



Modular Universal Simulation Environment (MUSE™)

The heart of simulation

About MUSE™

The Modular Universal Simulation Environment (MUSE™) software is a unique simulator and real-time code development environment. The philosophy behind MUSE™ addresses a critical industry need – a way to develop simulation and training devices where major components can be conveniently reused and adapted to meet new requirements.

MUSE™ is one of the most dynamic, comprehensive, and easy-to-use training software packages available for use by military and commercial companies. The MUSE™ simulation – from the visual database to displayable instruments, controls, panels, and/or indicators – is customized to meet your site's specific training requirements.

MUSE™ can be used to model common weapons platforms or mission systems in aerial vehicles (fixed wing or rotary/UAV), land vehicles, and sea-borne vessels.

MUSE™ is a comprehensive software framework for creating a high-fidelity simulation environment for any vehicle or system. It provides multiple-player (friend and foe) interactions within a simulated real-world environment. MUSE™ is a multiple-entity, interactive environment and may simulate any aircraft, ship, or land vehicle as well as a surface-to-air missile (SAM) site or anti-aircraft battery.

MUSE's™ tactical mission environments expose the simulated weapons system to realistic threat stimuli while performing a mission. The threat stimuli are generated via the simulation of enemy defense systems. These threats are in the form of surface-to-air, air-to-surface, and air-to-air engagements, generated wholly within MUSE™ or multiple Man-in-the-Loop (MITL) simulators.

MUSE™ lets you define the initial mission conditions (scenario parameters) for the environment and players, and model the operation of sensors and countermeasure equipment, weapons, and enemy defense systems.

MUSE™ Features:

- Significant Reduction in Development Cost
- Shorter Development Schedule
- Realistic Dynamic Simulation
- Mission Scenario Development
- Real-world Digital Terrain Database
- Out-the-Window (OTW) Visual Scene
- Realistic Threat Environment Simulation
- Re-configurable Displays
- Customized to Meet Your Requirements



Mission Planning

MUSE™ has an easy-to-use Graphical User Interface (GUI) that allows you to define the players and parameters for the mission's scenario.

During mission planning, you can assign a battle dimension (aerial, land, and sea-based targets) and equipment type for each player. These allow the MUSE™ threat software to provide targets that include pre-programmed tactics and characteristics such as aerial, sea, and land-based emitters; radar frequencies; electronic countermeasures; and combat patrol patterns.

Mission Execution

The MUSE™ software allows you to "freeze" the simulation at any given time and insert new conditions, initial positions, stores, and configurations etc.

Dynamic GUI

MUSE's dynamic GUI, which has full 3-D capability, provides you with the following features:

- GUI Flexibility – You can resize, move, and zoom in and out on windows, maps/database visuals/coordinates, instruments, and panels anywhere on the screen.
- Multiple Windowing Environment – You can have multiple windows open/layered.
- Simultaneous Video – You can simultaneously play a video with a sound track (such as a training video that demonstrates a particular operation) while a mission is in progress.
- "Snapshot" Capability – You can easily take snapshots of the MUSE™ windows for subsequent After-Action Review.
- Web Access – You can access the Web during a mission (if Internet access is available) or a local server.

OPTIONS:

The following MUSE™ options and tools are currently available if you want to further enhance your site's training capabilities:

Night Vision Goggle (NVG) Simulation Option

The NVG option includes a real-time instructor-controlled (MITL) forward-observer model.

Instrument/Panel Builder Tool

The Builder tool allows you to easily and rapidly create and modify 2D and 3-D simulated ("glass") indicators and panels with just a few clicks of the mouse. A special calibration tool also is included to allow you to quickly and accurately calibrate (as needed) any newly designed instrument/panel.

Electronic Warfare (EW) Training Option

The EW option provides additional aircraft/vehicle/vessel protection by detecting radar emitters, displaying threat information, and providing for the release of dedicated active and passive countermeasures.

Specialized Training Databases

High-fidelity visual databases of specific countries or areas that can be used for specialized training which may include areas to train specific tactics/maneuvers, test bombing ranges, reconnaissance locations, war zone/hostile territory, etc.

