



**DEPARTMENT OF THE AIR FORCE
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**U.S. Air Force
Scientific Advisory Board**

Maintaining Technology Superiority for the United States Air Force (MTS)

Abstract

The U.S. Air Force has generally had asymmetric technology advantages over our nation's adversaries for several decades; however, in recent years, some near-peer adversaries have invested significantly in their warfighting capabilities, seeking to gain technology parity and even superiority over U.S. Air Force capabilities. Adversaries can now substantially challenge U.S. dominance over air, space, and cyberspace. In some cases they are supplying other nations with these capabilities which presents a broader challenge to Air Force technology superiority. The Secretary of the Air Force therefore tasked the U.S. Air Force Scientific Advisory Board (SAB) to conduct a study on "Maintaining Technology Superiority for the U.S. Air Force." The study sought to provide a clearer understanding of how the Air Force can maintain, and in some cases regain, technology superiority to provide it asymmetric warfighting advantages against potential adversaries. The study identifies those technologies that will be most critical to winning wars in 2030 Anti-Access/Area Denial (A2/AD) environments, and shows how they can be integrated and employed in a coordinated cross-domain manner to provide technologically superior warfighting capabilities.

The study received briefings from entrepreneurial companies, universities, national laboratories, Federally Funded Research and Development Centers, University Affiliated Research Centers, and industry, as well as from Air Force Major Commands, Numbered Air Forces, Air Force Research Laboratories, and other relevant Air Force and Department of Defense organizations, as well as from the intelligence community. It also made site visits to many of these organizations for further fact finding and drew on numerous other information sources, including a wide range of technical reports, white papers, briefings, and other documents relevant to current and foreseeable state of technologies and their potential utility for supporting critical warfighting capabilities suited to 2030 A2/AD operating environments.

The study assessed that there are emergent defense and commercial technologies that would be able to support technologically-superior critical warfighting capabilities for 2030 A2/AD environments. For each of these critical warfighting capabilities, the study identified necessary integrated technical capabilities and foundational technology areas to accomplish these missions. The study also identified key attributes of an Artificial Intelligence-enabled multi-domain command, control, and communication capability that allow the integrated technical capabilities to be coordinated and employed across multiple domains to achieve superior warfighting capabilities.

The study interacted with innovative entities within the government, in the defense and commercial industry, and in academia to identify the common set of "best practices" for developing and fielding technologies to achieve rapid innovation and first-to-market performance. A key enabler for sourcing, maturation, and fielding of critical technologies is an Air Force "Chief Technology Officer" function.

The study recommends that the Air Force substantially refocus its Science & Technology investments on the foundational technology areas it identified, and allocate Air Force Research Development Test and Evaluation investments to develop the integrated technical capabilities it identified. It also recommends that maintaining technology superiority for the Air Force will require a sustained commitment and a continuing process of identifying, demonstrating, prototyping, and accelerated fielding of key technologies.