Southern African Large Telescope
SALTICAM
Preliminary Design Review

Document Number 3300AE0007:
Management Structure

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Table of Contents

1 Introduction 3
2 Organization Chart And Staff Effort/Resources 3
3 Work Breakdown Structure (WBS) 5
4 Reporting 5
5 Document Management Plan 5
5.1 Numbering 5
5.2 Formats 6
5.3 Publication 6
5.4 Version Control 6
6 Budget Management 8
7 Statement of Work 8
8 Interface Management 8
8.1 Interface Modifications 8
8.2 Project Interface Issues 9
8.3 Management Interface 9
9 Facilities, Equipment Control and Non-deliverables 9
10 Quality Assurance 10
11 Risk And Contingency Management 10
11.1 Technical 10
11.2 Budget 10
11.3 Schedule 11
12 Descoping Plan 11

1 Introduction

This document describes the Management Structure for SALTICAM. Management of all aspects of the instrument are discussed. The document closes with a discussion of risk.

2 Organization Chart And Staff Effort/Resources

Figure 1 shows the organizational chart for SALTICAM.

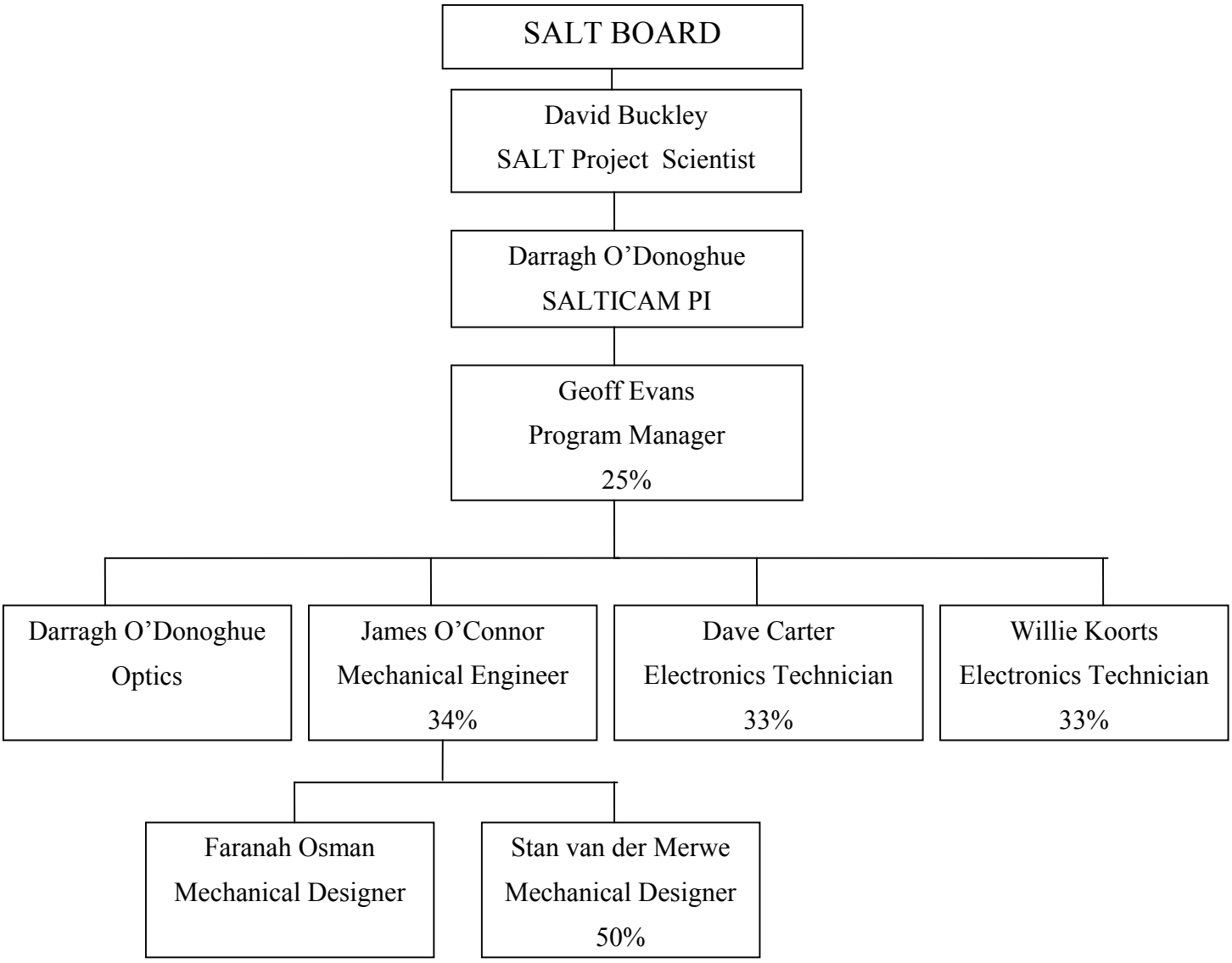


Figure 1: Organo-gram For SALTICAM Management

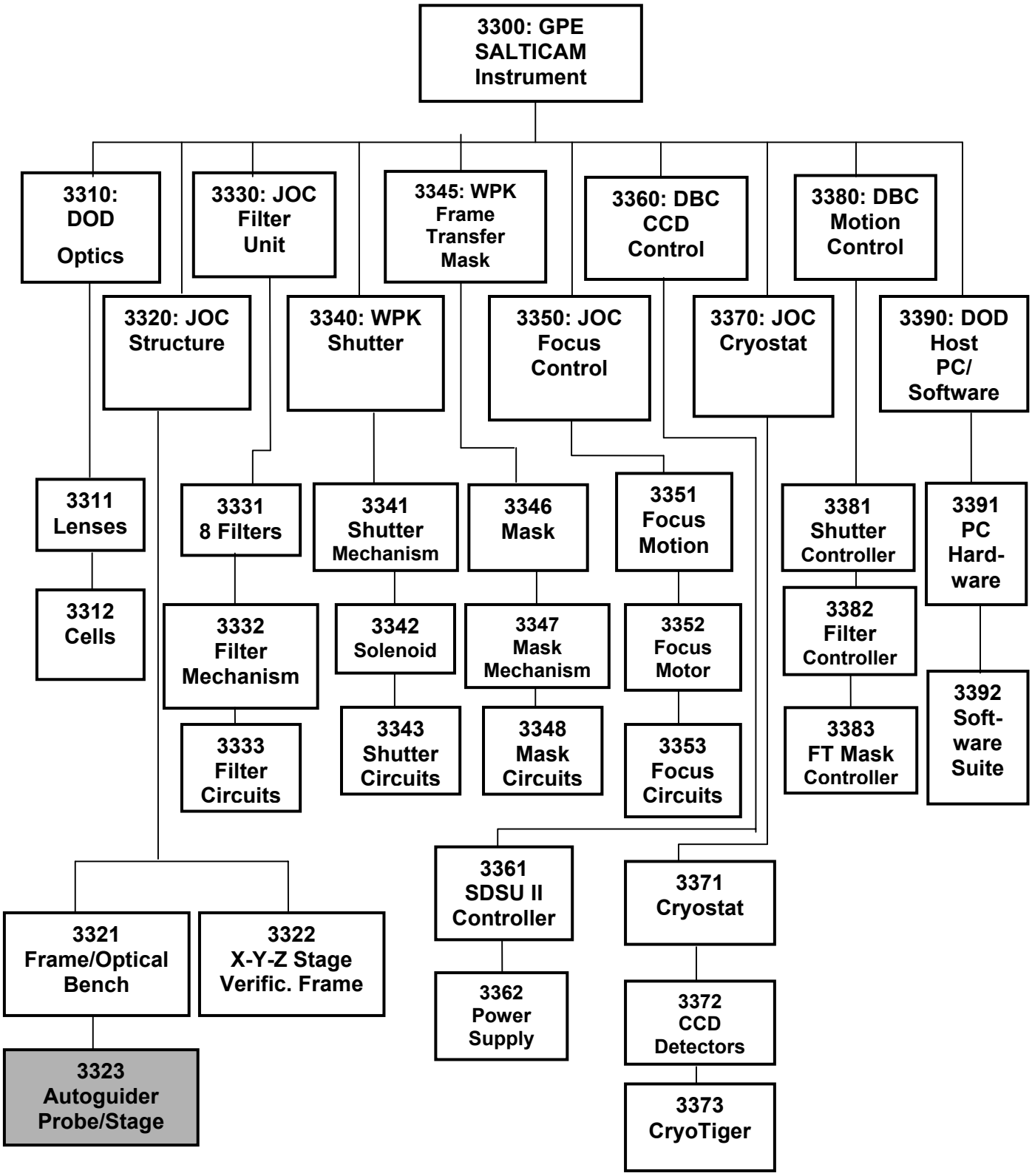


Figure 2: WBS For SALTICAM

The program extends over 2 yr. In order to be close to the original estimate of 3 person-years of effort, the labour charged amounts to 1.75 person-years per year. In fact, it is clear that this was a considerable underestimate: Faranah Osman, Mechanical Designer, who will spend at least 50 per cent of her time on the work, is not being charged. James O'Connor and Stan van der Merwe will spend considerably more than the 33 and 50 per cent of their time shown in Fig. 1; we estimate that the figures will be close to 50 and 75 per cent respectively. Note that the effort of the PI is not being charged.