Flight Tuning Tool

The Flight Tuning Tool (FTT) is a specialized software tool that assists in the development and rapid adjustment of details for the flight model.

High-Level Architecture (HLA) Option

For distributed computer simulator systems, COMPRO can provide HLA functionality (in accordance with the IEEE 1516 standard) to facilitate the use of joint training tasks across physical locations and computer platforms. With this option, you can inject or change scenario or mission information and immediately re-distribute the changes to all locations.

Compro's Modular Universal Simulation Environment (MUSE™) IOS emulators provide a cost-effective solution for migrating your simulator's aging Instructor/Operator Station (IOS) to state-of-the-art technology without changing the form, fit, or function of your existing IOS displays. The emulator module replicates IOS systems, including Vistagraphics and Charles River Data Systems, resulting in a new IOS that fully retains legacy IOS functional characteristics.

- From a maintenance/support perspective, Compro's MUSE™ IOS offers superior long-term supportability by using commercial-off-the-shelf assemblies, thereby eliminating proprietary, obsolete, and hard-to-find components.
- From an instructor/operator perspective, Compro's MUSE™ IOS offers seamless integration for the instructor/operator because its emulation is completely identical to the legacy IOS.

Features

- Eliminates Rewrite/ Retest/ Recertification of Simulator IOS Software
- No Host Application Code Modification Required
- Optional State-of-the-Art IOS Designer Tool Suite
- Runs under SUSE® Linux®; includes Qt and OpenSceneGraph

Benefits

- Reliability, Maintainability, and Upgradability
- Significant Reduction in Future Development/ Maintenance Cost and Risk

Legacy Emulator Characteristics

- Host compatibility – No host computer application code modification is required. Depending upon your legacy IOS configuration, the simulator will continue to interface with the new IOS via HSD or Reflective Memory System (RMS).
- Low-cost COTS platform – Includes state-of-the-art hardware commercial components (personal computers, LCD monitors/touch screens, etc.) running under the Linux operating system.
- Expandability – Capable of expansion options such as Electronic Qualification Test Guide (e-QTG) and modern printer connectivity.

MUSE™ Core Software Characteristics

- Enhanced IOS features – Optional leading-edge IOS Designer™ tool suite for developing new windows (such as for flight data analysis) or a new, completely modernized IOS GUI.
- Enhanced runtime features – Provides multiple camera views; simultaneously displays a training video with a sound track; displays real time 3D aircraft parameters, and resizes/ repositions IOS panels in real time.
- Laptop compatibility – Optional laptop execution for off-site IOS development and maintenance.
- Standardized data compatibility – Parses XML data files for visualizing simulator data via a simple user interface.

MUSE™ Lesson Plan Builder™

- Optional Lesson Plan Builder™ in which you select controls, functions, malfunctions, etc. and organize them sequentially into a training exercise that, when initiated, executes the training with minimal Instructor/Operator input.

MUSE™ IOS Designer™

The IOS Designer™ is a robust, object-oriented tool suite with which you can further upgrade your legacy IOS software or analyze simulation runtime data:

- Page Builder – A set of cross-platform tools for easily developing IOS pages in a new window.
- Glass Builder™ – An intuitive GUI for creating flight instruments/gauges for IOS runtime panels.
- HUD Builder™ – A simple tool for interactively changing the look of IOS HUD in desktop mode or during run time.
- Logic Builder™ – An easy-to-use GUI for creating interactive, online electronic schematics that can be used for development, debugging and troubleshooting.

The Modular Universal Simulation Environment (MUSE™) Page Builder™ provides the ability to enhance and modernize the look-and-feel of your Instructor Operator Station (IOS) display pages without impacting simulator execution.

You can convert your simulator's aging IOS display and still retain all legacy IOS functional characteristics. In addition, you can add new functionality to the IOS display such as instruments and gauges for flight data analysis.

Page Builder™ allows you to modify/create and test IOS display pages concurrently with the legacy IOS interface and software. The Page Builder™ interface provides two modes of operation:

Development Mode

You can develop or modify pages while viewing the actual legacy IOS pages. This enables you to immediately visually verify your work, thus speeding up IOS interface development.

