



# ACETEF

*Air Combat Environment Test and Evaluation Facility*

Simulation Support Team  
Capabilities

The Simulation Support Team (SST) at the Air Combat Environment Test and Evaluation Facility (ACETEF) supports and maintains the infrastructure and resources that are shared through the ACETEF facility and its external links. The SST is a core group that maintains the High-Performance Computing (HPC) center, provides instrumentation monitoring capability to the various systems under test (SUT), audio and visual networking support throughout the facility, and operation of the facilities secure networks, consisting of all internal and external links. The primary mission of this team is to provide ACETEF customers a reliable and reuseable architecture to support integrated multilaboratory and multisite testing.

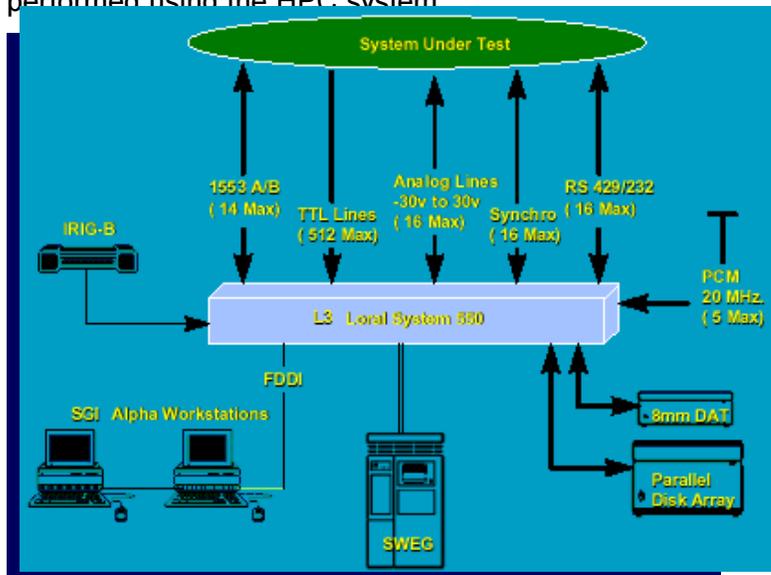
The ACETEF HPC operates both Silicon Graphics 4 Node Power Challenge Array and Multiple Onyx 2 computers combined to provide 42 GFLOPS Peak, 37 GB main memory, 713 GB of disk space, 104 CPU's, 9 Infinite Reality Engines, and a 20 TB Tape Archiver. This system is used in the modeling and simulation environment and supports a wide range of aviation test and evaluation support functions. It is used to maintain United States technology supremacy over our adversaries in weapon systems design and to foster the flow of this technology into warfighting support systems.



Ground laboratory HPC capabilities are currently in development to better RDT&E radar, IR, and electro-optic sensors. This is being done by developing in-spectrum databases and signal generation control for fully correlated visual, sensor data, and electronic combat at the scene level for Navy potential theaters--of-war. Typical real-time applications include multispectral scene generation and mission environment generation in a warfighting environment. The importance of modeling and simulation to the warfighter is that it 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 infrared synthetic scene generation, aircraft stores separation analysis, and structural load analysis are also performed using the HPC system.

## Instrumentation and Data Distribution Center

The SST operates a state-of-the-art instrumentation system that provides ACETEF customers with a robust real-time monitoring, and data capture, data reduction capability, as well as audio and video recording, and intercom communication between ACETEF laboratories and SUT's. The data instrumentation center collects and records all data, both truth data and SUT, for real-time and postmission analysis. The SUT's can range from domestic and foreign aircraft/ground vehicles positioned in the shielded hangar/



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ramp area and the anechoic chamber to individual avionics components positioned within in 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 SST instrumentation system provides the following capabilities to the customer:

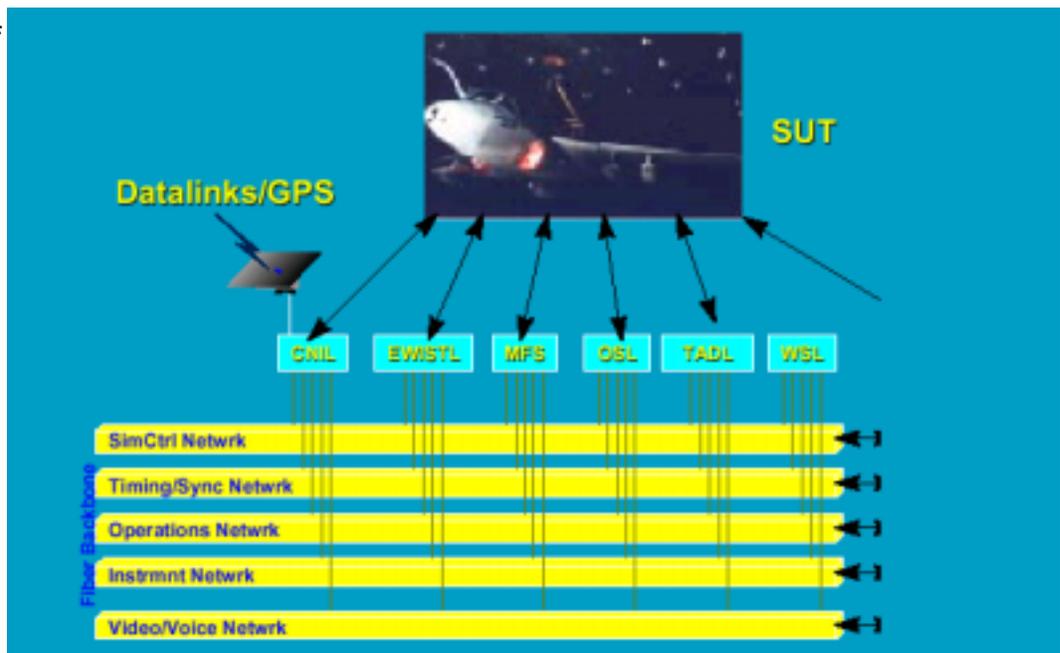
- PCM Telemetry
- MIL-STD-1553 Simulation
- MIL-STD-1553 Monitoring
- ARINC-429
- Analog/Digital Input/Output
- Serial/Parallel Input/Output
- IRIG Time Decode/Generation
- SCSI Recording
- Voice/Video Recording Simulation of Virtually Any Real-Time Input Data Stream

The instrumentation system is also 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 will consist of multiple streams of data bus activity from a SUT being simultaneously displayed and recorded as it interacts with a run-time simulation called Simulated Warfare Environment Generator (SWE). The instrumentation system is also capable of interfacing and simulating multiple systems on the SUT. Example of this is the simulation of the Inertial Navigation System (INS) and Air Data Computer (ADC) systems on tactical aircraft to simulate flight.

## Distributed Network Environment

A distributed network environment providing 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. The largest of these projects included 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, this distributed network exercise successfully demonstrated the feasibility of applying distributed simulation/stimulation-based test and evaluation capabilities. ACETEF has removed many of the limitations associated with traditional distributed interactive simulation systems by demonstrating how distributed simulations, real systems, real aircraft, and man-in-the-loop devices can interact in a single conflict simulation.



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