



Multi-Launcher Emulator (MLE) Special Test Equipment (STE)



Overview

The MLE was originally developed to support integration testing for the Hellfire-series missiles on Apache platforms employing the M-299 or M-310 missile launchers under a SBIR effort. For this application, the MLE comprised a suite of modular components that include four Launcher Emulator Modules (LEMs) that simulate the real-time functionality of up to four M-299 launchers as reflected at the MIL-STD-1760 interfaces on the host platform. Also included in this equipment suite is the Emulator Control Station (ECS) providing operator control and status monitoring of launcher simulations embedded in each LEM. The ECS laptop computer communicates with each LEM via an Ethernet network.

Each LEM is connected to the platform connector via a MIL-STD-1760 umbilical cable designed to customer-required lengths. Each LEM is capable of simulating the power switching, discrete switching, and data communications that replicate the same interactive behavior as the actual M-299 with Hellfire-series missile load-outs. Examples of the power and signal simulation include missile power application, built-in test (BIT), code transfer, targeting, and launch sequencing functionality for any Hellfire missile type. Through this interface each LEM monitors launcher power (e.g., 115 VAC 400Hz, 28 VDC), discrettes (e.g., Address, Release Consent) and responds as a remote terminal (RT) to the MIL-STD-1553 Mux A and Mux B interfaces for digital data transfer. Each LEM also provides a serial output connection for controlling an optional Dynamic Load Module (DLM) that applies specific loads at the MIL-STD-1760 interfaces

Each LEM also provides a serial output connection for controlling an optional Dynamic Load Module (DLM) that applies specific loads at the MIL-STD-1760 interfaces corresponding to the launcher and missile power and activity states. Each LEM supports the control of one DLM via the LEM serial interface connection. The DLM may be inserted between a LEM and the host aircraft to apply real-time loads corresponding to the launcher and missile control states.

MLE software is subdivided into a real-time embedded component hosted on the LEMs, and a non-real-time component hosted on the ECS. LEM simulation software executes using a real-time operating system (RTOS), e.g., QNX. The RTOS environment supports real-time simulation of launcher functionality with deterministic performance and timing. Enabled by its open system architecture, individual simulations representative of any Hellfire-series missiles may be selected for any missile rail including mixed load-out configurations. Moreover, new missile simulations may be added for JAGM and any other 'Hellfire-like' missiles. The ECS non-real-time software executes on a Windows 7 operating system and supports operator interfaces (e.g., control, monitoring) via its Graphical User Interface (GUI). Together these components form a scalable architecture that provides emulation of the M299 launchers with a mixed load-out of Hellfire-series missiles (AGM-114 K/L/M/P/P+/R) and future JAGM missiles. AMRDEC JAMS Program Office approval may be required for custom MLE applications.

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Features

The Multiple Launcher Emulator (MLE) represents one of WINTec's key products in our continuing evolution of Special Test Equipment (STE) supporting the aviation and weapons stores community. The MLE is a very cost-effective solution to ease the complex challenges of aircraft-platform to weapon-stores integration and testing.

Specifically, the MLE lessens the burden of integrating aircraft platforms with missile launchers and stores by emulating all pre-launch initialization signal and power requirements at the MIL-STD-1760 connector interface prior to launch. Rather than using actual launchers and missiles at each station, the MLE's small modular emulation units accomplish the same responses as the real launcher/ missile stores—plus data monitoring, logging, and fault injection tools.



M299 and M310 launcher simulation

Missile simulation:

- Hellfire K/L/M/P/P+/R
- JAGM initial ICDs (future)

MIL-STD-1760 Store Station Interface Emulation:

- Emulation up to four M299 Hellfire/Longbow launchers concurrently with mixed missile load-outs on each launcher
- Provided at the Aircraft Station Interface (ASI)
- Supporting MIL-STD-1760 Class II electrical interface

Real-time embedded emulation of:

- Store-side electrical interface
- Store functionality (power-up, initialization, data transfer, etc.)

Future growth capability for simulation of other launchers/weapons (e.g., JAGM)

Ability to induce errors and faults in all electrical interfaces

Ability to monitor and capture all data communications

Graphical, robust and user-friendly Human Machine Interface

Dynamic electrical load simulation (option)

MIL-STD-1760 In-Line Fault Module (option)

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