The Page Builder™ uses the inherent Common Data Base (CDB) variables from your system when creating new pages or interactive visual display components. Therefore, the functionality between the legacy pages and the new pages remains the same because the same underlying variables are being used.

Any new or modified pages are created as overlays to the legacy IOS display code, thereby keeping the legacy display intact for subsequent viewing when debugging in run-time mode.

Run-Time Mode

When the simulator's run-time is initiated, you can simultaneously launch your legacy IOS display and your newly-developed or modified overlay pages. You can rapidly switch between the legacy and new/enhanced pages.

The components on the newly-created and enhanced page will immediately be interactive and functional with the simulator. This allows you to view, use, and troubleshoot your enhancements in real-time.

Features

- Provides Simultaneous Viewing of Legacy and Enhanced IOS Page
- Has a Quick, Intuitive Graphical User Interface (GUI) for Creating New IOS Pages
- No Host Application Code Modification Required
- Runs under SUSE® Linux®

Benefits

- Does Not Impact Legacy IOS Functionality
- Direct Hardware Replacement
- Significantly Reduces Future Development/Maintenance Costs and Risks

MUSE™ Lesson Plan Builder™

The MUSE™ Page Builder™ includes MUSE™ Lesson Plan Builder™, which allows you to select controls, functions, malfunctions, etc. and organize them sequentially into a training exercise. The training exercise, when initiated, executes the training with minimal Instructor/Operator overhead.

With the Lesson Plan Builder™, you can develop new lessons plans with graphically-enhanced features for monitoring, such as instruments, gauges, plots, and/or a HUD display.

NOTE: Any lesson plans you previously developed for your legacy IOS display remain intact and fully operational.



The Modular Universal Simulation Environment (MUSE™) Logic Builder™ provides the ability to create electronic logic schematics that can be used for application program development, debugging, and troubleshooting. The schematics you create with Logic Builder™ will be **fully interactive** with your actual simulation hardware. – You can turn on power, switches, and lamps and observe the execution of the circuitry logic right **inside your diagram!** You can perform diagnostics either in real-time, while the hardware is functionally operational, or when running in stand-alone desktop simulation mode.

The Logic Builder™ allows you to logically connect software variables, signals, and electronic inputs/ outputs to graphical components and store the information in an XML data file that can be used by your application program.

Features

- Has an Easy-to- Use Graphical User Interface which Includes Built-In WYSIWYG Editing Tools
- Indicates Logical Path While in Stand-alone Desktop Mode or During Real-Time Flight Simulation
- Writes Schematic Data to a File in XML Format
- Runs in the Linux® Environment; Uses Qt™ and OpenSceneGraph Libraries

Benefits

- Reduces Program Debugging Time
- Minimizes the Learning Curve for Logic Schematic Creation!

Schematic Design Capabilities

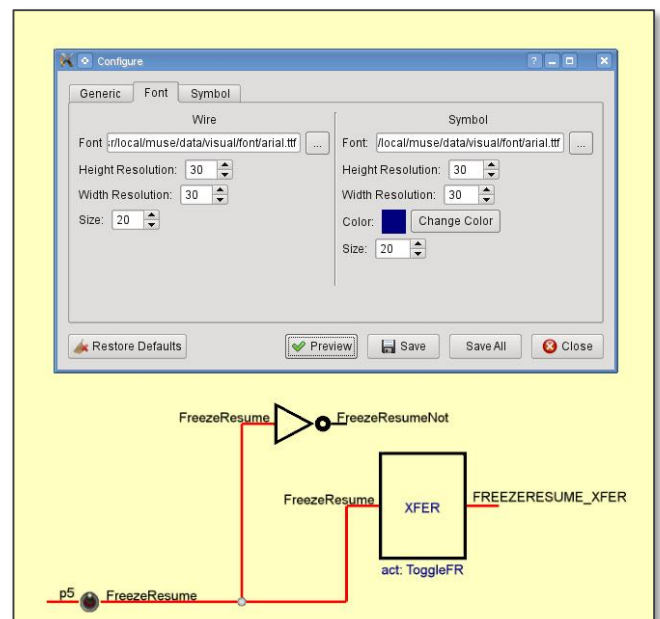
The functions and features of the Logic Builder™ are specifically designed to aid in the rapid development of usable logic schematics:

- Easy Symbol Creation
- Automatic Line Connection
- Automatic Character Matches
- Automatic Links to Corresponding Schematics
- Built-in Validation Checking
- Easy Visual Adjustment
- Global and Local Search Capabilities
- Variable Definition Capabilities
- Export Capabilities

Interactive Diagnostic/Test Capabilities

You can debug software-to-hardware logic communication as you create the schematic, and/or use the schematic as a diagnostic tool for maintenance and support personnel.

