BLOOMY®

Automated test solutions for the entire product lifecycle

Environmental Control System Test Platform

Real-time HIL test of environmental control systems for airframes

The Airframe Environmental Control System Test Platform provides a hardware in-the-loop (HIL) closed-loop test environment for validation, production and maintenance testing of cockpit and cabin environmental control systems for airframes. The system simulates a military or commercial airframe cabin and air cycle machine, including sensors, actuators, controls and indicators, and may be expanded for multiple ECSs. The system delivers repeatable, cost-effective testing in a fraction of the time needed with typical in-house simulation systems.

The test system is based upon the Bloomy Simulation Reference System, which reduces overall lifecycle costs and creates a common test platform for HIL test systems in a System Integration Laboratory (SIL). The reference system includes industry-standard components from National Instruments, The MathWorks, Virginia Panel Corporation, and Bloomy. These components are used in other Bloomy Test Platforms including the FADEC/EEC Test Platform and the Flight Control System Test Platform.

APPLICATIONS

- Airframe environmental control system verification and validation
- Development, production, or maintenance testing
- "Fly the Box" test of customer return material
- Development of control laws prior to airframe test
- Environmental Stress Screening (ESS)/ Highly Accelerated Life Testing (HALT)
- System Integration Labs (SILs)

FEATURES

- Simulation environment for comprehensive airframe environmental control testing
- Analog I/O including thermistor, RTDs, strain gages
- Actuator loads including inductive solenoids, torque motors, and indicator loads
- Discrete switch signals including open/ ground, open/Vcc, open/closed
- Available digital communications including ARINC-429, MIL-STD-1553B, FireWire, AFDX, serial
- DC Power (+28VDC); optional 1Ø/3Ø AC supplies
- ThroughPoint™ Interface Panels with integrated breakout box functionality

SYSTEM BLOCK DIAGRAM
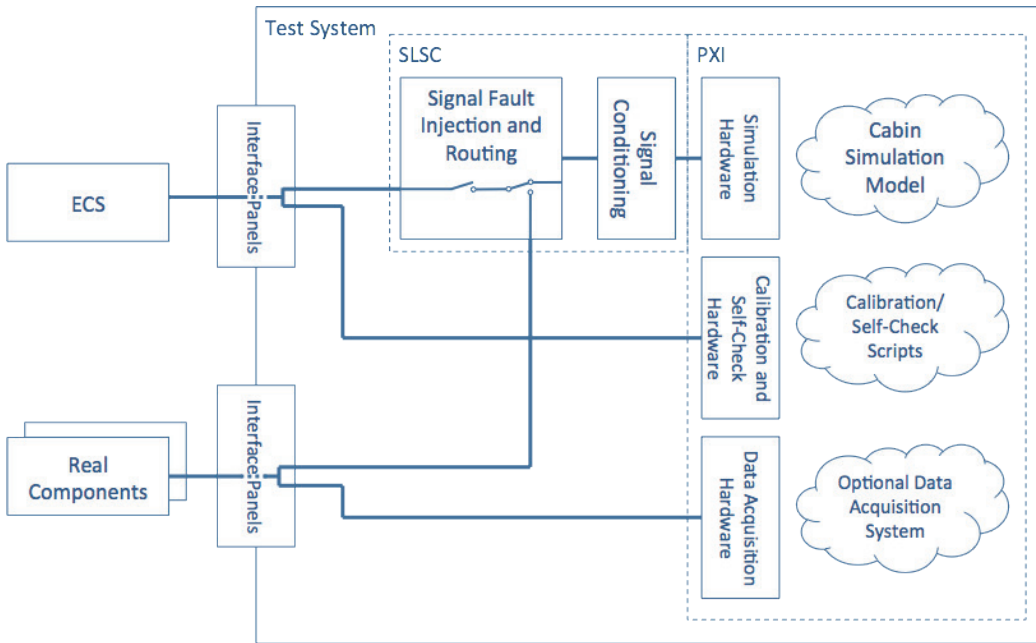
SPECIFICATIONS

SIGNAL CONDITIONING AND COMMUNICATION I/O	
Interface Type	**Channels**
VDT/Resolver simulation (4W, 5W, 6W)*+	Optional
Thermocouple simulation*+	Optional
RTD simulation*+	8
Thermistor simulation+	8
Strain Gauge simulation+	8
Loads (torque motors, solenoid, lamp, etc.)*+	16 (8x <5W, 8x >5W)
Discretes (one-wire and two-wire)+	32
Differential analog outputs to UUT+	8
Potentiometer/variable resistor simulation	8
RS-422	2
ARINC-429	Optional
AFDX/ARINC-664	Optional
MIL-STD-1553B	Optional
IRIG B	1
Ethernet Test Bus	Optional
DC Power	1
AC Power	Optional

FAULT INSERTION
*Open circuit fault included.
Other fault conditions (short to ground, pin to pin short, etc.) optional for all signal types

SELF-TEST
+Self-test standard, calibration optional
Loopback self-test optional for all other signal types

COMPUTING RESOURCES	
Real-Time Simulation Host	PXIe-based, RTOS, up to 8-Core Xeon
Instrumentation and System Management	PXIe-based, Windows, up to 8-Core Xeon

SOFTWARE ENVIRONMENTS	
Real-time Framework	National Instruments VeriStand
Test Executive	National Instruments TestStand
Data Acquisition and Programming	National Instruments LabVIEW, C/C++
Data Management and Analysis	National Instruments DIAdem
Software Models	23 model types, including LabVIEW, Simulink, Matrix, C/C++, MapleSim

SYSTEM DIMENSIONS AND POWER		
System Chassis		1- or 2-bay 40U equipment racks
	1-bay:	approx. 78"H (w/locking castors) x 23"W x 36"D
	2-bay:	approx. 78"H (w/locking castors) x 46"W x 36"D
Weight		Configuration dependent
Power Requirements		Power requirements vary with selected AC and DC power supply options
Emergency Power Off		Standard
Uninterruptible Power Source		Standard for all computing resources

WARRANTY
1-year warranty on all hardware components, optional extended warranties available
3-year software service plan on all National Instruments software products