



U.S. Air Force
Scientific Advisory Board

**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE
WASHINGTON DC**

**21st Century Training and Education Technologies (TET)
Abstract**

The U.S. Air Force (USAF) Scientific Advisory Board (SAB) study on 21st Century Training and Education Technologies addresses the potential impact of Augmented and Virtual Reality for the enhancement of education and training across the USAF. These technologies, part of an increasing array of Advanced Learning Technologies (ALT), promise higher fidelity and increased accessibility appropriate for broad deployment and a variety of applications. The impact of ALT is of particular interest to the USAF with respect to maintaining the training supremacy it has enjoyed for decades.

The Study Panel examined the state of current and emerging commercial-off-the-shelf (COTS) ALT as well as its present uses in the USAF and across the Department of Defense (DoD). Additionally, the study assessed the potential impact of ALT training capabilities on the competency and readiness of Airmen across a broad spectrum of mission areas. The Panel focused on the need for identifying quantifiable metrics to measure performance of ALT training capabilities and determining processes to keep ALT training systems up-to-date over their life-cycle. Finally, the study provided a roadmap for near-, mid-, and far-term science and technology efforts to guide USAF research and investments as well as organizational requirements for development and fielding. The Panel used evidence gathered from multiple briefings from sources across the Department of Defense, private industry, and academia to determine several recommendations. The SAB recommends the USAF:

- Establish a USAF-wide strategy and concept of operations to match training and education requirements with appropriate learning solutions. The instructional design process should be continually adapted to include emerging technologies and emphasize deliberate practice with high repetition rates, diverse learning environments, and immediate and useful feedback.
- Designate a central Training Systems Development and Fielding organization with the resources to enable ALT innovation across the USAF. This organization would hold the responsibility of determining the best ALT solutions for different applications and managing the contracting of ALT hardware and its required software and data rights.
- Develop modular and easily updatable training solutions as improved technologies become available. Establish internal expertise for the creation of training content leveraging COTS products and architectures.
- Design data structure and collection strategies for continuous ALT improvement and individualized learning. Define data requirements and metrics for analysis of the performance of training systems. Collect relevant biometric data to guide individualized-learning and export the data to the Airman's individual learning record.
- Wherever feasible, modify training pipelines to allow individual passage through the syllabus and graduation. When not feasible, mitigate gaps with beneficial ALT engagements, including, but not limited to: Joining graduates with the feedback loop to improve recently completed courses and creating opportunities to maintain skill sets or expand learning opportunities.