DSG-R&D CS-Studio Phoebus Meeting Minutes

Date: March 1, 2024
Time: 2:00 PM – 3:00 PM

Attendees: Peter Bonneau, Aaron Brown, Pablo Campero, Tyler Lemon, and Marc McMullen

1. EIC DIRC Phoebus Alarm System Test

Peter Bonneau

1. Discussed the three parts of the Phoebus alarm system test (Fig. 1), with the EIC DIRC laser interlock system, that are being developed and individually tested
    - An NI cRIO EPICS client that digitizes the TTL laser interlock status signals from the interlock enclosure
        - To write and debug the alarm software without requiring the NI hardware, an EPICS-based laser interlock signal simulator was developed and tested
    - The EPICS softIOC server, which hosts the laser interlock PVs, stores the alarm limits, and generates alarms if PVs meet or exceed limits
    - The Phoebus alarm system software packages and alarm applications. The alarm system is an EPICS client that monitors PVs on the network sourced by software and hardware IOCs via EPICS channel access
2. Discussed how this three-part test system simulates a typical EPICS-based experimental system configuration for the halls
    - When alarm system is integrated into an experimental system for the halls, the EPICS IOCs and the alarm system are in separate hardware and computers and communicate via the network

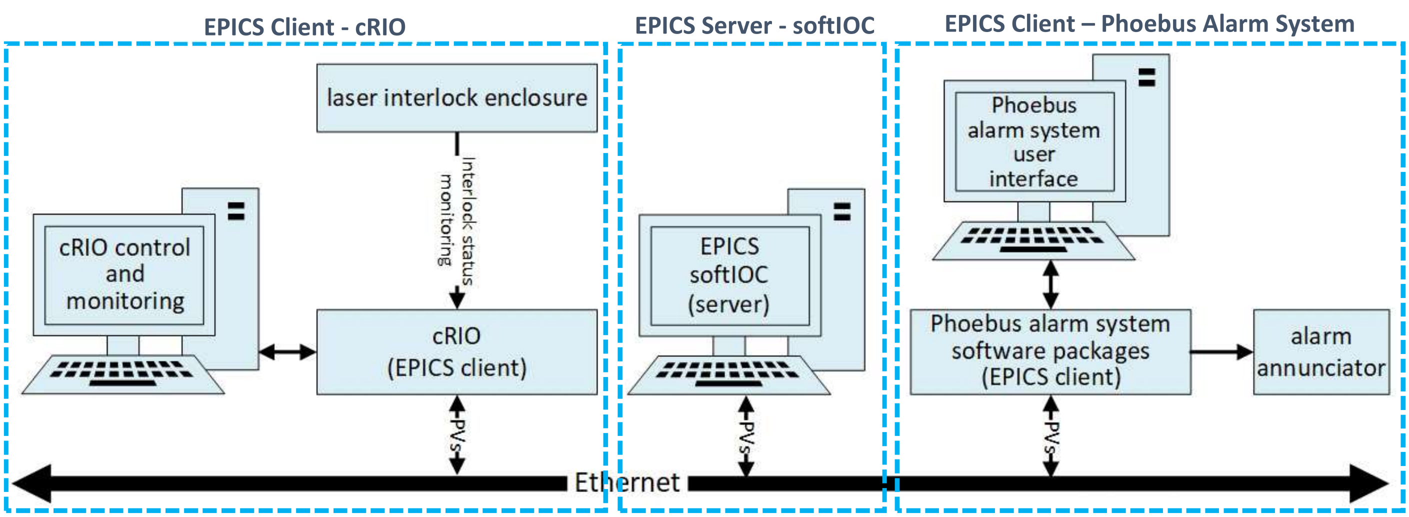


FIG. 1. Phoebus Alarm System Test Setup with EIC DIRC Laser Interlock

2. EIC DIRC Demonstration - Phoebus Alarm Distributed System Test

Peter Bonneau

1. To verify the distributed communication and interaction between the software and hardware components used in EIC DIRC Phoebus alarm system, a distributed system test has been developed
   - As done in the completed EIC DIRC Phoebus alarm system, the software and hardware components are distributed and communicate through the Ethernet network (Fig. 2)

