

## **Model 2443HV Three-Axis Hydraulic Flight Motion Simulator (FMS)**

### **STANDARD FEATURES**

- Position Accuracy:  $\pm 10$  arc sec
- Middle and Outer Axis Rates: 500 deg/sec
- Rate Accuracy:  $\pm 0.1\%$
- Inner axis rate: 1000 deg/sec
- Rack-mounted AERO 4000 Digital Controller
  - Front panel display of status and data
  - Local and remote operation
  - Trapezoidal velocity profiles (in rate mode) with programmable velocity and acceleration
  - Sinusoidal motion generator, with programmable amplitude and frequency
  - Profile mode for position, velocity, and flight (PVA) commands
  - Programmable analog inputs and outputs

### **DESCRIPTION**

The 2443HV is one of Ideal Aerosmith's standard Three-Axis Flight Motion Simulator models designed for Hardware-In-The-Loop (HWIL) Seeker Guidance Testing. This system is configured for interfacing to an RF chamber. Extremely efficient hydraulic actuators allow high system utilization, such as Monte Carlo-type test scenarios, on a time-continuous basis. This three-axis FMS system is controlled with Ideal's flexible AERO 4000 Controller which provides real-time motion control via several industry-standard high-speed interfaces.

The 2443HV features a geared hydraulic drive on the innermost axis, high-performance direct drive hydraulic vane actuators on the Middle and Outer axes and precision optical encoders on all axes. The AERO 4000 digital signal processor-based (DSP) controller provides accurate and reliable motion control. The user can operate the FMS from the AERO 4000 Graphic User Interface for local control, or remotely via a computer interface. It affords easy operation, and can accommodate the Ideal Aerosmith Table Language (ATL) for remote operation. The AERO 4000 controller comes standard with IEEE-488, RS-232, and Ethernet communication interfaces.



### **SPECIAL FEATURES**

- Optional servo valves and manifolds available to provide 600 deg/sec rates on middle and outer axes
- RF shielding enclosure integrated into the base structure design with accommodations for interfacing table base to RF chamber and customer wiring penetrations
- Table base configured with an actuated linear positioning system and multiple mounting/anchoring positions to simplify test article loading and system calibration
- Vertical base design that will accommodate either a vertical or horizontal outer axis orientation. (vertical outer axis shown in photograph)
- Middle axis gimbal that accommodates interchangeable inner axis drive designs to satisfy future testing requirements

### **OPTIONS**

- Various slip ring packages or wire wrap configurations
- Electric drive assembly on inner axis to satisfy high-speed test requirements
- SCRAMNet or VMIC reflective-memory interfaces
- GPS and/or 10MHz timing synchronization module

***For more detailed information, contact Ideal to request a Specification Document.***

<b>Performance Specifications</b>			
	<b>Inner</b>	<b>Middle</b>	<b>Outer</b>
<b>Rotational Freedom (deg)</b>	$\pm 170$	$\pm 55$	$\pm 55$
<b>Positioning</b>			
• Accuracy, arc sec (deg)	$\pm 30 (\pm 0.01)$	$\pm 10 (\pm 0.003)$	$\pm 10 (\pm 0.003)$
• Repeatability, arc sec (deg)	$\pm 10 (\pm 0.003)$	$\pm 5 (\pm 0.0014)$	$\pm 5 (\pm 0.0014)$
• Resolution, (deg)	0.0001	0.0001	0.0001
<b>Rate</b>			
• Maximum, deg/sec	$\pm 1000$	$\pm 500^1$	$\pm 500^1$
• Minimum, deg/sec	$\pm 0.001$	$\pm 0.001$	$\pm 0.001$
• Display Resolution, deg/sec	$\pm 0.0001$	$\pm 0.0001$	$\pm 0.0001$
<b>Acceleration, max., deg/sec<sup>2</sup></b> (sinusoidal move)	18,000	15,000	15,000
<b>Bandwidth, -3dB,</b> (with nominal payload)	22	20	20

\*Values listed are maximum values and are dependent upon system configuration. Performance parameters may vary between various configurations of the Model 2443H.

Note: 1) 600 deg/sec rates on middle and outer axes available as an option

<b>System Physical Configuration</b>	
<b>Inner (roll) axis</b>	The nominal test load may be secured to a precision mounting diameter and corresponding hole pattern. Custom tabletop and interface patterns available upon request.
<b>Number of User Lines</b>	Optional slip ring package is 48 lines at 5 amps per line. Custom packages are available. System shown has limited travel configuration without slip rings.
<b>Test Load</b>	
• Nominal	100 lbs (45.5kg), 16.5" (419mm) diameter, 24" (600mm) long
• Maximum	250 lbs (113.6kg), 16.5" (419mm) diameter, 48" (1200mm) long from intersection of axes to rear of payload
<b>AERO 4000 Digital Controller</b>	Request an AERO 4000 Controller data sheet for more information.
• Type & Configuration	AERO 4000 Test Table Controller configured in a 19-inch Cabinet.
• Communication Interfaces	IEEE-488, RS-232 and Ethernet ports available to user. SCRAMNet or VMIC reflective-memory interfaces available as options.

For additional information or special requirements, contact Ideal Aerosmith. Specifications subject to change without notice. Please call for pricing.

Rev B