In addition to the persons explicitly mentioned in Fig. 1, other SAAO technical and administrative/support staff will also be drawn in to the effort. There is capacity for an additional 3 electronics technicians. On the mechanical side, there are 2 full time machinists available. These staff will be used as necessary. Administrative support will also be provided.

3 Work Breakdown Structure (WBS)

Fig. 2 shows the WBS down to the second level.

4 Reporting

The SALTICAM PM, in cooperation with the SALTICAM Principal Investigator (PI), shall report quarterly on the status of the SALTICAM project. The report shall include a progress report, financial report, a schedule update, and a discussion of any significant issues affecting the work.

The Quarterly Report shall be distributed to the SALT Project Scientist.

In addition to the Quarterly Report, the SALT Project Scientist may attend monthly meetings of the SALTICAM project team.

5 Document Management Plan

SALTICAM will establish a web-based system of electronic document distribution.

5.1 Numbering

SALTICAM will use a document numbering plan to identify uniquely every document produced in the design, development, delivery, and commissioning of SALTICAM. Included are all schematics, diagrams, software listings, wiring lists, presentations, review materials, science reports, and so on. Not included are web pages, e-mails, phone records, or other forms of personal communications.

The SALTICAM document numbering plan shall conform to the SALT document numbering standard wherever possible.

