Real-time Telemetry Processing System

The Real-time Telemetry Processing System (RTPS) is recognized throughout the flight test community as an essential productivity and safety of flight tool. It has handled tens of thousands of flights for virtually every Navy test program since 1973. Telemetry, the invisible link between aircraft and ground station, transfers results from complex measuring instruments on test aircraft to a team of flight test engineers at any of nine Project Engineer Stations (PES).

PROJECT ENGINEER STATIONS

Real-time telemetered and calculated results are available in many formats on numerous devices. In the PES, flight test results are displayed on computer screens with latencies below the refresh rate of the screens (~20 milliseconds) and strip charts with latencies below one millisecond. Each PES room can handle an aggregate data rate of 1.8 mega samples per second. Multiple display and analysis applications have "every sample no redundant sample" access to the data. Laser printers provide report-quality hard copies.

All measurement routing definitions and application program assignments are interactively entered at the PES, usually in a preflight session. These may be permanently retained for future flights and/or playbacks. Definitions and/or assignments may be reviewed and changed during the flight.

The RTPS PES rooms also support the Interactive Analysis and Display System (IADS). IADS is the primary display and analysis tool for the F-35 Joint Strike Fighter program and will be available to all RTPS customers.

RTPS Project Engineer Station

RTPS PES data display

RTPS PES data display

REMOTE SITE SUPPORT

ATR supports detachments aboard aircraft carriers and land-based sites, such as NAVAIR Lakehurst, with personnel and portable telemetry handling systems that provide the same advanced features as the home system at the NAS Patuxent River Cedar Point Complex.

FOR MORE INFORMATION

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GENERIC APPLICATIONS SOFTWARE

RTPS applications software is customized for each project, no matter how varied the test requirements. The Telemetry Systems Branch has developed hundreds of computational functions, dozens of display types and many major specialty packages, most notably the highly sophisticated flutter analysis package. The current version, RTPS IV, increases the capacity for executing these programs substantially in multiple dimensions. The versatility of the system is further enhanced by IADS.

POST-FLIGHT DATA DISTRIBUTION

RTPS IV provides rapid turnaround of test results. The data recall capability available in the PES is also provided to post-flight users. A Desktop Data System provides tools for data handling and enhances the heavily used Web-based data access tools along with third party analysis tools such as MatLab and Omega Data Environment (ODE).

SYSTEM ARCHITECTURE AND DATA LINKS

RTPS consists of nine independent systems, or "streams," configured in a loosely coupled network with a common file system. Each stream is composed of an L3 Communications 550 Telemetry System, Silicon Graphics and Intel-based PC servers and graphics workstations connected together via reflected memory network. Any of the streams can be disconnected from the network to run in a stand-alone configuration to accommodate classified operations.

Two PES rooms are located in the ATR Secure Annex, rated up to Top Secret. RTPS data can be routed to the Range Computation and Control System (RCCS) from any of the PES rooms to drive three-dimensional displays in the RCCS control room. The Presidential Helicopter program included two smaller PES rooms in their hangar that are extensions of RTPS.

Real-time data is available to and from other test facilities. A permanent 12-meter, C-band satellite earth station or alternate connectivity through the Defense Resource Engineering Network (DREN) can provide telemetry, voice, time and range data to any other facility with earth station access. Test data can concurrently be ingested from other facilities. Post-flight satellite communications of recorded data is also supported. Connections are available for data exchange with the Air Combat Environment Test and Evaluation Facility (ACETEF) and Manned Flight Simulator (MFS) at Patuxent River.

RTPS IV CAPABILITIES

- Nine independent 34' x 32' Project Engineer Stations.
- Capable of handling Secret and Top Secret projects
- Seating capacity: 40
- Four wall-mounted 50-inch, flat-panel plasma displays
- IADs compatible
- Computing power for complex analysis routines
- Data throughput for EU and derived measurements at 1.8 mega samples per second
- Pulse Code Modulation (PCM) transmission: 4 PCM Streams at 30 megabits per second
- External Links:
- Air Combat Environment Test and Evaluation Facility
- Manned Flight Simulator
- Range Control Center
- West Coast Ranges
- Recall of all telemetry and derived data at each workstation for in-depth inter-maneuver analysis.
- Fully compatible with remote site systems (e.g. carrier, Lakehurst)
- Video routing capability allows any room display or external video source to be viewed at any of the consoles
- Each workstation provides independent real-time analysis and display
- Ability to convert from one project to the next in a matter of minutes
- Handles more than 20 highly complex flight tests a day