An Integrated Test Environment for Systems Engineering

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What is OSEE's OTE Framework?

- The Open System Engineering Test Environment (OTE) is a framework for requirements-based testing in the context of an overall systems engineering approach
- OTE has been used commercially to qualify mission software for Boeing's next generation Apache Attack Helicopter
- Being contributed as a component of the Open System Engineering Environment (OSEE) Eclipse project
- Facilitates seamless flow between test development, debugging, execution, and result analysis

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Integrated Requirements-Based Testing

- Bidirectional traceability between software requirements, application code, and tests is provided through OSEE Application Framework
- Coverage holes detection via traceability
- Action Tracking System identifies test impacts driven by requirement changes
- Test development status tracking
- Detailed, integrated test status and coverage reporting

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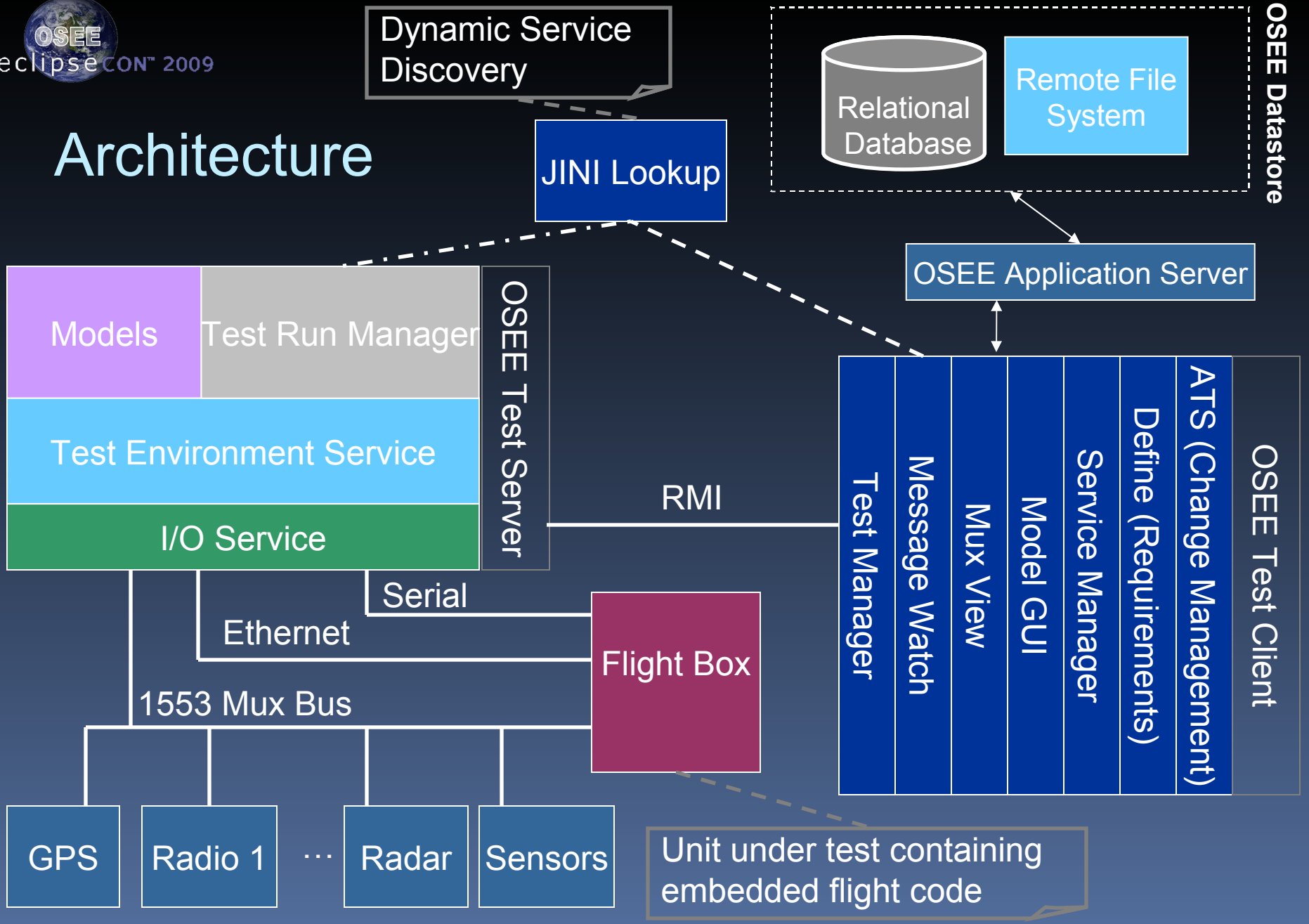
Architecture



