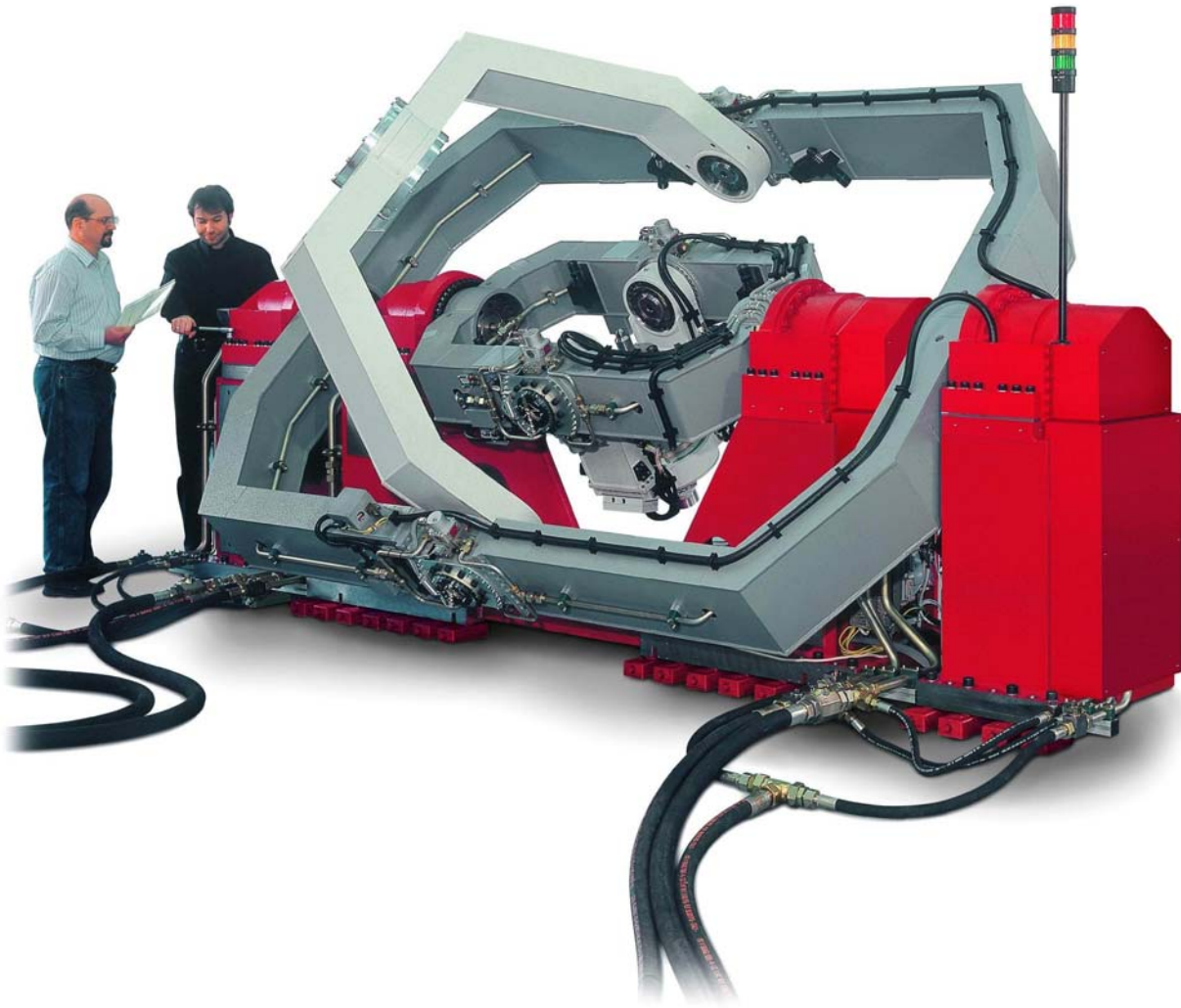


Hardware-in-The Loop Flight Motion Simulator  
**HD7756 Five Axis Flight Motion Simulator**



**Description**

The Series HD7756 comprises a precision 3-axis Flight Motion Simulator (FMS) and a 2-Axis Target Motion Simulator (TMS). The system is designed for high dynamic missile test. The HD7756 provides a comprehensive platform for Hardware-in-the-Loop (HWIL) simulation of guided missiles, munitions and other inertial systems.