2. For the demonstration of the Phoebus alarm distributed system test, a MS Windows computer running Zoom connects via three individual Windows remote desktop connections to the three Linux computers used for the test

3. Separated into three parts, each part is run on its own Linux computer connected together by a common Ethernet switch. Linux #1 (Fig. 2), runs the laser interlock signal simulator. The simulator produces the laser interlock status signals

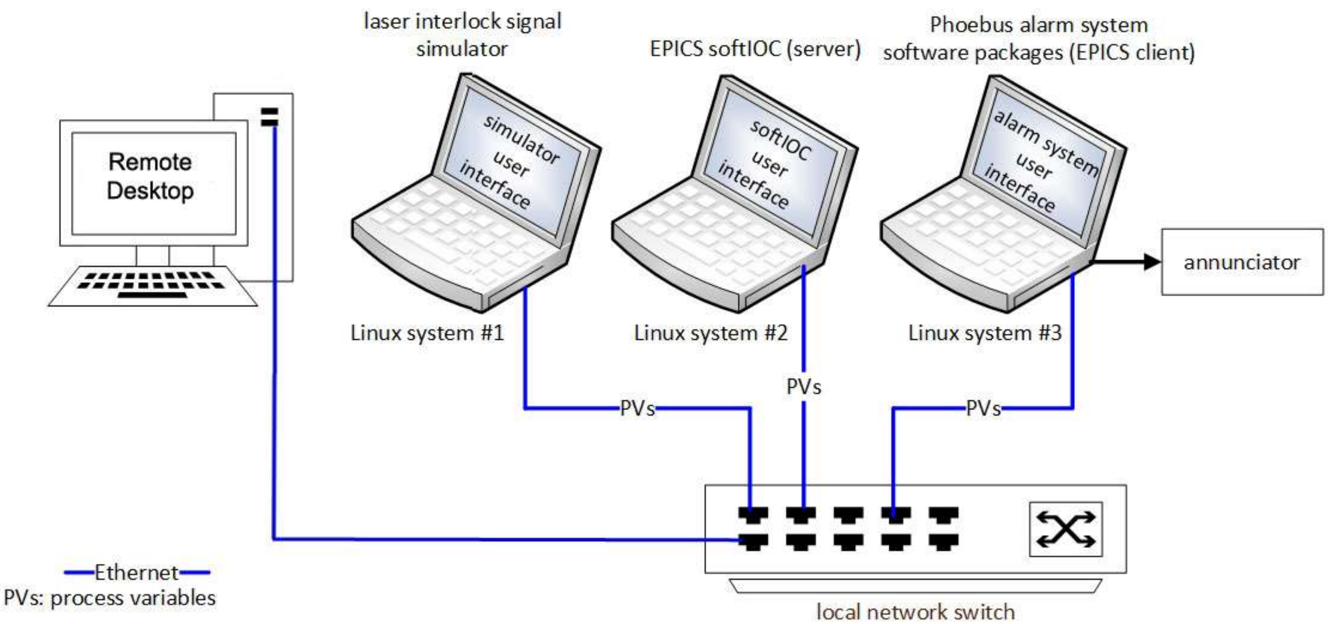


FIG. 2. EIC DIRC Laser Interlock - Phoebus Alarm Distributed System Tests

4. Via the remote desktop connection to Linux #2, the softIOC for the EIC DIRC test was started. Running as an EPICS server, it hosts the PV values provided by the simulator. SoftIOC also stores the alarm limits and generates alarms if PVs meet or exceed limits