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Test Environment Service

- Provides dynamic lookup of resources
- Provides both soft real-time and simulated capabilities
- Schedules periodic execution of models (simulation components)
  - API for easy creation of simulated components
- Supports a user configurable number of simultaneous client connections
- Manages I/O and testing resources

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Extensible Real-time Messaging System

- Supports communication with real hardware via
  - MIL-STD-1553 MUX
  - Serial
  - Wire
  - Analog and Digital discretes
  - Publish/Subscribe Data Distribution Service (DDS) through Ethernet

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Real-time & Simulated Functional Testing

- Simulated Environment (eases demand on limited test station hardware resources)
- Tests (without modification of any kind) can be run in both soft real-time and simulated environments (simultaneously, if desired)
- Simulated components can be used with both environments
- Streaming automated test point tally and rollup of pass/fail determination
- Interactive Testing (automated tests with user input)

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Test Manager

- Provides a common interface for functional tests in real-time and simulated environments across all levels of testing fidelity
- Test results streamed in real-time from test service to test manager
- Create, save, and load run lists
- Integrated with JDT/CDT debugger
- Lists available test services that can be used to run test files
- Real-time display of test service usage information
- Supports the execution of multiple simultaneous batches within a single workspace

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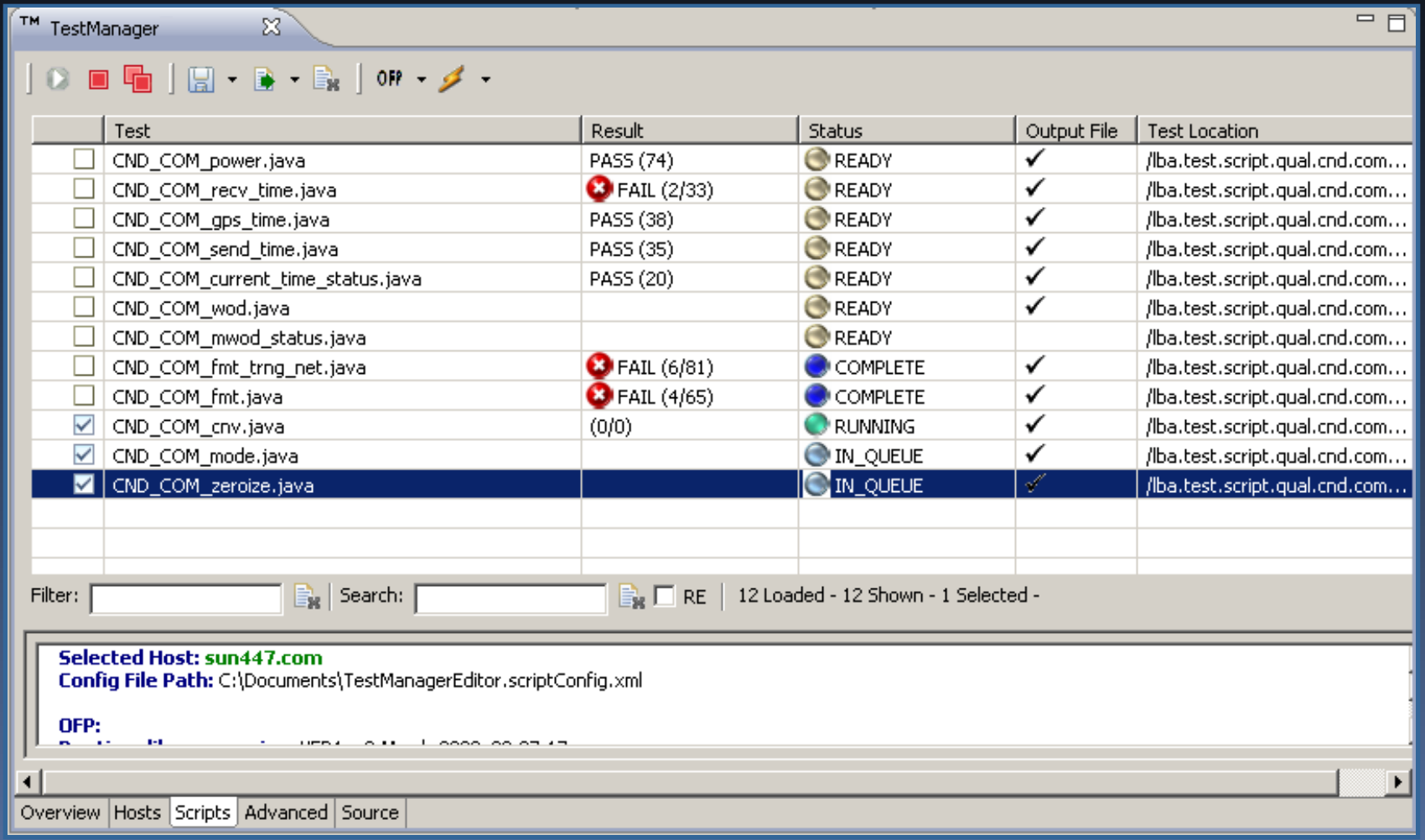
Test Manager



