 18 2018

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference - Defense Science Board Task Force on Applications of Quantum Technologies

Quantum technologies have shown increasing capabilities in metrology, sensing, communications, and computation. Increases in precision and sensitivity will extend the capability of existing systems and allow new types of measurements to be made. Quantum-based communication techniques have been developed for over 30 years and provide a means for secure communications in contested environments. Quantum computation and simulation have made significant progress in recent years. Understanding the state-of-the-art and the likely trajectory of these technologies will allow the Department of Defense (DoD) to strategically incorporate these technologies into its systems.

The Air Force Science Advisory Board studied quantum science and technologies in 2015. Progress across the breadth of quantum-enabled technologies including recent announcements of the use of quantum computers to simulate atomic properties and the possibility of using quantum technologies in more application areas, including land, sea, and sub surface applications, makes the topic worthy of additional investigation.

For each of these missions or capability areas, the key technology questions to be considered are:

- What is the level of technology readiness of these technologies? What technological challenges do they face in order to be considered for DoD applications?
- What is the level of research and development in these technologies in universities, Government laboratories and industries both domestically and in other countries?
- Which technologies will be developed for commercial applications? Which areas will be applicable to primarily unique DoD applications? For DoD applications: will the technologies required for design, fabrication, testing, and use provide a persistent differentiation?
- What are the ancillary technologies (refrigeration, filters, interconnect, packaging, specialized materials, etc.) required for implementation of these technologies?

I will sponsor the study. Dr. John Manferdelli and Dr. Robert Wisnieff will serve as the co-Chairmen of this study. Mr. Paul Lopata will serve as the Executive Secretary. Lt Col Milo Hyde will serve as the Defense Science Board Secretariat representative.

The task force members are granted access to those DoD officials and data necessary for the appropriate conduct of their study. The Under Secretary of Defense for Research and Engineering will serve as the DoD decision-maker for the matter under consideration and will

coordinate decision-making as appropriate with other stakeholders identified by the study's findings and recommendations. The nominal start date of the study period will be within 3 months of signing this Terms of Reference, and the study period will be between 9 to 12 months. The final report will be completed within three months from the end of the study period. Extensions for unforeseen circumstances will be handled accordingly.

The study will operate in accordance with the provisions of Public Law 92-463, "Federal Advisory Committee Act," and DoD Instruction 5105.04, "DoD Federal Advisory Committee Management Program." It is not anticipated that this study will need to go into any "particular matters" within the meaning of title 18, United States Code, section 208, nor will it cause any member to be placed in the position of action as a procurement official.

A handwritten signature in blue ink, appearing to read "M.D. Griffin", with a long horizontal flourish extending to the right.

Michael D. Griffin