High-Performance Computing

Air Combat Environment Test & Evaluation Facility

Overview

The ACETEF High-Performance Computing (HPC) provides the real-time processing power needed to run simulation software, interfaces and visuals needed for installed system testing. The HPC also provides the capability for external links to other test and simulation centers. These links support numerous distributed simulation exercises that are operated by the facility.

The HPC maintains connection to the following networks: Defense Research Engineering Network (DREN), Distributed Interactive Simulation Network (DISN), East Coast Communication Network (ECCN), Defense Network (DNET) and SIPRNET. The HPC Distributed Center operates both Silicon Graphics 4 Node Power Challenge Array and Multiple Onyx 2 computers combined to provide 42 GFLOPS Peak, 37 GB main memory, 713 GB of disk space, 104 CPU's, 9 Infinite Reality Engines and a 20 TB Tape Archiver. This system is used in the modeling and simulation environment and supports a wide range of aviation test and evaluation (T&E) support funcions. Ground laboratory HPC capabilities improve research, development, test and evaluation radar, infrared, and electro-optic sensors. In-spectrum data bases and signal generation control are used for fully-correlated visual, sensor data and electronic combat at the scene level for Navy potential theaters of war. The ACETEF shares these in-spectrum capabilities to better define warfighting deficiencies, technological opportunities, joint service alternatives, requirement analysis, risk assessments, system analysis, cost and operational effectiveness analysis, system threat assessments and developmental and operational T&E. Typical real-time applications include multispectral scene generation and mission environment generation in a warfighting environment.

Modeling and simulation integrates greater functionality, expands the performance envelope, optimizes performance and safety, increases survivability and improves lethality in a warfighting environment. Local batch and interactive functions such as infared synthetic scene generation, aircraft stores and separation analysis and structural load analysis are also performed using the HPC system.

High-Performance Computing Hardware

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Instrumentation and Data Documentation Center

A state-of-the-art instrumentation system provides ACETEF customers with a robust real-time monitoring, data capture and data reduction capability as well as audio and video recording and intercom communication between ACETEF laboratories and systems under test. The data instrumentation center collects and records all data for real-time and post-mission analysis. Systems tested can range from domestic and foreign aircraft and ground vehicles positioned in the shielded hangar/ramp area and the anechoic chamber to individual avionics components positioned within ACETEF laboratories. The instrumentation system consists of the L3 System 500 Model 550 that can be deployed for a nearly limitless array of high-speed, high-performance, real-time data acquisition needs.

The instrumentation system is capable of handling multiple streams of data from different sources, providing a real-time correlation of the collected data in a time- or event-specific manner. A typical test consists of multiple streams of data bus activity from a system under test being simultaneously displayed and recorded as it interacts with a run-time simulation called Simulated Warfare Environment Generator (SWEG). The instrumentation system is also capable of interfacing and simulating multiple systems on the system under test.

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HPC Hardware

Distributed Network Environment

A distributed network environment in the ACETEF infrastructure for both internal and external links is implemented and maintained by the SST. ACETEF provides a virtual combat environment for the analysis, test and evaluation of air combat concepts, flight and avionics systems and fully integrated air vehicles. This ACETEF simulation and networking architecture has been tested and exercised on numerous occasions. These projects include integrating five separate ACETEF laboratories and an external test facility through a direct network link into a simulated war-at-sea exercise. By networking several man-in-the-loop assets to the ACETEF conflict environment, distributed network exercises successfully demonstrate the feasibility of applying distributed simulation/stimulation-based test and evaluation capabilities. ACETEF demonstrates how distributed simulations, real systems, real aircraft and man-in-the-loop devices can interact in a single conflict simulation.