The schematic's logic can be exercised and the results viewed in Real-Time mode (while the simulator is running) or in Simulation mode (while the simulator is offline). In addition, you can modify a schematic and observe the logical effect of the update within seconds of making any change(s).



The Modular Universal Simulation Environment (MUSE™) Glass Builder™ provides an easy-to-use Graphical User Interface (GUI) that allows you to create and edit 2-D and 3-D models. With this drawing tool, you can rapidly prototype or create final versions of “glass” instruments and gauges used in simulation environments. The Glass Builder™ not only creates the graphical model but also generates the corresponding source code in OpenSceneGraph (.osg) format. The resultant model can be used by any number of programming applications!

Features

- Has an Easy-to-use graphical user interface which includes built-in WYSIWYG editing tools
- Automatically generates OSG code as you define the model
- Writes calibration data to an XML file
- Runs in the Linux® environment

Benefits

- Drastically reduces model development time – you can create glass instruments in minutes!
- Minimizes the learning curve for glass gauge and instrument creation!

Characteristics

The Glass Builder™ allows you to control the following graphical characteristics:

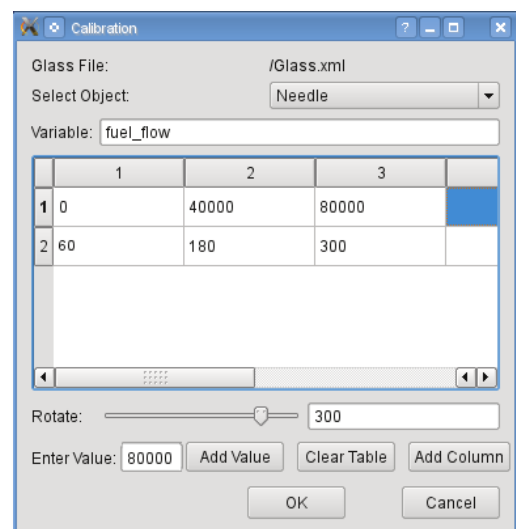
- Shape
- Color, texture, and other features
- Size
- Layering
- Text formatting and positioning
- Grouping

In addition, the Glass Builder™ includes a calibration function that allows you to logically connect a variable to a graphical component (such as an indicator needle), generate the corresponding calibration data, and store the information in an XML file.

As Easy As 1-2-3...

1. Using the GUI, specify a base object such as a circle. Then specify tick marks and add lines of text:
2. Create other objects such as an indicator needle. Calibrate the needle and automatically update the data in the XML file.

RESULTS: A usable model, thousands of lines of automatically generated OSG code, and an XML file with positional information, variables, and calibration data for your Out-The-Window IOS program!



