The use of 3D simulations tools as an interactive training and performance support mechanism for the US Army, Airforce, Marine Corps and Canadian Forces

Abstract

The operational tempo of the United States and Canadian Armed Forces has increased significantly over the last several years, resulting in the growing need to deploy new recruits faster with reduced training residency time. Additionally, the Armed Forces are rapidly fielding new equipment, on which employees have received little or no training due to time and/or geographic constraints.

This presents a challenge: due to limited training time, new equipment can be incorrectly installed, maintained, and/or operated in the field, resulting in misuse, premature failure of parts, and increased risk of injury to employees. Likewise, evolving procedures in the field are requiring the Forces to continually deliver just-in-time information and on-the-job training to employees in the field, despite barriers raised by geography and lack of access to Subject Matter Experts.
These case studies provide an overview of the United States and Canadian Militaries' use of interactive 3D equipment simulations to solve problems faced in the training and operational environments. Through studies and assessments of the use of 3D training simulations at US and Canadian Military sites in North America and overseas, some of which are cited below, interactive 3D equipment simulations have been found to offer a cost-effective means to accelerate equipment training and improve personnel understanding and accuracy of task performance.

- By reducing dependency on equipment and hard trainers for training, the Military is able to reduce training costs significantly (for example, in the millions of dollars range per single item).
- By providing virtual hands-on practice of procedures with 3D equipment simulations, the Military is able to provide wider access to training, resulting in better qualified personnel, while also making training more time efficient, supporting increased student throughput at training institutions.
- By providing 3D internal views of the simulated equipment, the Military is able to increase employee knowledge and understanding of equipment part interactions, reducing part breakage rates and the associated costs in the operational environment:
- By augmenting field support materials with interactive 3D equipment simulations, the Military is able to provide more effective just-in-time training on rapidly fielded equipment, resulting in quicker familiarization with the equipment, better understanding of tasks and procedures, and reduced premature failure of parts.
- By providing computer and Web-based access to 3D equipment-enabled virtual training materials, the Military is able to respond rapidly to evolving training requirements identified in the field, addressing knowledge gaps related to Battle Damage Assessment and Repair procedures, Improvised Explosive Devices, and other critical issues.
- By integrating 3D equipment simulations into equipment life cycle management systems, the Military is able to shorten maintenance turn- around-time, improve the quality of task performance, and improve technician understanding.
- Military organizations leveraging interactive 3D solutions are experiencing immediate improvements in the areas of personnel safety, performance, and operational readiness.

Some of the case studies presented will include:

- U.S. Army : Detroit Diesel 12V71 Engine Maintenance Training
- U.S. Army : Chinook 47D Helicopter Auxiliary Power Unit Maintenance Training
- U.S. Army National Guard Small Arms Virtual Task Trainers
- U.S. Army Caterpillar Engine Basic Mechanics Training
- U.S. Army Brake Systems Maintenance Training
- U.S. Air Force Small Arms Cycle of Operations Virtual Task Trainer
- U.S. Marine Corps M224 Mortar Trainer for Small Arms Repair Course
- Canadian Forces MK-46 Lightweight Torpedo Training Aid
- Canadian Forces Propeller Virtual Maintenance Training Module
- U.S. Army VSAT (Very Small Aperture Terminal) Satellite Task Trainer
- U.S. Army Humvee Virtual Task Trainer
- U.S. Army 3kW Tactical Quiet Generator (TQG) Task Trainer

- Canadian Forces Study of Use of 3D Simulations in Facilitating Air Technician Maintenance Operations and Procedures

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