NASA IV&V Independent Test Capability

2011

**Project Support**

- AFSS
  - Acquire and setup AFSS test configuration
  - AFSS spare flight chassis
  - Selected COTS test coverage software
  - Developed reusable mechanism to generate system test coverage using socket

- GPM
  - GPM Operational Simulator Components
    - AVSS Ground System Interface
    - Wind River Simics
    - Instrument Simulators (AVSS, GNS)
    - ITC Synchronous Bus - SSC communications
  - GO-SIM Features
    - Uses and contracts radiology error matrix
    - Error injection
    - Single-step debugging
    - Inject errors via ground system
    - System under test
    - Eliminate linkage from other IV&V analyses

- MPCV
  - Secrate-Sim Simulation Components
    - GO-SIM Features
    - Software-only flight simulator
    - Flight software insertion
    - Provides mechanism to test MPCV flight software for IV&V
  - Secrate-Lite Simulation Components
  - Secrate-Heavy Simulation Components
  - Secrate-Lite Simulation Components
  - Secrate-Hard Simulation Components

- JUNO
  - JUNO IV&V SUBSIM investigation

- JWST
  - JWST Software
    - Science Instrument Development Unit (SIDU)
    - Hardware-in-the-Loop Test Environment
    - Components
      - COTS PowerPC Board
      - 1553 Cards
    - Spacewire Test Set (SWST)
    - ASIST / Eclipse Ground System

**ITC Framework**

**Current Features**

- Launch and monitor simulations (GOSSIM, JUNO)
- Track and view data
- Watch Window
- Inject Fault Data
- Data logging
- Visualization Software Integration

**Jon McBride Software Testing and Research “JSTAR” Laboratory**

**Objectives**

- Software and test environment development by ITC Engineers
- Testing by IV&V analysts
- Using IV&V developed test environments
- Using various tools
- Tools support (SWAT)
- Perform evaluations test tools (new, upgrades)
- Perform acceptance testing of tools
- Training Environment

**Lab Foundation = Server and Desktop Virtualization**

**Tools**

- Wind River Workbench 3.9
- Wind River Test Davis / JModel

**Virtual Images**

- Wind River Simics 4.4
- GPM Ground System (Sammi Linux)
- AVSS-Ground System
- MIBS Subscription
- Tornado CoreOS version 5 (x86_64)
- LLDB ToolsBox
- RealTime Enterprise 5 (x86_64)
- IBM Rational Synergy
- Ubuntu 10.4
- IBM Rhapsody
- ISS MADE

**Projects**

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**Understand for C/C++**

- Secrate Lite & Heavy (April 2011 ver)

**Support**

- Establish Jon McBride Software Testing and Research (JSTAR) Laboratory
- Become Experts in Simulation for IV&V Program and NASA
- Support Every Project in the IV&V Program for Five Years

**Validate Other IV&V Findings**

- **Measureable**
- **Repeatable**

**Independent Testing Value**

- **Unbiased**
- **Q2 and Q3**

**Develop Core Expertise in Testing**

**Team Members**

- Justin Morris
- Brandon Bailey
- Shawn Garrett

**ITC Laboratory**

http://itc.ivv.nasa.gov