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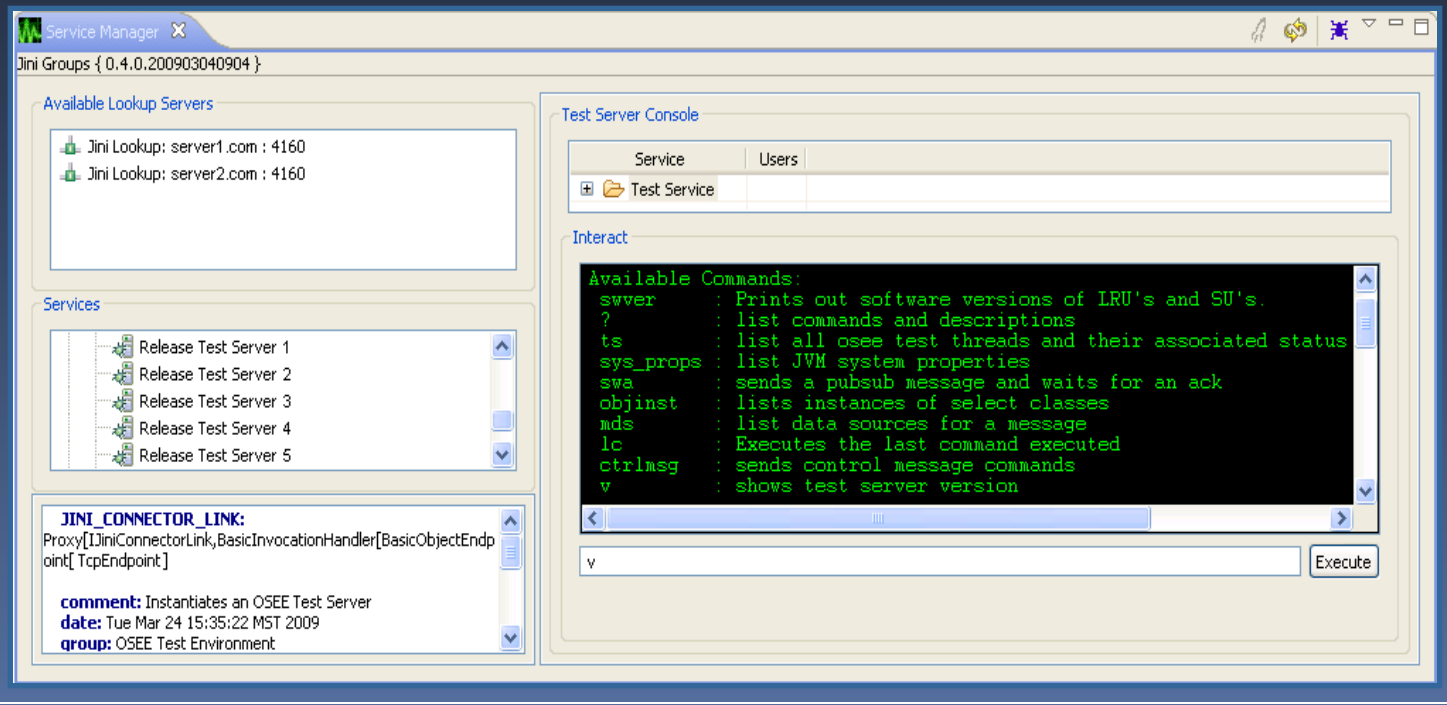
Service Manager

