## Overview

The MSE has evolved from prior efforts supporting integration and testing of the Joint Direct Attack Munitions (JDAM) on the MQ-9 Reaper UAV, as well as from SBIR-related research and development. For the Reaper-JDAM integration, a suite of modular components including six Store/Rack Emulator Modules (SREMs) simulated the real-time functionality of six JDAMs at each station's MIL-STD-1760 interface specified in relevant ICD revisions or UAI supplements.

Also included in this equipment suite is the Emulator Control Station (ECS) providing operator control and status monitoring of the active store simulations and bomb-rack simulation embedded in each SREM. The ECS laptop PC communicates with each SREM via an Ethernet network. MSE configurations may range from one JDAM store up to eight JDAM stores at individual stations on aircraft platforms. SREMs may also be configured to operate as independent stand-alone units.

Each SREM is connected at the platform wing station via a physical MIL-STD-1760 umbilical cable designed to customer-specified lengths. Through this interface each SREM monitors store/rack power (e.g., 115 VAC 3-phase 400Hz, 28V DC1), safety-enable power and discretes (e.g., 28 V DC2, Release Consent, Interlock) and responds as a remote terminal (RT) to the MIL-STD-1553 Mux A and Mux B interfaces for digital data transfer.

The embedded models can replicate the same interactive behavior as any selected Carriage or Mission Store.

Examples of the store simulation functions include transfer alignment, Mass Data Transfer (MDT) of GPS message types, moment arms, built-in-test (BIT), target mission data, safety critical release sequencing, and more.

MSE software is subdivided into a real-time embedded component hosted on the SREMs, and a non-real-time component hosted on the ECS. SREM simulation software executes using a QNX real-time operating system (RTOS). The RTOS environment supports real-time simulation of platform-carriage-store functionality with deterministic performance and critical timing contraints.

Enabled by its open system architecture, individual simulations representative of many carriage and mission stores may be selected for any platform or carriage station including mixed load-out configurations. Moreover, store simulations may be created or tailored to be compliant with Universal Armament Interface (UAI) and Platform Annexes, Store Supplements, or legacy interfaces. Alternative interfaces support customized solutions with RS-422 and Ethernet.

The ECS non-real-time software runs via the Microsoft 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 various Carriage and Mission stores functionality required for proper weapon employment.

## Features

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

Specifically, the MSE supports integrating aircraft platforms by providing a MIL-STD-1760E Class II interface with embedded models for non-UAI (legacy) or UAI-compliant interfaces for many J-Class weapons (i.e., JDAM, JSOW, JASSM, WCMD, and SDB I) and smart bomb racks (BRU-61A).

The embedded models simulate Carriage Stores and Mission Stores through the logical messaging of the MIL-STD-1553 interface busses. The models support all aspects of store initialization, Built In test (BIT), conditioning, targeting (as applicable), time-critical function processing, and more.

In addition to monitoring the MIL-STD-1760 AC and DC signals in conjunction with model operation (i.e., critical functions inhibited unless safety critical signals are present), the MSE also has a bomb rack simulation interface that reports rack status and monitors for arming and release signals. A store released through the rack will result in the MIL-STD-1760 interlock being opened and cessation of all MIL-STD-1553 messaging. In addition, the rack will also report that the store is not present.

Rather than using actual carriage and mission stores at each station for platform integration, the MSE's small modular emulation units provide the same control and responses as the real carriage or mission store with the addition of operator status display screens, embedded real time data logging, and store model fault injection tools.

For more information, email info@wintec-inc.com .

# Multi-Store/Rack Emulator (MSE)
## Special Test Equipment