THE UNDER SECRETARY OF DEFENSE
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WASHINGTON, DC 20301-3010

ACQUISITION,
TECHNOLOGY,
AND LOGISTICS

AUG 03 2016

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference – Defense Science Board Task Force on the Design and Acquisition of Software for Defense Systems

The Department has always been challenged to develop software intensive products within cost and schedule and with the desired performance. Cyber security, steadily increased functionality (including artificial intelligence and autonomy features), and a growing desire for tightly networked systems all lead to more complex software intensive programs.. This is true for weapons systems platforms—such as F-35 and Aegis—as well as for logistics and other systems that support the Warfighter.

The software challenge becomes more important in light of the emerging threats and promising capabilities that could greatly affect future military systems. Building and upgrading systems to be resilient to cyber vulnerabilities and threats has never been more important. Software for systems that must function in a complex and constantly changing environment must be developed using techniques appropriate to those demands. When systems attributes include adaptive cognitive capabilities, the challenges are only greater. Software that "learns" greatly complicates software testing insofar as it changes itself every time the system is used. Commercial software development is also constantly and quickly evolving in response to both technological opportunity and competitive pressures; the Department and the Defense industrial base need to capitalize on the opportunities provided by commercial sector improvements in software development techniques and practices.

For these reasons, this Task Force is established to examine the current state of DoD software acquisition and recommend practical actions to improve performance by the DoD and its suppliers.. The Task Force will consider development, test and evaluation of learning systems. Since the DSB examined software acquisition in 2007, there has been considerable attention on improving acquisition outcomes; the Weapons System Acquisition Reform Act in 2009 and the Better Buying Power initiatives from 2010 to 2016 are just two notable examples. Given these changes, has the acquisition of software intensive systems by DoD improved or is it lagging behind? Topics to be considered include but are not limited to the following:

- Contrast and compare DOD and commercial software development. How current are traditional defense contractors and DOD program offices on software development capabilities? What emerging and state-of-the-art commercial software development capabilities should military systems embrace?

- What impediments exist in the DOD requirements, contracting and program management practices to the use of more advanced software development processes and how can they be removed?

- Do we need, for example, expansion of the use of special authorities like Federal Acquisition Regulation Part 12 (Other Transactional Authorities)? What about "plug fest" type approaches? For agile approaches, how is the requirements process best addressed?

- Do "agile" software approaches live up to their promise? Have DoD and DOD suppliers applied "agile" techniques effectively? What are the impediments to more extensive use of "agile" approaches in the Department?

- Should the DoD adopt the commercial concept of a minimum viable product?

- What are best management approaches to achieving rapid and effective software upgrades in military systems? Are modular open architectures (hardware and software) being used effectively? If so, how does one perform required functions like testing and information assurance assessments in a timely manner?

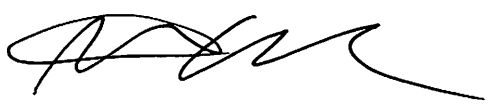
- What lessons can be learned from those DoD programs with recent major software challenges, such as F-35 mission software builds (e.g., Blocks 2B, 3i, 3F) and ALIS, and/or next generation GPS Ground Control System?

- What specific recommendations would be made to ensure rapid adoption of cognitive capabilities as they mature?

I will sponsor the study. The Honorable William LaPlante and Mr. Robert Wisnieff will serve as co-chairmen of the study. Mr. James J. Thompson, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, will serve as Executive Secretary for the study. Lt. Col Victor Osweiler, U.S. Air Force, will serve as the Defense Science Board Secretariat Representative.

The task force members are granted access to those Department of Defense officials and data necessary for the appropriate conduct of their study. The Under Secretary of Defense for Acquisition, Technology, and Logistics 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 6 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, the "Federal Advisory Committee Act," and DoD Directive 5105.04, "Department of Defense 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.



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