

Integrating GL Studio Components into OpenGL Applications

GL Studio exposes an API that allows developers the ability to integrate their GL Studio RSOs seamlessly with any OpenGL-based application, including the ability to handle user input and external data. In this article, we discuss how this is done, how to manipulate an RSO's properties from within an external application, and how to configure an application to send user input to an RSO. This is a very deep topic, as there are many windowing APIs out on the market at this time, and it would be impossible to cover specifics for all of them. Instead, we are going to focus on a higher level overview of how to accomplish this task.

So first thing's first: How do we get an RSO into our application? There are two ways to do this: Either by linking in the static library or linking to an RSO DLL at runtime. There are pros and cons to both approaches: The static library allows direct access to your RSO's properties, as the RSO interface can be bypassed, but any change made to the RSO would force you to rebuild your entire application. The DLL, while being the better choice from an object-oriented standpoint, relies on the RSO interface as a go-between for your application and RSO. There is no best approach; the requirements of your project should dictate which technique to use.

No matter which approach is taken to load your RSO, CreateObjects() should be called before trying to use the RSO. Once created, a component has two functions that must be called once per frame: Calculate() and Draw(). Updating component properties at runtime is done by calling the RSO's Resource() function.

The final topic to address is how to pass mouse and keyboard interaction to a component. This is done by creating a DisplayEvent, populating it with data, and calling your component's HandleInput function, passing in a reference to the DisplayEvent. Many classes derive from DisplayEvent, such as MouseEvent, KeyboardEvent, and ObjectEvent, and information on these derived classes is available in the header file events.h, included with GL Studio.

An example integration is available on our support site for download. Our support team is available to answer any questions about this or any other topic at support@disti.com.



If you have any questions regarding DiSTI Insider content please feel free to contact:

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Where We'll Be

I/ITSEC 2008
 Orlando, FL
 December 1-4, 2008



Joseph P. Cribbins Aviation Product Support Symposium
 Huntsville, AL
 February 11-12, 2009

GL Studio Training Dates

February 9-12, 2009, Orlando FL

New Products Webinar

DiSTI is hosting a free webinar on December 11, 2008 featuring a capability overview of GL Studio 4 and the Data Director. To register for this event please visit our website and click on DiSTI Webinars. The registration link for "DiSTI New Product Review" is at the bottom of the page.

Letter from the President

A trailblazer leading the way into uncharted territory often takes on a great deal of uncertainty. But trailblazers are needed to show others a better way to get from where they are to where they should be. In 2003 DiSTI began forging a way forward on the fledgling concept of virtual maintenance training by leveraging proven concepts and technology utilized by the operator training community. As a trailblazer, DiSTI developed the virtual maintenance training environment while many others were still debating if the concept would even work.

Today DiSTI stands as a leader of graphical user interfaces technology utilized in virtual maintenance training applications. Our virtual maintenance training technology is now the gold standard in the development of maintenance training applications for the U.S. DoD and foreign militaries. This year alone, DiSTI's technology was selected for use on two major aircraft maintenance programs; the F-18 E/F IVEMT for Boeing and the F-35 Lightning II ASMT for Lockheed Martin.

While these new programs will share proven technology utilized on other successful high profile maintenance trainers they will also contain new technology and processes that advance our training capabilities. Trailblazers do not have the luxury of sitting back; there are too many new places to explore.

Joseph Swinski
 DiSTI President

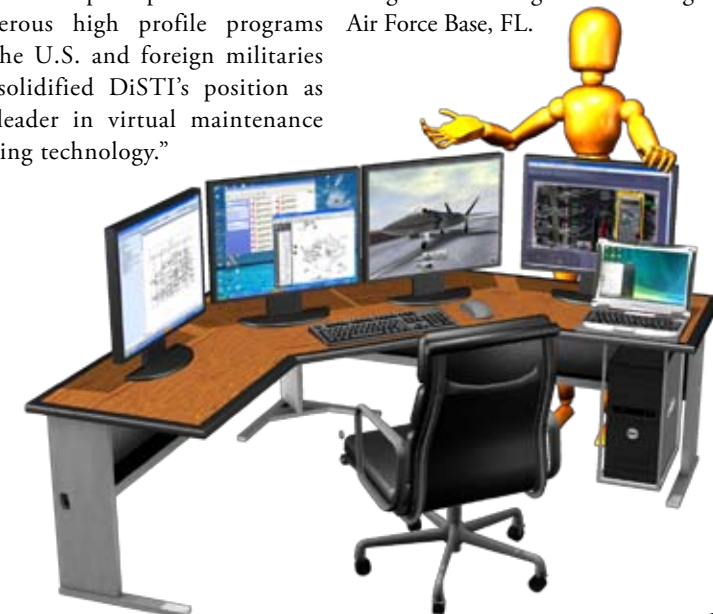
AAI/DiSTI Win Lockheed Martin F-35 Maintenance Trainer

DiSTI's next generation 3-D virtual maintenance training technology was selected by AAI Services Corporation for development of the F-35 Lightning II Aircraft Systems Maintenance Trainer (ASMT). The ASMT is one element of the F-35 Training System, a family of training devices that is being developed by Lockheed Martin Simulation, Training & Support. The ASMT will provide training for student maintainers on ground operation, maintenance, and testing procedures for the F-35 aircraft systems.

