Southern Africa Large Telescope

Prime Focus Imaging Spectrograph

Rutgers Etalon Subsystem

Interface Control Document

Revision 1.3
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1 Scope

This document specifies the interfaces between the UW-Madison part of the Prime Focus Imaging Spectrograph (PFIS) and the Rutgers-supplied Etalon subsystem. The interfaces are optical, mechanical, electrical, cryogenic, pneumatic, software, and communications. Figure 1 shows the PFIS/SALT block diagram.

Note that PFIS presents a single interface to the facility. Resources required by the PFIS subsystems (detector assembly and the etalons) are routed from the PFIS interface within the instrument. This is required for designing the PFIS wire harness.
2 Optical
This section specifies the optical interface between the PFIS and the Etalon subsystem.
Figure TBD shows the optical design of the PFIS.
The optical interface between PFIS and the Etalon subsystem is defined to be TBD.

2.1 Collimation
The degree of collimation at the optical interface is TBD.

3 Mechanical
This section specifies the mechanical interface between the PFIS and the Etalon subsystem.
Figure TBD shows the mechanical design of the PFIS.

3.1 Weight Budget
The Etalon subsystem has a weight budget of TBD kg per Etalon assembly.

3.2 Envelope
Figure TBD shows the mechanical envelope for the Etalon subsystem.

3.3 Center of Gravity
Each Etalon assembly can be in two states, in or out.
When in, the CG of each Etalon assembly must lie within a volume of TBDxTBDxTBD mm, measured TBD with respect to its mount point.
When out, the CG of each Etalon assembly must lie within a volume of TBDxTBDxTBD mm, measured TBD with respect to its mount point.

3.4 Mount Point
Figure TBD shows PFIS mount point for an Etalon assembly.

3.5 Handling Fixtures
The Etalon assemblies shall accommodate cranes and hoists with suitably placed 1/2-13 threaded holes. Their location will depend on the detailed mechanical design, but should allow the Etalon assemblies to be lifted in an attitude suitable for integration with the PFIS structure.
3.6 Shipping Container
The Etalon subsystem shall be delivered to UW in a container suitable for reuse in shipping the Etalon subsystem to South Africa. The shipping container(s) shall provide for the safe transport of the Etalon assemblies and all components and optical elements, and any tools and fixtures required to assemble, install, remove, and disassemble the Etalon subsystem.

The shipping container will be suitable for any combination of road, rail, air, or sea transportation.

4 Electrical
This section specifies the electrical interface between the PFIS and the Etalon subsystem.

4.1 Electrical Power
Electrical power is provided by the facility and is described in the PFIS-PFIP ICD.

4.2 Electrical Connectors
The Etalon subsystem shall use the same style electrical connectors as PFIS. The type is TBD.

4.3 Signal Connectors
Each Etalon assembly has two signal connectors, one for the Queensgate controller cable and one for controlling the insertion mechanism.

The mechanism control connector type is TBD. Table TBD shows the pinout.

5 Cryogenic
There are no cryogenic requirements for the Etalon subsystem.

6 Pneumatic
This section specifies the pneumatic interface between the PFIS and the Etalon subsystem.

The Etalon subsystem will use pneumatic control for the etalon mechanisms. The air is provided by the facility, and is described in the PFIS-to-PFIP ICD.

6.1 Pneumatic Connectors
The Etalon subsystem shall use the same style pneumatic connectors as PFIS. The type is TBD.
7 Computers and Communications
This section specifies the computer and communications interface between the PFIS and the Etalon subsystem.

The Etalon subsystem will be controlled with LabView on a Linux PC with a PCI backplane.

The Etalon assemblies will be controlled with a Queensgate etalon controller over a proprietary Queensgate cable.

The Queensgate etalon controller will be controlled from the PC on a RS232 line.

The Etalon Assembly mechanisms will be actuated with motors or pneumatics (TBD). In either case, the control will be through a PCI card interface compatible with the control interfaces used for the other PFIS mechanisms. The PFIS and Etalon subsystem PIs will agree on a controls plan that is acceptable to both teams.

8 Software
This section specifies the software interface between the PFIS and the Etalon subsystem.

The Etalon subsystem will be controlled with LabView on a Linux PC, and the Etalon subsystem PI will provide a LabView Virtual Instrument (VI) for the Etalon subsystem.

We anticipate that no C code will be needed to control the Etalon subsystem.

8.1 Commands
The Etalon subsystem will execute the following commands.

☐ Etalon 1/2 in/out

☐ Etalon x/y/z set (set tip/tilt/gap to new values)

☐ Etalon x/y/z adjust (adjust previously sent values)

The Etalon LabView VI will provide all suitable software interlocks to prohibit any commanded operation from performing an illegal operation. In no instance will it be possible to damage any component with any combination of commands.

8.2 Telemetry
The Etalon LabView VI shall provide, via standard LabView methods, the following information.

☐ Etalon 1/2 position/status

☐ Subsystem status (includes error status for illegal commands, etc)