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**ATLAS CSS BOY Operator Interface Requirements Specification**

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# INTRODUCTION

An operator interface for the Argonne Tandem Linac Accelerator System (ATLAS) utilizing Control System Studio Best Operator Interface Yet (CSS BOY) is required to control and monitor the ATLAS hardware.

## Purpose

This document describes the design requirements of the operator interface for the ATLAS project. The interface is a GUI built on an Eclipse framework called CSS BOY which will interface with EPICS.

## Scope

The interface will be built using CSS BOY from <http://ics-web.sns.ornl.gov/css/products.html> . Although system interfaces are common at Argonne, the use of CSS BOY is new and therefore may require insight into system limitations and deployment structure. Because many of the widgets and display components for ATLAS have already been chosen, the interface will be designed with these specific components in mind.

## Assumptions and Constraints

### Assumptions

Before the operator interface design can begin, the specification requirements document must first be completed and all interested parties must agree to the information contained herein.

Functional testing of the operator interface can be performed using an EPICS soft IOC. Can we access the ATLAS soft IOC?



### Constraints

Time constraints?

## Document Overview

The design methodology will be briefly described before presenting the details of the functional requirements. A section for other requirements will be presented.

The appendices include a glossary of terms used throughout this document as well as interface design diagrams.

# DESIGN METHODOLOGY

# FUNCTIONAL REQUIREMENTS

## User Requirements

## Operator Screen Requirements

### LLRF4 Registers

Highlighted PV’s from all\_params.adl should be shown on the Operator screen with buttons, readbacks, or sliders. There are 32 register labels, and 32 highlighted PV’s with buttons/sliders. An additional 14 PV’s are highlighted displaying their values (readbacks?). What to do with these 14?

### Buttons

OPERATOR: front.opi Is this button really needed ?

EXPERT: expert.opi, formerly all\_params.adl

DATA BUFFER: history.opi, formerly phase\_ampl\_1.adl

SEL MODE: ?

XGUI: ?

### Plots

The waveforms contain 1024 elements.

The top display should utilize:

$(TS)LLRF4:STATS0:S1\_ampl\_s\_wf

$(TS)LLRF4:STATS0:S1\_phase\_s\_wf

$(TS)LLRF4:STATS0:S2\_ampl\_s\_wf

$(TS)LLRF4:STATS0:S2\_phase\_s\_wf

The bottom display should utilize:

$(TS)LLRF4:STATS0:S3\_ampl\_s\_wf

$(TS)LLRF4:STATS0:S3\_phase\_s\_wf

$(TS)LLRF4:STATS0:S4\_ampl\_s\_wf

$(TS)LLRF4:STATS0:S4\_phase\_s\_wf

### RF Manual Controls

AMPL: $(TS)LLRF4:DRV0:out\_amp\_set\_ao

PHASE: $(TS)LLRF4:DRV0:out\_amp\_set\_ao

CAVITY TUNING: ?

FREQ OFFSET: $(TS)LLRF4:DRV0:ou\_freq\_set\_ao

CAV FLD: ?

FWD PWR: ?

REV PWR: ?

### Frequency Auto Scan

## Expert Screen Requirements

## Data Buffer Screen Requirements

CSS BOY strip charts.

## Do you not want us to do anything with XGUI?

# OTHER REQUIREMENTS

# Software Interfaces

Currently there is not an interface control document which specifies the software interfaces but for APS all interfaces would be compatible with other APS project applications and would use the EPICS software toolkit which would be developed, deployed, and maintained by the AES Controls Group.

# Communications Interfaces

This control shall be capable of communicating information to and from the system via the LAN using the EPICS Channel Access (CA) communication protocol.

# Hardware/Software Requirements

If a soft IOC were to be used then the system would require an already existing workstation for the IOC to run on; however, if other hardware I/O were to be required then the hardware platform would most likely be the standard APS VME64x rack mounted crate manufactured by Dawn VME Products. The workstation would likely be running Red Hat Linux Enterprise operating system while the VME crate would run the vxWorks operating system; both are compatible with EPICS.

# Operational Requirements

This control system must be operational 24/7 during ATLAS experiments.

# System Reliability

1. A single Eclipse workspace can not be opened in more than one session at a given time. This could pose a challenge if multiple users need to access the interface simultaneously.

# Recoverability

The foreseen failure modes of this system are related to hardware, software, and computer issues; including PV gateway problems. In the event that the system is unavailable to the user due to system failure either hardware or software system recovery must be performed in a timely manner consistent with APS call-in procedures for system recovery and repair.

In the event of a power outage all systems should be powered on with the power supply currents at zero amp output.

A clear role of system component responsibility must be conveyed to those that will be responsible for the equipment required to operate the device.

# Error Handling

Any system errors should be handled automatically by the control system in a failsafe way whenever possible.

# CONVENTIONS AND STANDARDS

All data formats and communication interfaces shall be IEEE compliant.

# APPENDIX A - Glossary

CSS BOY – Control System Studio Best Operator Interface Yet

EPICS – Experimental Physics Industrial Control System

GUI – Graphical User Interface

MEDM – Motif Editor Display Manager (Standard APS EPICS Display Screens)

PV – Process Variable (Specific value in EPICS database)

# APPENDIX B - Figures



Figure 1: SCU ID Electrical Connections