DiSTI's latest software tools and processes streamline the conversion of Computer Aided Design (CAD) data to produce a high-fidelity, interactive virtual maintenance training environment for the F-35 ASMT application. The application will be driven by AAI Services' realistic F-35 aircraft simulation, yielding a maintenance training solution with high physical and functional fidelity.

"DiSTI's virtual maintenance training technology, and AAI's rich history in the development of innovative training product and service solutions, formed the symbiotic basis for this winning team," said DiSTI President Joe Swinski. "Our exceptional past performance on numerous high profile programs for the U.S. and foreign militaries has solidified DiSTI's position as the leader in virtual maintenance training technology."

DiSTI will be producing the virtual environment in Orlando, FL, and delivering the content to AAI Services Corporation's Training and Simulation Center in Charleston, S.C., for final integration and testing. The training devices will be delivered to the Integrated Training Center at Eglin Air Force Base, FL.



Product Updates

DiSTI Announces GL Studio 4



In May 2000, DiSTI released a revolutionary new toolkit for graphical interface development called GL Studio. It was the first toolkit of its kind to apply the power of object-oriented C++ code generation to the challenges of graphical interface application development and it quickly gained traction within the military simulation and training community.

Eight years later, GL Studio is now the gold standard for projects demanding rapid development of high performance graphical interfaces produced in human readable object-oriented coding formats. From the small niche community of military simulation and training, GL Studio is now being used by major manufacturers of automobiles, aircraft, space vehicles, and medical equipment for uses ranging from prototyping to embedded safety critical displays.

Success stems from a loyal customer base built from a corporate mantra to always do what is right for the customer and to deliver products that meet their demands. Many of our customers have been users of GL Studio since version 1.0 and often recommend us to other colleagues and professionals.

The next major release of the GL Studio toolkit is rapidly approaching and it will feature numerous product enhancements driven, as always, by customer requests. DiSTI began work on this major upgrade over a year ago and will be showcasing a beta version at I/ITSEC 2008. The release of GL Studio 4 is anticipated in the first quarter of 2009 and all GL Studio customers with active support contracts are eligible to receive this major upgrade.



NEW FEATURES:

- » A UNIFIED DOCKABLE GUI ARCHITECTURE
- » IDE STYLE CODE ENTRY
- » CUSTOMIZABLE DESIGN LAYOUT PREFERENCES
- » TABBED ARRANGEMENT OF MULTIPLE DESIGNS
- » IMPROVED 3-D NAVIGATION IN THE DESIGNER
- » CONSOLIDATED OBJECT PROPERTIES LAYOUT
- » NEW PLUG-IN FEATURES SUCH AS GLSPOLYLINE, GLSOBJECTADJUSTER, AND GLSNINEPATCH

DiSTI Becomes the Leader in Virtual Maintenance Trainer Technology

DiSTI has become the world leader in developing leading edge maintenance training technologies, but this success has not come overnight. In 2003 DiSTI began combining proven operator training technologies, high-fidelity 3-D interfaces, and customized automation code to produce what has become the Virtual Maintenance Training Environment. Today this technology facilitates the rapid production of virtual maintenance training environments for any device or system at significant time and cost savings.

The Virtual Maintenance Training Environment (VMTE) delivers a compelling and comprehensive maintenance training solution with features that include:

- A fully immersive 3-D environment
- DiSTI's Natural Navigation™ human machine interface (HMI)
- The capability to provide unrestricted free-play
- All required test and support equipment
- A modular upgradable architecture
- Execution on laptop computers

Year	Product	Innovation
2003	USN F-18 SAMT	VMTE Inception
2005	USN LCAC	Flash Integration
2006	PC Simulation	SCORM conformance
2007	US Army DEMA	Java Technology
2008	JSF ASMT	CATIA import
2008	F-18E IVEMT	Unigraphics import

The VMTE is created using tools and processes developed by DiSTI that streamline the development activity. This technical process and tool-chain is a design infrastructure that automates the graphical art and engineering development activities to create the 3-D interactive virtual environment and components. The process utilizes DiSTI's award winning GL Studio toolkit with custom software plug-ins, CAD conversion tools, and commercial 3-D modeling products as the basis of the workflow architecture. Integration of the 3-D interactive objects into the user interface is automatically completed by the tools and process.

The user interface is coupled with a simulation engine to complete the environment. The resulting VMTE is equivalent in form and function to the physical device being replicated.



Several significant milestones, achieved over the last five years, have affirmed DiSTI's leadership position in providing virtual maintenance training technology.

