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ACQUISITION,
TECHNOLOGY,
AND LOGISTICS

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MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference – Defense Science Board Task Force on Biology

The nature of conflicts has fundamentally changed since the end of the Cold War. Although preparing for conventional force-on-force combat remains a major focus of the Department of Defense (DoD), its current concepts of “national security” include the now-familiar problems of insurgency, terrorism, and attacks by individuals and groups on the United States and its allies. Strategic forms of conflict, including economic warfare and other forms of aggression, are more complex and less familiar. These forms, consisting of political and social “weapons” designed to exert their effects over decades, are intended to damage or destroy the strength and efficiency of an open society.

New technologies enable new forms of conflict. The Cold War was based largely on a competition in technologies related to nuclear weapons, radar, stealth, space, and information. Conflict has recently embraced “gray zone” operations and cyber warfare. What is next?

Out of a field of several candidates, which includes autonomous weapons and artificial intelligence, biology is the science with the most explosive growth—although not yet the greatest practical impact. The first revolution in modern biology was the discovery of the structure of DNA, and the second was genomics. A third revolution, currently underway, is the convergence of approaches from engineering, physical sciences, life sciences, and medicine to address grand challenges in biology, health care, agriculture, industrial manufacturing, and materials science. Capabilities in development include genetic and systems-based approaches designed to manipulate biological systems in desired ways at the molecular and organism level. Although this revolution is currently centered in the United States, there exist relatively minimal barriers to entry; therefore, new concepts can be rapidly disseminated internationally.

Unlike other areas of modern technology, DoD has not actively participated in the development of modern biology. As a result, the Department runs a serious risk of being surprised when bioscience is applied to strengthen or expand an adversary’s capabilities. Although the United States has the strongest bioscience university/industrial complex in the world, DoD is currently not a significant part of that complex and has not pursued capabilities that are focused on problems of interest. The goal of this task force is to explore and articulate the opportunities and potential risks enabled by modern and emerging bioscience advances that could significantly impact our national security and improve our defense capabilities.

This task force will focus on the most rapidly moving areas of modern bioscience. These areas have the potential to provide the basis for technologies that either yield novel opportunities for defense innovation or, in the hands of an adversary, present a threat to national security. Its emphasis will be on new technologies, and it will include consideration of technical advances

that can be accomplished now as well as conservative speculation on what might be technically possible in 25 years. The task force will also consider non-technical issues that are critical to future developments, including: 1) the sources of innovation, 2) legal, ethical, and regulatory aspects to developing products to be used with humans/animals and plants, and 3) key areas where substantial investments would have very high payoff in both long and short term. For those areas where the task force identifies a novel risk, it will suggest potential strategies and opportunities for risk management to include the development of novel countermeasures.

The task force will leverage a number of resources in the conduct of its work. In addition to its inherent expertise and access to professional networks and information sources, the task force may, at the discretion of the co-Chairs, invite presentations from specialized experts in academia, industry, and Government. The task force will have access to relevant DoD subject-matter experts and may conduct site visits to DoD laboratories and Federally-Funded Research and Development Centers in order to ascertain the Department's capabilities in relevant technologies, tools, and scientific expertise. At the conclusion of its work, the task force will provide a briefing and a written unclassified report, with classified annexes as needed.

I will sponsor the study. Dr. Arup Chakraborty and Dr. George Whitesides will serve as co-chairmen of the study. Dr. James B. Petro will serve as Executive Secretary for the study. Captain Jeff Nowak, U.S. Navy, 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 Acquisition, Technology, and Logistics will serve as the DoD lead 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 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, "Department of Defense 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.



James A. MacStravic
Performing the Duties of the
Under Secretary of Defense
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