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DiSTI's Technology Ensures Training Continuity for U.S. Navy's LCAC

Background:

Highly strategic to modern warfare, the U.S. Navy's Landing Craft Air Cushioned Vehicle (LCAC) is a high-speed, fully amphibious landing craft capable of carrying a 60-75 ton payload at speeds in excess of 40 knots and a nominal range of 200 nautical miles. The craft can effectively access and penetrate nearly 80% of the world's coastlines to perform amphibious assaults and operational maneuvers from ship to shore as well as across the beach.

Because the craft requires regular refurbishment and upgrades to keep it operational, the Navy began a Service Life Extension Program (SLEP) in late 2000. This program is vital to the success of the LCAC, extending its lifecycle by 50 percent, from 20 to 30 years. As a result of the changes to the operational vehicles, the training devices built to support the LCAC's mission must also be brought up to date to incorporate the latest modeling and simulation technologies. These upgrades will mirror the upgrades made to the operational crafts. One such trainer that was going offline for upgrades was the full mission trainer located at the Naval Amphibious Base, Little Creek.

When Naval Air Systems Command (NAVAIR) Orlando selected UNITECH as the prime contractor to develop highly advanced supplemental training aids while the operational trainer was undergoing upgrades, UNITECH turned to DiSTI, a long time business partner and the developer of GL Studio, to provide the combination of program management, software engineering services and technology necessary to fulfill the contract. GL Studio is DiSTI's flagship product offering for developing real-time, 3D human to machine interfaces for use in computer based training, maintenance and part task trainers such as the LCAC, full mission simulators and safety critical applications.

Executive Summary

Prime Contractor: Universal Systems & Technology, Inc. (UNITECH)

Government Client: NAVAIR Orlando

End System: US Navy Landing Craft Air Cushioned (LCAC)

Engagement Overview: Create high-fidelity, photo realistic 3D, training aids for craft operators and maintainers to support transitioning to the Navy's Service Life Extension Program (SLEP) for the LCAC.

Challenge: Little Creek had to provide training continuity while the training devices were being upgraded; simulations developed for the training aids had to be reusable for future simulators as well as the maintenance trainer courseware to achieve a strong ROI; the LCAC environment was complex and required state-of-the-art simulations and a high degree of realism.

Solutions: DiSTI's program management and systems engineering services, using its GL Studio software suite as the development tool

Results:

- Unparalleled realism
- Significant cost savings due to reusable software objects for operator trainers and future maintenance courseware
- Zero training downtime for Norfolk military personnel
- Leverages clients' existing investment in training aids and development tools by extending the life of the simulations

Challenge:

Pulling the Little Creek full mission trainer out of commission while it underwent the necessary upgrades would leave an unacceptable gap in the ability for military personnel to train on the LCAC and could affect deployment readiness. Additionally, because the craft is complex, with many structural similarities to an airplane (including a full cockpit), the desktop training had to deliver a high-fidelity, immersive, photorealistic environment to effectively simulate the many tasks involved in operating the LCAC. Additionally, it was imperative from a cost standpoint that simulations developed under the new engagement be fully adaptable to future training needs such as the maintenance training courseware upgrade for the SLEP LCAC.

Solution:

Working together as part of the integrated process team (IPT) that included the prime contractor and government customer, the team set out to develop a virtual trainer to replace the full mission training device that was being taken out of service for upgrade to the SLEP configuration. The DiSTI team started by developing a photo-realistic 3D model of the three operator crew stations—the navigation station, the engineering station and the craft master station—of the LCAC using its GL Studio solution. The complete operator crew stations were developed in approximately 500 hours.

These virtual operator stations were integrated into the virtual environment desktop trainers produced by UNITECH to fulfill the vital supplemental training role for operating the LCAC.

The next step was to produce a virtual environment desktop trainer to support the SLEP version of the LCAC. This time UNITECH was able to reuse the operator crew stations developed previously saving almost 500 development hours. Only minor modifications were necessary to upgrade the virtual crew stations to the SLEP LCAC configuration. Pieces of these stations also moved on to new SLEP version of the full mission trainer, again saving hundreds of development hours.

Finally the original virtual operator stations were able to be reused as part of the LCAC SLEP Maintenance Training courseware program. As part of this program the DiSTI software developers created hundreds of reusable software objects (RSOs), each designed to realistically replicate detailed functions and behaviors of each of the LCAC's components. RSOs were developed for four courses: Propulsion & Lift, Craft Control Core, Craft Control Lower, and Craft Control Upper.

The result of the effort culminated into the development of 200 hours of using DiSTI-developed, high fidelity, photo realistic interactive objects blended into existing courses, fully heightening

the learning experience. The deliverable was a blended solution consisting of instructor-led, alternative, technology-based instruction and laboratory exercises. All courses were web enabled and provided performance-based assessments for each student.

Throughout the entire engagement, DiSTI provided the full complement of program management, acceptance testing and quality assurance services to ensure a positive outcome for the contract.

Results:

Using the DiSTI approach to developing RSO's, UNITECH was able to save over 1500 development hours by being able to reuse content among multiple programs. DiSTI completed the contract on time and on budget, meeting all of the criteria outlined in the statement of work, providing UNITECH and NAVAIR with measurable benefits including:

- Unprecedented training realism, enhancing retention and ensuring ongoing troop readiness
- Significant cost savings due to the reusability and portability of the simulations for both the operational trainers and current/future courseware
- Zero training downtime for Little Creek military personnel while the full mission trainer was offline
- Reduced future training costs since reusable software objects (RSOs) can be updated on demand
- Leveraged customer's existing investment in current courseware and development tools



Images of the LCAC Simulated Maintenance Trainer and 3D environment.