Southern Africa Large Telescope

Prime Focus Imaging Spectrograph

SAAO Detector Subsystem

Statement of Work

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1 Scope
This document is the Statement of Work between the University of Wisconsin-Madison and the South African Astronomical Observatory (SAAO). It specifies the work to be done by SAAO in connection to the UW's Prime Focus Imaging Spectrograph (PFIS).

2 Schedule
The Detector subsystem PI shall provide a schedule, compatible with Microsoft Project 2000, to the PFIS project manager. The initial delivery shall occur 1 month before PDR, and shall be updated each quarter.

3 Budget
The Detector subsystem PI shall provide a budget to the PFIS project manager. The initial delivery shall occur 1 months before PDR, and shall be updated each quarter.

The budget shall show costs of materials, labor, capital equipment, and overhead, broken down by quarter.

4 Work
The Detector subsystem PI agrees to perform the following work.

4.1 Detector Subsystem
1. Design and build a cryogenically-cooled detector housing
2. Integrate the PFIS CCD detectors into the detector housing
3. Integrate the detector housing with an SDSU II Array Controller and Power Supply
4. Characterize detector subsystem performance
5. Provide a LabView virtual instrument control software for the subsystem

4.2 Integration, Test, & Operations
1. Support integration of the Detector subsystem into PFIS
2. Support laboratory testing of the Detector subsystem in PFIS
3. Support commissioning of the Detector subsystem of PFIS at SALT
4. Write observing software for the Detector subsystem
5. Write data reduction software for Detector subsystem observations up to the point where detector-specific calibrations (dark frames if relevant, bias frames and flat fielding) are employed. Further reductions, such as wavelength calibrations, or standard star observations are outside the scope of the work.
4.3 Other

1. Participate in PDR and CDR
2. Consult on commissioning science observation program for PFIS
3. Prepare a scientific paper describing the Detector subsystem if deemed sufficiently meritorious, or co-author a paper on the instrument as a whole and contribute the section describing the Detector subsystem.

5 Documentation

This section specifies the documentation to be supplied to UW-Madison with the Detector subsystem. Text documentation shall be provided in MS Word or PDF format. Mechanical drawings shall be provided in an electronic format compatible with Autocad release 14.

Table 1 shows the delivery dates for certain documents. Documentation described below but not included in Table 1 due with the delivery of the Detector Subsystem to UW-Madison.

Table 1: Document Delivery Schedule

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Delivery Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of Work</td>
<td>Draft</td>
<td>PDR – 4 weeks</td>
</tr>
<tr>
<td>UW/SAAO ICD</td>
<td>Draft</td>
<td>PDR – 4 weeks</td>
</tr>
<tr>
<td>FPRD</td>
<td>Draft</td>
<td>PDR – 4 weeks</td>
</tr>
<tr>
<td>OCDD</td>
<td>Draft</td>
<td>PDR – 4 weeks</td>
</tr>
<tr>
<td>PDR Documents</td>
<td>Draft</td>
<td>PDR – 3 weeks</td>
</tr>
<tr>
<td>UW/SAAO ICD</td>
<td>Final</td>
<td>PDR + 8 weeks</td>
</tr>
<tr>
<td>FPRD</td>
<td>Final</td>
<td>PDR + 8 weeks</td>
</tr>
<tr>
<td>PDR Documents</td>
<td>Final</td>
<td>PDR + 8 weeks</td>
</tr>
<tr>
<td>OCDD</td>
<td>Final</td>
<td>CDR – 6 weeks</td>
</tr>
<tr>
<td>Acceptance Test Plan</td>
<td>Final</td>
<td>CDR – 6 weeks</td>
</tr>
<tr>
<td>Commissioning Test Plan</td>
<td>Final</td>
<td>CDR – 6 weeks</td>
</tr>
<tr>
<td>CDR Documents</td>
<td>Draft</td>
<td>CDR – 3 weeks</td>
</tr>
<tr>
<td>CDR Documents</td>
<td>Final</td>
<td>CDR + 8 weeks</td>
</tr>
</tbody>
</table>
5.1 Functional Performance and Requirements Document (FPRD)

The Detector subsystem PI shall provide a Functional Performance and Requirements Document (FPRD) that states the end-item performance specifications, and a verification matrix showing the method of verification of each performance specification.

The PI shall provide the FPRD as indicated in Table 1.

5.2 Operational Concept Definition Document (OCDD)

The Detector subsystem PI shall provide an Operational Concept Definition Document (OCDD) describes the operational scenarios relevant to using the Detector subsystem. The PI shall provide the OCDD as indicated in Table 1.

5.3 Acceptance Test Plan

The Detector subsystem PI shall provide an acceptance test plan suitable for demonstrating correct operation of the Detector subsystem. The acceptance test will be run at SAAO before shipping to UW, at UW after shipping from SAAO and during integration, before shipping to South Africa, and again after arriving in South Africa.

The plan shall be suitable for verification of correct operation as well as diagnosis of problems, in so far as they can be carried out in each location.

The Detector subsystem PI shall provide Acceptance Test Plan as indicated in Table 1.

5.4 Commissioning Test Plan

The Detector subsystem PI shall provide a commissioning test plan suitable for demonstrating compliance with the FPRD and SOW.

The Detector subsystem PI shall provide Commissioning Test Plan as indicated in Table 1.

5.5 Optical Specifications and Drawings

The Detector subsystem documentation shall include specifications for all optical components. (Jeff, this can only include the cryostat window so I would suggest putting this in your next section).

5.6 Mechanical Specifications and Drawings

The Detector subsystem documentation shall include the definition of all mechanical components and subsystems. COTS entities will be defined by supplier details and proprietary parts numbers. Custom components and assemblies will be defined by ACAD14 compatible drawings. Assembly drawings will be of sufficient detail to enable a competent technician to interpret them.
5.7 Electrical Specifications and Drawings
The Detector subsystem will include both COTS and custom electronics. The custom electrical specifications shall include voltage, current, peak and average power.

5.8 Parts Lists
The Detector subsystem documentation shall include a complete description of materials, parts and components.

5.9 Wiring Lists
The Detector subsystem documentation shall include a complete description of all internal wiring, all wiring diagrams, and wire lists describing every cable and connector.

5.10 Software Modules and Listings
The Detector subsystem documentation shall include all software listings in electronic format.
The documentation shall include a software block diagram showing the relationship of software modules, and describe all inputs and outputs for each module.
Also included are all test procedures for component and subsystem-level testing and verification.

5.11 Vendor Data Sheets
The Detector subsystem documentation shall include vendor data sheets and specifications for all commercially supplied components.

5.12 Assembly, Shipping & Installation
The Detector subsystem documentation shall include manuals that describe the assembly (and disassembly) of the Detector subsystem, how to pack and ship it, and how to install it into the PFIS.

The Detector subsystem documentation shall include a user's manual describing all operational aspects of the Detector subsystem and its calibration.

5.14 Maintenance Manual
The Detector subsystem documentation shall include a maintenance manual. The manual shall contain procedures for periodic maintenance and troubleshooting.