

NGRAIN AND CAE HELP CANADIAN FORCES INCREASE TRAINING THROUGHPUT

Proof of Concept Study Proves Blended Learning Can Reduce Maintenance Training Time by as Much as 60 Percent

BACKGROUND

To train new recruits to standard faster, the Canadian Forces are transforming maintenance training programs through *blended learning*, which integrates 3D simulations with traditional training methods such as technical manuals and PowerPoint. Simulation-based training has a demonstrated potential to accelerate training and ease demands on hardware training devices. The Canadian Air Force commissioned a project to measure the effectiveness of using virtual maintenance training compared to current training methods.

CHALLENGE

The Canadian Forces School of Aerospace Technology and Engineering (CFSATE) provides the Air Force with qualified personnel to ensure aircraft serviceability. CFSATE is faced with fewer qualified aircraft technicians graduating, and even fewer being able to progress to the journeyman level in a reasonable timeframe.

CFSATE determined that the lack of effective training materials was the main reason for having limited training throughput. Current training is based on the use of text-based manuals and 2D multimedia. However, students' skill progression is limited because these traditional training materials lack the "hands-on" experience required to effectively train on maintenance procedures. Hardware training devices typically provide students with this required hands-on experience. However, they are often not available because they are expensive, difficult to procure, and do not support distributed learning.

The requirement to train more technicians in a shorter timeframe with fewer resources has created a training gap at CFSATE.

SOLUTION

CFSATE carried out a user study to measure the effectiveness of using 3D equipment simulations to conduct maintenance training. The goal of the project was to assess if an air technician student could reach mandated performance levels on specific maintenance tasks, and pass a practical exam using a virtual training system.

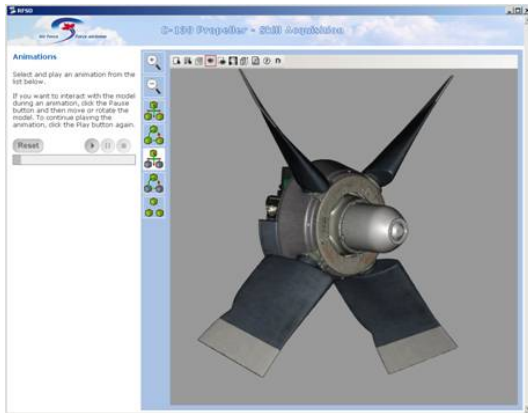
The project deployed an integrated training solution from NGRAIN and CAE that allows student to familiarize themselves with equipment parts and components, troubleshooting procedures, and repair tasks. The virtual training solution also lets students practice "hands-on" maintenance procedures using interactive 3D equipment simulations.

"We need to increase our throughput in maintenance training. The proof of concept delivered by NGRAIN and CAE supported our view that trainees can acquire knowledge faster when 3D equipment simulations supplement traditional methods."

- LCol R. Thompson, Director Air Requirements 7

The training solution consisted of the following integrated training enablers:

- Original course curriculum instructional material from CFSATE that included text descriptions, diagrams, video, and photos;
- NGRAIN Virtual Task Trainer (VTT) that allows students to learn and practice complex installation, inspection, assembly, disassembly, repair and overhaul tasks by using interactive 3D virtual equipment;



NGRAIN C-130 Propeller Virtual Task Trainer

- CAE Simfinity's Virtual Maintenance Trainer (VMT) to interact with a "virtual aircraft" for context, familiarization, procedural and troubleshooting training using FAA Level D full fidelity simulation software.



CAE Simfinity VMT

IMPLEMENTATION

A user trial was conducted at CFSATE that included 16 new recruit technician students. This set of students received only 1 day of instruction on the subject matter using the virtual training, compared to 2.5 days of training that is typically provided to students using the traditional training method. The 16 students also had no previous technical training, whereas typical students have 12 months of maintenance training experience prior to taking this course.

The group using the virtual training studied the C130 propeller system and specific maintenance procedures in three steps:

1. Pre-course self-paced computer-based training using the CAE Simfinity VMT;
2. Instructor led training;
3. Practice sessions using the NGRAIN VTT, to enhance course material understanding and to practice the removal sequence of a C-130 propeller.

This was followed by a practical exam and a questionnaire.

RESULTS

The results showed the benefits of using a simulation-based approach to training. The practical exam proved that the students met the school's performance standard in a greatly reduced period of time. After one day of study using the virtual training, all students passed the practical exam with an average of 94 percent for this module, representing a 60 percent reduction in training time.

Students also expressed a heightened level of interest and acceptance of using interactive 3D simulations compared to reading technical manuals and other non-interactive training content.

The training module will be integrated into the CFSATE curriculum. Longer term, CFSATE expects that the use of simulations will enhance the retention of important skill and knowledge elements in support of continuation or refresher training in an operational theatre.

The Air Force concludes from this that virtual environments have the potential to significantly reduce training time for aviation technicians, and will follow up these results with similar trials for Avionics Trades.

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