S-PLANE

XSIM-HILS

Hardware-in-the-Loop Simulator

Features

Overview

- Real-time flight and mission simulation
- Unparalleled I/O diversity and quantity
- MATLAB/Simulink-based modelling environment
- Modular hardware and simulation software
- Powerful 12-core simulation computer
- Real-time control and monitoring
- Supported by XSIM tools including XSIM-Workbench for simulation control

Applications

System, sub-system, and mission simulation for:

- Flight control development
- System and subsystem verification and simulation
- Flight test preparation
- Generation of safety cases for certification
- Overall flight system risk reduction
- Training

Overview

XSIM-HILS is a comprehensive Hardware-in-the-Loop Simulator designed for the development, testing, and verification of mission and flight critical systems. It combines modular hardware with powerful simulation software to create a real-time testing environment that mirrors real world conditions. With advanced processing capabilities and a wide range of physical input and output interfaces, its suitable for the most advanced configurations. XSIM-HILS integrates seamlessly with S-PLANE's X-Series and NX-Series of flight and mission computers as well as 3rd party equipment.

XSIM-HILS is used for subsystem and full system testing, verification and validation, qualification and integration, making it ideal for use throughout the development and maintenance lifecycle. It is supported by XSIM-Workbench, a Windows application enabling simulation control, real-time performance monitoring, event triggering, and downloading logged data. Users can simulate operational scenarios including environmental disturbances and failure conditions, with events scripted or triggered live to evaluate system responses under challenging conditions.

Optional model libraries cover aircraft dynamics, sensors, actuators, propulsion systems, and environmental effects, enabling rapid builds of system and subsystem simulations. Custom models can also be developed and integrated, to support specialised hardware, software, or mission-specific requirements.

XSIM-HILS is available in both development and integration configurations, each supporting desktop and rack-mounted installation. The development version provides easy and flexible access to ports, while the integration version offers concentrated industry-standard connectors. Supporting up to four I/O port expansion units at once, with three I/O configuration options to choose from, XSIM-HILS has unparalleled I/O quantity and diversity, which can be scaled to meet complex system demands while reducing costs, improving safety, and accelerating deployment.

XSIM-HILS

Technical Specifications

Modular | Diverse IO | Advanced Simulation | Proven

SIMULATION CAPABILITIES	
Simulation Speed	Real-Time (2 kHz)
Features	• MATLAB/Simulink-based modelling environment • Model library (dynamics, subsystems, automation) • XSIM-Workbench GUI for simple prep and operation • Runtime state monitoring (scopes, readouts) • Runtime event triggering (individual model level) • Scenario creation and execution (Event Lists) • Data logging (post-sim analysis)
SIMULATION I/O TYPES	
Serial Ports	• RS-232/RS-422/RS-485FD/RS-485HD Software Configurable Ports
GPIO Ports	• Continuous maximum input voltage of 32.2 V • GPO: 100 mA (max) sink current • GPI: 1.5 mA (max) input current • PWM frequency range: 10 Hz - 2 kHz • Software configurable pull-up per port (of 4 channels): None, 3.3 V, 5 V, 12 V, 28 V
Analog Inputs	• Continuous maximum input voltage of ±32.2 V • Digital Resolution: 16-bit (976.56 µV per LSB)
Analog Outputs	• Continuous maximum output voltage of ±32.2 V • Digital Resolution:16-bit
CAN 2.0b	• Software configurable termination • Maximum speed: 1 Mbps
ARINC-429	• Software configurable • Speed: 12.5 kHz - 100 kHz
MIL-STD-1553	• MIL-STD-1760 Compatible • BC (Bus Controller) • RT (Remote Terminal) • MT (Bus Monitor) • Maximum Speed: 1 Mbps

	I/O Configuration			Maximum Supported (Base + 4 x Expansions)
	A	B	C	
Multi-Protocol Serial	26	4		Up to 130
GPIO Channels	64	40		Up to 320
GPI Channels		40		Up to 200
CAN 2.0b	4			Up to 20
Analog Input Channels	16			Up to 80
Analog Output Channels	16			Up to 80
ARNIC 429		16 TX 16 TX		Up to 80 TX Up to 80 RX
MIL-STD-1553			4	Up to 16

MECHANICAL AND ELECTRICAL SPECIFICATIONS	
Mass: Base unit	6 kg
Mass: Expansion Unit	4 kg
Dimensions: Rack Mounted	483 mm (19in) x 88 mm (2U) x 329 mm (w x h x d) per unit
Dimensions: Desktop	412 mm x 98 mm x 250 mm (w x h x d) per unit
Voltage Range	100 to 240 VAC, 47 to 63 Hz
Power Consumption	80 to 350 W (Typical, expansion configuration dependant)
Processors	Intel Core i5-1350PRE 12 cores (4P + 8E) Up to 4.6 GHz 12 MB Cache
Memory	16 GB (Upgradeable to 64 GB)
Primary storage	320 GB
Secondary Storage	1 TB (optional)
Ethernet	3x 1000BASE-T Interfaces
ENVIRONMENTAL SPECIFICATIONS	
Operational Temperature	+10°C to +40°C ambient
Storage Temperature	-40°C to +85°C
Humidity	Relative Humidity 85%

X-KIT Key Equipment

X-CUBE

- The X-CUBE is the core avionics unit of the X-KIT for UAS/OPS conversion
- Function: Flight Control Unit (FCU), Power Distribution Unit (PDU) and Input/Output (I/O) Concentrator
- Support SCP, DFR and TFR internal redundancy with dedicated voting
- Further supports dual X-CUBE external redundancy with failover architecture

X-ADT

- Airborne Data Terminal (ADT)
- Function: Mission Computer, I/O Concentrator, HD-SDI Video Encoder, Data Storage, Ethernet Switch
- Supports S-PLANE's mission software and third-party or custom containerised software
- Interfaces with and manages and controls mission payloads (RADAR, EO/IR, SIGINT, AIS and Direction Finder)

X-RPU

- Remote Piloting Unit (RPU)
- Function: Safety-critical Command & Control Computer, and I/O Concentrator
- Interfaces to Primary Flight Controls (PFC), GCC MFD, Hard I/O (buttons and switches with parallel redundancy) and to data links/tracker

TRACKER+

- Stand-alone GNSS-based antenna tracker for UHF, L-, S- and C-bands
- Function: Long-range Line of Sight Communication (LOSCom) between aircraft and Ground Control Stations (GCS)
- Mesh network enabled

GCC and Paragon

- Ground Control Console (GCC)
- Configured as a Remote Piloting Station, Payload Operating Station, or Engineering Station
- Function: HMI for Paragon, PFD with HUD, and MFD (touch display) for Remote Piloting

Equipment Chains & Products

	AIRBORNE CONTROL	GROUND CONTROL	COMMUNICATION	SIMULATION
NX-FCU	Automation & ISR Mission		Automation & ISR Mission	
X-CUBE	Automation		Automation	
X-ADT	ISR Mission		ISR Mission	
X-RPU		Automation		
GCC		Automation & ISR Mission		
Paragon	Automation & ISR Mission			
X-GDT		ISR Mission	Automation & ISR Mission	
TRACKER+			Automation & ISR Mission	
XSIM-HILS				Automation & ISR Mission
XSIM-Workbench				Automation & ISR Mission
XSIM-Video				Automation & ISR Mission

Contact Details: 9B Cyclonite Road, The Interchange, Somerset West, South Africa, 7130 • Phone: +27 21 851 9282, Fax: +27 86 298 4587, Email: info@s-plane.com

Information provided on this brochure is subject to change without notice.