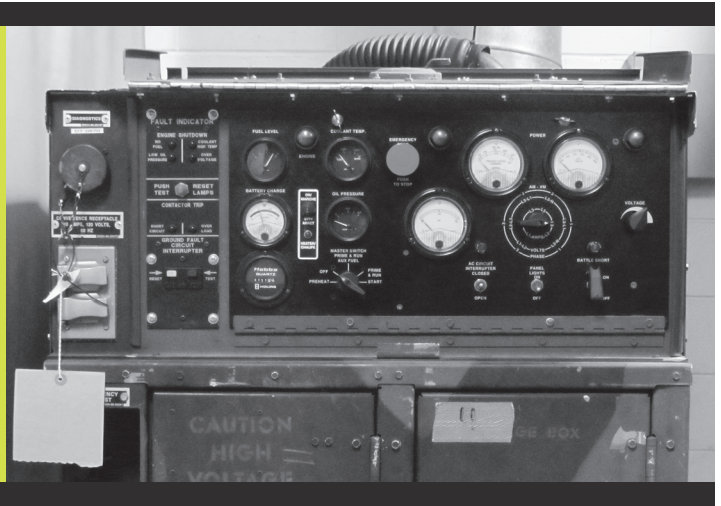


BRIDGING GENERATIONS IN GENERATOR TRAINING



PROJECT	5KW POWER GENERATOR VIRTUAL TASK TRAINER
CLIENT	CANADIAN FORCES SCHOOL OF ELECTRICAL AND MECHANICAL ENGINEERING
KEY OBJECTIVES	<ul style="list-style-type: none"> ▶ IMPROVE STUDENT OPERATIONAL KNOWLEDGE ▶ SUPPORT TROUBLESHOOTING AND FAULT-FINDING EXERCISES ▶ IMPROVE PROGRAM PASS-RATE

CHALLENGE

The maintenance of tactical field generators is a challenging discipline for instructors to teach. Classroom instruction relied on two-dimensional diagrams, schematics and pictures, which were difficult to apply to the actual equipment. At the same time, troubleshooting procedures need to be conducted in specific sequence and students struggled to retain the information from the classroom and apply it to their practice on the real system. Even when instructors invested additional hours coaching the students, many were unable to complete practical assessments, which resulted in a failure rate of 20–25 percent each time the course was held.

The training was highly focused and extremely detailed, presenting the electrical schematics and diagrams in sequence using a PowerPoint presentation. This created a challenge for both instructors and students because the 2D information presented was difficult to follow and didn't easily translate once the students began working on the actual generator.

The CFSEME training team also noticed that in addition to the high failure rate, the course was attracting a new, younger demographic of students who were digitally savvy and more comfortable finding information than having it presented to them in a lecture-style format. Some classes had three different generations of students, and instructors struggled to effectively tailor the training to such a diverse audience — providing each student the learning resources they needed — without extended the length of the course. The School knew that keeping its technicians engaged would improve the learning experience and increase knowledge retention.

BACKGROUND

Powering the Canadian Forces around the world is trusted to the electro-optical technicians that maintain the different types of generators and electrical systems. At Base Borden, the Canadian Forces' largest training facility, the Canadian Forces School of Electrical and Mechanical Engineering (CFSEME) is responsible for teaching its technicians how to keep these power systems running in a variety of environments and climates.

The 5KW power generator, a diesel generator used most often to provide power to tactical support equipment, is a critical system that technicians must maintain. CFSEME instructors provide the theory of operations, system maintenance, and troubleshooting procedures for the generator during the Electro-Optics course. The generator segment is a critical component of the technician training, and skills established in this segment are applied to other types of generators.

SOLUTION

To address its training challenges, CFSEME selected NGRAIN to develop a Virtual Task Trainer™ (VTT™) to visually communicate the main components of the generator, the start and stop procedures, equipment circuitry, as well as support troubleshooting and fault-finding procedures. The VTT leverages the award-winning NGRAIN 3KO® or 3D Knowledge Object™ — an interactive, 3D simulation that visually communicates information about the 5KW Power Generator. The VTT is a commercial-off-the-shelf software solution that incorporates instructional-design best practices to provide CFSEME with a flexible, technology solution that can be used in an instructor-led classroom environment, in a Learning Management System, and independently by students.

The virtual equipment can be viewed in detail and from multiple angles. Users can cross section the generator and view parts in context to improve their understanding of the complex power system. Incorporated directly into the training plan, the interactive nature of the VTT enables students to freely remove and install parts, practice procedures, develop critical thinking skills to support fault-finding and troubleshooting, and apply the information learned on the physical equipment. The NGRAIN technology presents troubleshooting exercises that help students develop cognitive skills that easily translate to their work on the job.



NGRAIN 3D simulation of generator resulted in 100% pass-rate

RESULT

The use of the NGRAIN VTT to support the technician training at CFSEME for the 5KW Power Generator has dramatically improved the learning environment. Since being implemented, every student has passed the course on first attempt and the average mark of passing students has increased from 82 percent to 97 percent. An additional benefit has been the calculated return on investment which has been exceeded by 25 percent, though this number is conservative as it does not yet include the expected long-term benefits of keeping equipment in-service for longer periods of time. With NGRAIN, CFSEME has a multi-faceted instruction platform that combines the best elements of traditional teaching methodologies with innovative new digital resources.

The return on investment and supporting data used in this document was calculated by, and provided to, NGRAIN by the Canadian Forces School of Electrical and Mechanical Engineering.