- Integrated test server resource management
- Remote viewing and manipulation of test service



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Test Output

- Test output file format is XML
- Interactive out files (user can navigate the out file)
- User selectable views of out files
- Automatic correlation of a run-time test point to the test source line that generated it (integrated into JDT using problem view and markers)
- Full test output can be stored in the OSEE object-oriented persistence layer for later analysis and results summary and reporting

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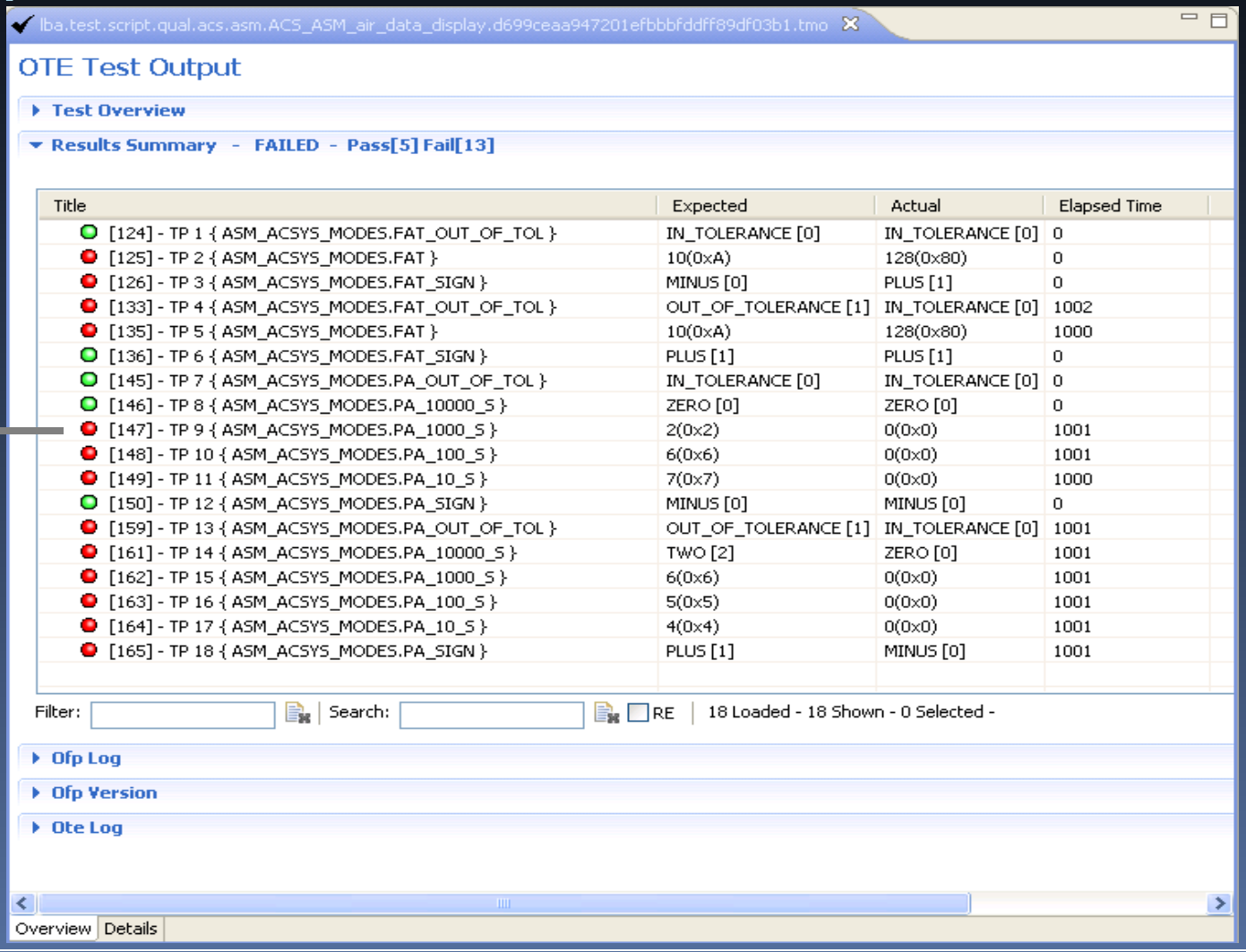
Test Output Editor