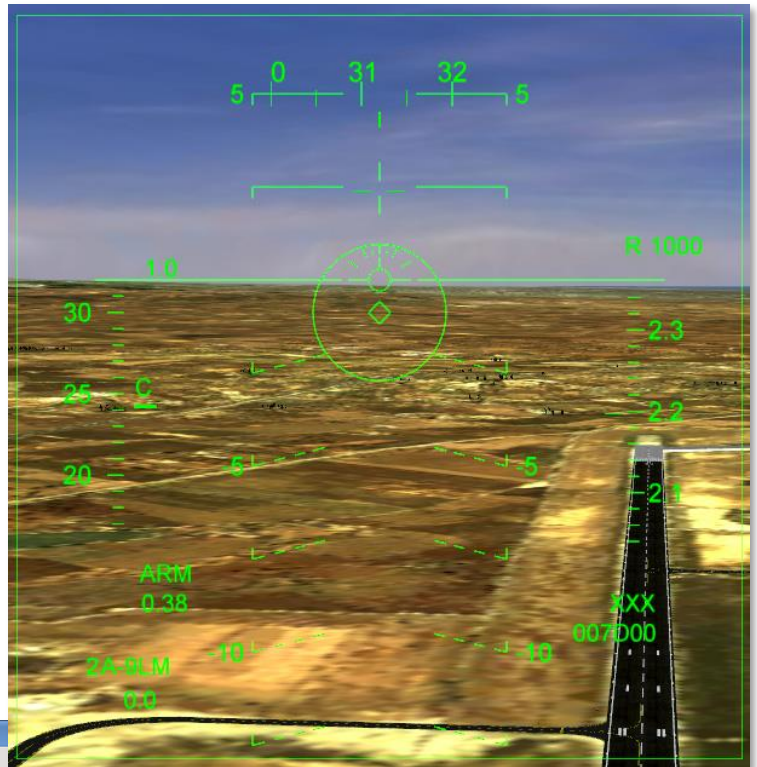
MUSE™ Heads Up Display (HUD) Builder

The MUSE™ HUD Builder™ provides the ability to create and modify a MUSE™ IOS HUD, without ever having to change a line of code! All characteristics are applied via an XML file that identifies each HUD component. Adjustments can be made either manually while running the stand-alone desktop IOS simulator, or in real time using the HUD display on the MUSE IOS window. When you change a parameter in the XML file and save, the HUD is automatically updated.

The HUD Builder™ allows you to:

- Change the overall characteristics of the HUD display such as color, font, character size, etc.
- Change the look and feel of individual HUD components including: position, start/and end points, alignment, labels, quantity, width, height, distance between lines, etc.

Additionally, the HUD Builder™ allows you to logically connect a variable in your program to a graphical component defined in the XML file.



```
F16Hud.xml - KWrite
File Edit View Tools Settings Help
New Open Save Save As Close Undo Redo
1 <?xml version="1.0" encoding="ISO-8859-1"?>
2
3 <hud>
4   <color r="0.0" g="1.0" b="0.0" a="1.0" />
5   <font>helvetica-bold.ttf</font>
6   <font_size>0.65</font_size>
7   <main_offset x="0" y="5.27" z="0"/>
8   <film>true</film>
9   <hud_body>
10    <component>
11      <type>rect</type>
12      <name>dogfight_speed_box</name>
13      <pos x="-8" y="2" z="0"/>
14      <width>3</width>
15      <height>1.5</height>
16      <show_ptr>dogfight_show</show_ptr>
```

Features

- Easy to Use
- Accommodates dynamic and static HUD display components
- Can reconfigure HUD while in stand-alone desktop mode or during real-time flight simulation
- Significantly reduces amount of time required to build or change display



About Us

INFINITE POSSIBILITIES, Performance, Versatility, Competitive Advantage

In the world of evolving technologies, success is achieved by companies willing to challenge established boundaries.

Compro is constantly developing innovative solutions for emerging real-time markets, including rapid transit, process control, and interactive entertainment systems.

Compro's mission is developing products, solutions, and services that provide the speed, power, and reliability required by the most sophisticated and time-sensitive applications in the industry. We create those systems with the potential for compatibility and expansion that will meet tomorrow's most ambitious expectations.

Compro is committed to providing the most comprehensive services necessary to meet every customer's needs.

Compro is known worldwide for its customer-focused leadership in technology, support solutions and innovative "industry-firsts."

To date, Compro has achieved an installed base of over 10,000 systems, representing over 3,000 customers worldwide. These customers are served via our world-wide offices with our Corporate office strategically located in central Florida.

Compro is an international supplier to the flight simulator, data acquisition, and transportation and energy markets and to original equipment manufacturers and integrators (such as Boeing, Lockheed, Thales, EADS, etc.) who serve those markets. Compro develops legacy interfaces and integrates COTS hardware and software that are demanded by today's most challenging real-time environments. Compro's products are involved in open systems, integration for data acquisition, legacy migration, and flight simulation solutions.

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