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MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference - Defense Science Board Task Force on Ensuring
Microelectronics Superiority

Microelectronics components are critical enablers that underpin all of the major technology areas expected to give U.S. forces their qualitative edge. Future military systems that will rely on microelectronics include air, space, land and sea vehicles, cyber-electromagnetic maneuvering and command and control systems, artificial intelligence, and autonomous systems as well as quantum information sciences and other evolving technologies. However, a January 2017 report by the President's Council of Advisors on Science and Technology noted:

“The global semiconductor market has never been a completely free market: it is founded on science that historically has been driven, in substantial part, by government and academia; segments of it are restricted in various ways as a result of national-security and defense imperatives; and it is frequently the focus of national industrial policies. Market forces play a central and critical role. But any presumption by U.S. policymakers that existing market forces alone will yield optimal outcomes — particularly when faced with substantial industrial policies from other countries — is unwarranted. In order to realize the opportunities that semiconductors present and to effectively mitigate major risks, U.S. policy must respond to the challenges now at hand.”

The need for innovative microelectronics, as well as the ability to sustain the trustworthy and assured microelectronics supply for legacy Department of Defense (DoD) systems, is a challenge for the Department. The ability to meet many of the modernization priorities in the National Defense Strategy will rest on a secure microelectronics foundation both the technological capabilities, and a reformed acquisition and supply chain management process to ensure the delivery and verification of hardware and software that will be integrated into weapons systems.

In order to achieve the benefits needed for the U.S. military to maintain its superiority over potential future adversaries, the Defense Science Board Task Force on A Strategy for Ensuring U.S. Leadership in Microelectronics and Securing the Technological Advantage of the U.S. Military will consider how the United States can maintain a strong industrial base to provide increasingly more sophisticated and reliable microelectronics capability to defense systems.

The Task Force will examine the following questions:

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- What approaches can guarantee capacity that can respond to varying national security needs, such as node sizes, recipes, heterogeneous integration of best-of-breed, and variable volume on demand?
- How can the DoD assure access to trustworthy, state-of-the-art, high-performance components: commodity, custom, semi-custom, and hybrid? Further, how can access to radiation hard components for strategic and space applications be assured?
- How can the DoD assure access to trustworthy components to service DoD legacy systems? Is it possible to identify engineering principles and methods to insert state-of-the-art microelectronics in DoD systems and reduce perpetual dependence on obsolete parts?
- What is needed to ensure that the U.S. leads high-performance microelectronics for decades to come? What aspects of policy and workforce must be considered?
- What is needed to accelerate leap-ahead research and development and innovation for microelectronics?
- Can public/private partnerships advance DoD microelectronics trustworthiness needs?
- How should the national security microelectronics community be resourced and organized for maximum impact?

I will sponsor the study. Dr. Victoria Coleman, Dr. John Manferdelli, and Dr. Robert Wisnieff will serve as the tri-Chairman of this study. Ms. Nicole Petta will serve as the Executive Secretary. Mr. Kevin Doxey will serve as the Defense Science Board Secretariat.

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 three months of signing this Terms of Reference, and the study period will be between 9-12 months. The final report will be completed within six 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 members 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