The 3-Axis FMS is configured with a horizontal outer (pitch) axis, a middle (yaw) axis, which is orthogonal to the outer axis and an inner (roll) axis supported by the middle axis gimbal. The inner axis is the payload mounting area.

The inner axis has continuous angular freedom and is driven by a high torque brushless AC motor. The

middle and outer axes have limited angular motion and are driven by hydraulic actuators. A hard-anodized aluminum tabletop on the roll axis serves as the payload mounting surface.

The 2-Axis TMS is configured with an outer elevation axis which supports the inner azimuth axis. The missile target is mounted to the azimuth gimbal at the large payload mounting area.

Construction materials used are treated for long term dimensional stability. The stiffness of the system is such that orthogonality of the axes and bearing wobbles are maintained, virtually independent of axis rate or position. Protective coatings are used to prevent corrosion and outer surfaces are painted.

The real time digital controller, ACUTROL® Model ACT3000 controls the table. The controller has a colour, touch sensitive operator interface flat panel display and scalable analog input/output interfaces. Programmable Event Pulses can be used for calibration and synchronization with external

computers or test equipment. Typically, the standard digital interface Ethernet (TCP/IP) and IEEE-488 are supplemented with a real time computer interface. SCRAMNet and VMIC reflective memory interfaces are the preferred standard in the HWIL test environment.

**Performance Specification**

<b>FMS</b>			
	<b>ROLL</b>	<b>YAW</b>	<b>PITCH</b>
	inner	middle	outer
<b>Design Features</b>			
Actuator	AC-torquer	Dual vane	Single vane
Position transducer	Inductosyn Tape	Inductosyn	Inductosyn
Electrical access to UUT	Slipring	Twist cable	Twist cable
Axis Intersection within sphere of	1 mm radius		
<b>UUT</b>			
Payload Max	250mm dia. x 500mm aft dimension		
Payload, mass	30 kg, nominal	up to 150kg	
Slipring and facility lines to UUT	<i>Customer specified</i>		
<b>Specification</b>			
Angular freedom, nominal	continuous	>+/-60 deg	>+/-120 deg
Angular freedom, servo controlled	continuous	+/-55 deg	+90 to -135
Position resolution	0.0001 deg	0.0001 deg	0.0001 deg
Position accuracy	+/-0.001deg	+/-0.005deg	+/-0.005deg
Position repeatability	+/-0.003deg	+/-0.003deg	+/-0.003deg
Position drift over one hour	<0.0005deg	<0.0005deg	<0.0005deg
Rate, peak	+/-1'500 deg/s	+/-400 deg/s	+/-400 deg/s
Rate, minimum	0.001 deg/s	0.001 deg/s	0.001 deg/s
Rate, accuracy	0.10%	0.10%	0.10%
Acceleration peak with load	32'000 deg/s <sup>2</sup>	15'000 deg/s <sup>2</sup>	15'000 deg/s <sup>2</sup>
Bandwidth -3db, nominal (tolerance +/-5Hz)	40Hz	30Hz	25Hz
<b>TMS</b>			
	<b>Azimuth</b>	<b>Elevation</b>	
	inner	outer	
<b>Design Features</b>			
Actuator	Dual vane	Dual vane	
<b>UUT Details</b>			
UUT Length	500mm (nominal)		
UUT Weight	50kg (nominal)		
UUT Dia	300mm		
Payload, inertia	N/A		
<b>Specification</b>			
Angular freedom, nominal	>+/-60 deg	>+/-45 deg	
Angular freedom, servo controlled	+/- 55deg	+/-45 deg	
Position resolution	0.0001 deg	0.0001 deg	
Position accuracy	+/-0.005deg	+/-0.005deg	
Rate, peak	+/-100 deg/s	+/-100 deg/s	
Rate, minimum	0.001 deg/s	0.001 deg/s	
Rate, accuracy	0.10%	0.10%	
Acceleration peak with load	1'200 deg/s <sup>2</sup>	1'200 deg/s <sup>2</sup>	
<b>Dynamic response</b>			
Bandwidth -3db	10Hz	10Hz	

- Options**
- Digital interface in addition to the standard IEEE-488 and Ethernet (TCP/IP) are; RS-422, SCRAMNet, or VMIC
  - Non standard sliprings
  - Special UUT adapters

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