RESEARCH SUMMARY

# Accelerating the Transfer of Training Technologies to Support Evolving Department of the Air Force Mission Capabilities

## A Framework, Lessons Learned, and Recommendations

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## ISSUE

Training and education in the Department of the Air Force (DAF) is undergoing a major transformation as part of an effort to maintain an asymmetric advantage over competitors. As part of this transformation, the DAF wants to invest in advanced training technologies—such as augmented and virtual reality, gaming, and synthetic training environments—that are emerging from the academic, industry, and government sectors. To reap the benefits of these new training technologies, the DAF must successfully transition them to the force. In this report, we examine what factors enable a successful technology transfer and how those factors have come into play in select use cases.

## APPROACH

We used a mixed-methods approach to build a framework for training technology transfer. We reviewed academic, industry, and government literature on technology transfer and conducted semi-structured interviews with stakeholders across the DAF and the wider U.S. Department of Defense (DoD) training enterprise. Using our findings, we outlined the steps of a technology transfer process and then identified factors that enable or create barriers to training technology transfer at specific steps in the process.

We then selected six use cases from real-world training technology programs: Generalized Intelligent Framework for Tutoring, Synthetic Training Environment–Information System, Joint Simulation Environment, Standard Space Trainer, Special Operations Center for Medical Integration and Development, and Integrated Technology Platform. For each case, we conducted additional interviews with the relevant program experts and reviewed technical documents to identify technical and nontechnical factors that contributed to the success or failure of transitioning the training system. These factors were compared with those that were indicated by our framework.

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This research leveraged findings from a companion report that identified which advanced training technologies might be the most promising investments for the DAF and connected each promising technology to next steps to enable a transition into the DAF training and education enterprise.[1]

## KEY FINDINGS

- The factors that facilitate or hinder the transition of training technologies correspond to policy levers for the DAF and are not limited to financial factors but also include aspects of personnel, social factors, technology attributes, return on investment, absorptive capacity, and processes.
- Across the six advanced training technology use cases, the most pervasive and critical barriers relate to insufficient funding, scalability, program understanding and socialization, inconsistent incorporation of technologies, enabling multilevel security for distributed training, and misalignment with science and technology plans.
- Examples of key enablers to a successful technology transfer based on the lessons learned from the use cases are using agile software development, using a single vendor with a modular architecture, ensuring that training systems align with operational systems, ensuring continuity in development, securing advocacy, and ensuring funding continuity.

## RECOMMENDATIONS

- **The training technology transfer framework should be used at the enterprise or organization level to make periodic (e.g., yearly) assessments of where the bottlenecks are in the process** and pinpoint specific actions that can be taken to eliminate them. For example, systematic deficiencies in the necessary information technology (IT) architecture to facilitate expansion of technologies might point toward a need for action at the enterprise level.
- At a more tactical level, **the framework should be made available and used by innovation cells and training and education management at the major commands** to troubleshoot and plan for specific ongoing or future training technology transfers. Use of the framework at the tactical level would be more appropriate for identifying local enablers and barriers to transition.
- **Air Force Futures (AF/A5/7) should be responsible for enterprise-level application of the framework** in coordination with other major commands and for making it available to other stakeholders to facilitate planning and troubleshooting.
- **The DAF should codify and socialize the lessons learned from our use cases as training technology transfer guidance** for all DAF stakeholders and potentially a wider DoD audience.
- **Major training technology transfer barriers and challenges should begin to be addressed now** to pave the way for the major transformation of the training and education enterprise. This is not only a matter of technology and funding: Prominent barriers also require addressing communication, alignment between organizations, and cultural resistance.
- The DAF should **consider investments in adaptive training, performance assessment, virtual and augmented reality, natural language interfaces, and gaming technologies and take steps to enable their transition**.
- The analysis of emerging technologies is inherently iterative, and an **updated assessment of the technology landscape, potential use for DAF training and education, and means of transitioning promising**

1 Mark Toukan, Emmi Yonekura, Prateek Puri, Maria C. Lytell, Jon Schmid, Andrea M. Abler, Meyer Thalheimer, Eddie Ro, and Isabelle Winston, *Assessing the Landscape of Advanced Technologies for Department of the Air Force Training and Education*, RAND Corporation, RR-A2326-1, 2024.



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**technologies should be conducted within the next five years**. Experts indicated that many of the technologies we examined would reach promising maturity in five to ten years.

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