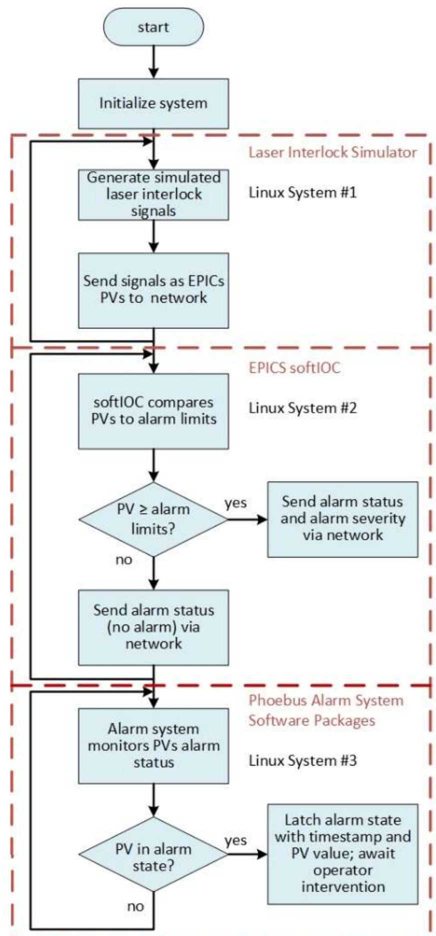
5. Via the remote desktop connection to Linux #3, the Phoebus alarm system software packages and the Phoebus applications are run. Operating as an EPICS client, the Phoebus alarm system monitors the EPICS PV laser interlock status signals. If a PV alarms, the value of the PV is captured by the alarm system with the timestamp of the occurrence

6. Table 1 summarizes the software functions distributed over the three Linux computers in the test. The EIC DIRC alarm distributed system test program flow diagram summarizes the EPICS PV alarm generation and monitoring by the Phoebus alarm system

Linux System	Software	Function
Linux System #1	Laser interlock signal simulator	• Generates simulated laser interlock signals as EPICS PVs (EPICS client)
Linux System #2	EPICS softIOC (Server)	• Stores EPICS alarm limits • Generates alarms if PVs exceeds limits • EPICS PV server for clients
Linux System #3	Phoebus Alarm System	• Monitors EPICS PVs for alarm conditions • Latches PV value with timestamp if in alarm • Alerts users via user interface and annunciator

TABLE 1. Summary of EIC DIRC Phoebus Alarm Distributed System Test

- In addition to the alarm software packages, Linux #3 runs the Phoebus alarm and display applications
- Once the three Linux systems are operation, the Phoebus main application window is started, and the layout file *EIC-DIRC-TEST-V1* is run



EIC DIRC Phoebus Alarm Distributed System Test Flowchart
Mary Ann Antonioli
2/21/24

7. The layout file automatically starts Phoebus alarm system programs
   - Phoebus display for the laser interlock signal simulator monitoring and control
   - Phoebus alarm system table
   - Phoebus alarm system status tree
   - Phoebus alarm system signal summary
   - User interface for the laser interlock signal simulator and the PVs and EPICS alarm

8. Test was concluded upon the verification of PV alarm generation and detection by the Phoebus alarm system when interlock PVs meet or exceed EPICS user-defined limits (Fig. 3)

PV name	Value [V] Read	HIHI set	HIHI read	HIGH set	HIGH read	LOW set	LOW read	LOLO set	LOLO read	Alarm status	Alarm severity
eic_dirc_intlk_real_time_stat	4.00	2.00	2.00	1.99	1.99	-0.01	-0.01	-0.02	-0.02	HIHI	MAJOR
eic_dirc_intlk_latch_stat	4.00	2.00	2.00	1.99	1.99	-0.01	-0.01	-0.02	-0.02	HIHI	MAJOR

FIG. 3. Verification of Laser Interlock Signal Simulator and EPICS PV Alarm Limits

3. EIC DIRC Phoebus Alarm System Test - Hardware Configuration and Programming

Tyler Lemon and Mindy Leffel

1. Discussed the hardware assembly status
   - Received the interconnect cable needed for between the laser interlock enclosure and the cRIO
   - The LabVIEW software has been loaded onto the cRIO controller