DiSTI developed the 3D virtual interface for the U.S. Navy's F/A-18C Simulated Aircraft Maintenance Trainer, the first fully interactive virtual 3-D maintenance trainer delivered to the U.S. Navy. Trainees have the ability to perform over 450 maintenance procedures, utilizing all ground support and test equipment, on a 3-D virtual aircraft that simulates the behaviors of the real aircraft. The success of the U.S. Navy program led to a follow-on Foreign Military Sale (FMS) of F-18C maintenance trainers to the Finnish Air Force.

The VMTE was embedded into Flash based courseware developed for training maintenance personnel on the U.S. Navy Landing Craft Air-Cushioned (LCAC) vehicles. The LCAC entered a service life extension program to lengthen the useful life of these vehicles, necessitating a change to the maintainer's courseware. The 3-D virtual maintenance training environment developed by DiSTI is embedded into a Flash based courseware framework providing 200 hours of level 3 & 4 interactivity in a single blended learning environment.

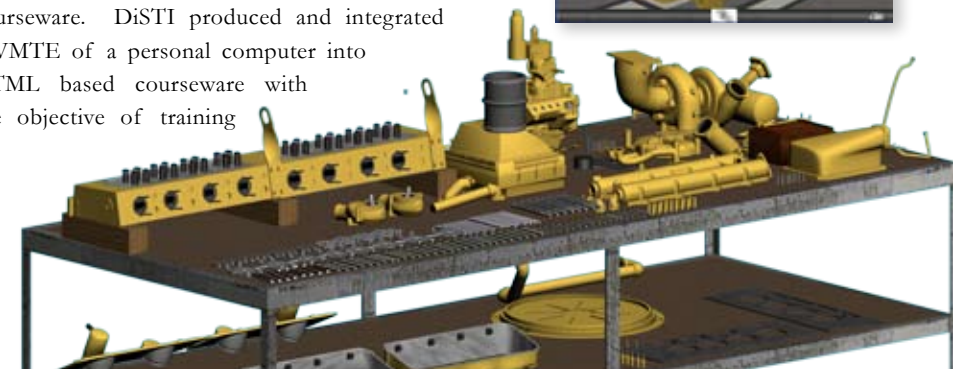
Working closely with the U.S. Navy, DiSTI successfully embedded virtual maintenance training content into SCORM conformant courseware. DiSTI produced and integrated a VMTE of a personal computer into HTML based courseware with the objective of training

tier-one technical support personnel on computer troubleshooting procedures. The courseware executed on the U.S. Navy's Knowledge Online (NKO) training system validating the ability to embed 3-D virtual maintenance technology inside of SCORM conformant courseware.

DiSTI delivered the first interactive 3-D maintenance training content, built using Java Technology, to the U.S. Army Transportation School. This new technology allows the 3-D engine training aids to run securely on any computer via the Java Runtime Environment eliminating the need to install a proprietary third party player. The application allows students to follow disassembly, assembly, inspection, and cam box timing procedures while utilizing the appropriate specialty tools.

Today DiSTI is utilizing computer-aided design data, supplied directly from the original equipment manufacturers, to produce the next generation of maintenance trainers. The Lockheed Martin F-35 Lightning II Aircraft Systems Maintenance Trainer and the Boeing F/A-18E Super Hornet Integrated Visual Environment Maintenance Trainer will both have virtual maintenance environments derived directly from the CAD data.

As the need for virtual maintenance training expands in the future, DiSTI's virtual maintenance training technology will continue to extend and adapt to meet new training challenges with industry leading solutions.



Customer Focus

Raytheon Technical Services in Indianapolis Indiana selected the GL Studio toolkit to aid in the development of a maintenance trainer for the V-22 tilt-rotor aircraft. GL Studio is being used to develop the cockpit interface for the training device. The design features a unique solution involving integration of GL Studio content with OEM supplied display code.



DiSTI Announces Data Director



DiSTI is proud to announce the development of a brand new product called the DiSTI Data Director. The technology originated as part of DiSTI's virtual maintenance trainers. Development into a commercial product has been driven by the automotive industry where there is a need to seamlessly connect multiple data sources, such as math models or simulation data to user interface objects, with no programming.

The Data Director is an ideal tool for the Human Factors and Prototyping communities who wish to quickly connect instrumentation to physical data models in an easy to use GUI environment. The Data Director includes a library of common instrument types for out-of-the-box integration into user layouts using a drag-and-drop methodology. Users can extend the instrumentation library by purchasing additional RSO bundles from DiSTI or utilize content built with GL Studio.

Data interoperability modules are loaded via a plug-in architecture. The interoperability modules serve as the bridge to connect the properties available in the instrumentation to the simulation parameters. The connections are made in the Data Director GUI without writing any application code.

DiSTI's initial release of the Data Director will feature an interoperability module for MathWorks' Simulink and Concurrent Computer Corporation's SIMulation Workbench product. Future interoperability modules may include VT M&K's VR Link, Telelogic Statemate, Laminar Research X-Plane, and CIGI.