Test points linked to test code that generated



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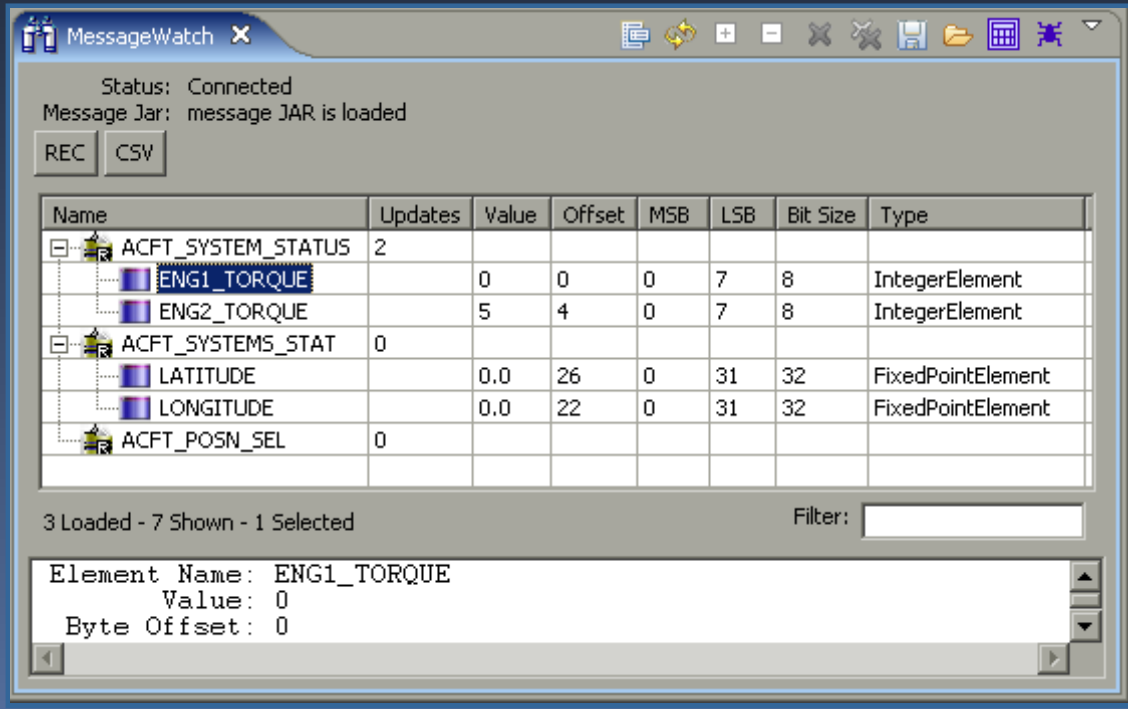
Messaging and Playback GUIs

- Monitor, manipulate and record real-time messaging data
- Advanced regular-expression searching for messages
- Import/Export view lists
- Playback environment
  - Supports advanced debugging of the test environment using repeatable conditions
  - Investigate real flight recordings



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Questions?

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