SALT documents numbers shall be of the form SALT-33XXyyZZZZ-NNNN where XX denotes the SALTICAM subsystem, yy is the document type as specified in the Project Directive on document and equipment numbers, ZZZZ numbers sequentially the documents for each subsystem XX, and NNNN is an item/part number within a document.

The SALTICAM subsystems are assigned numbers (XX) as follows.

00	Management	50	Focus Control
10	Optics	60	Detector Control
20	Structure	70	Cryostat
30	Filter Unit	80	Motion Control
40	Shutter	90	Software
45	Frame Xfer Mask		

5.2 Formats

Text document formats include (in order of preference): MS Word, PDF, LaTex, RTF, and Postscript.

- Spreadsheets: MS Excel
- Engineering Drawings: IDEAS

5.3 Publication

Each official document will be given a number according to its place in the work breakdown structure, and its name will be entered into a web-based master document list. It will be added to the SALTICAM web site in one of the allowed electronic formats.

5.4 Version Control

Each test document will have a version number, a date, and a short “change table” in the front to summarize how one version is different from the previous version.

The date must use 4 digits for the year, and the month must be spelled out (abbreviations are allowed). Two-digit year numbers and any use of month numbers are strictly forbidden.

Wherever possible, documents should be revised in a "clone then change" procedure in which a copy is made of the document, and then that copy is made into the next revision. This recommendation shall not apply for unpublished documents that are in a state of flux, such as mechanical drawings that are being refined hourly or daily. Schedule Management

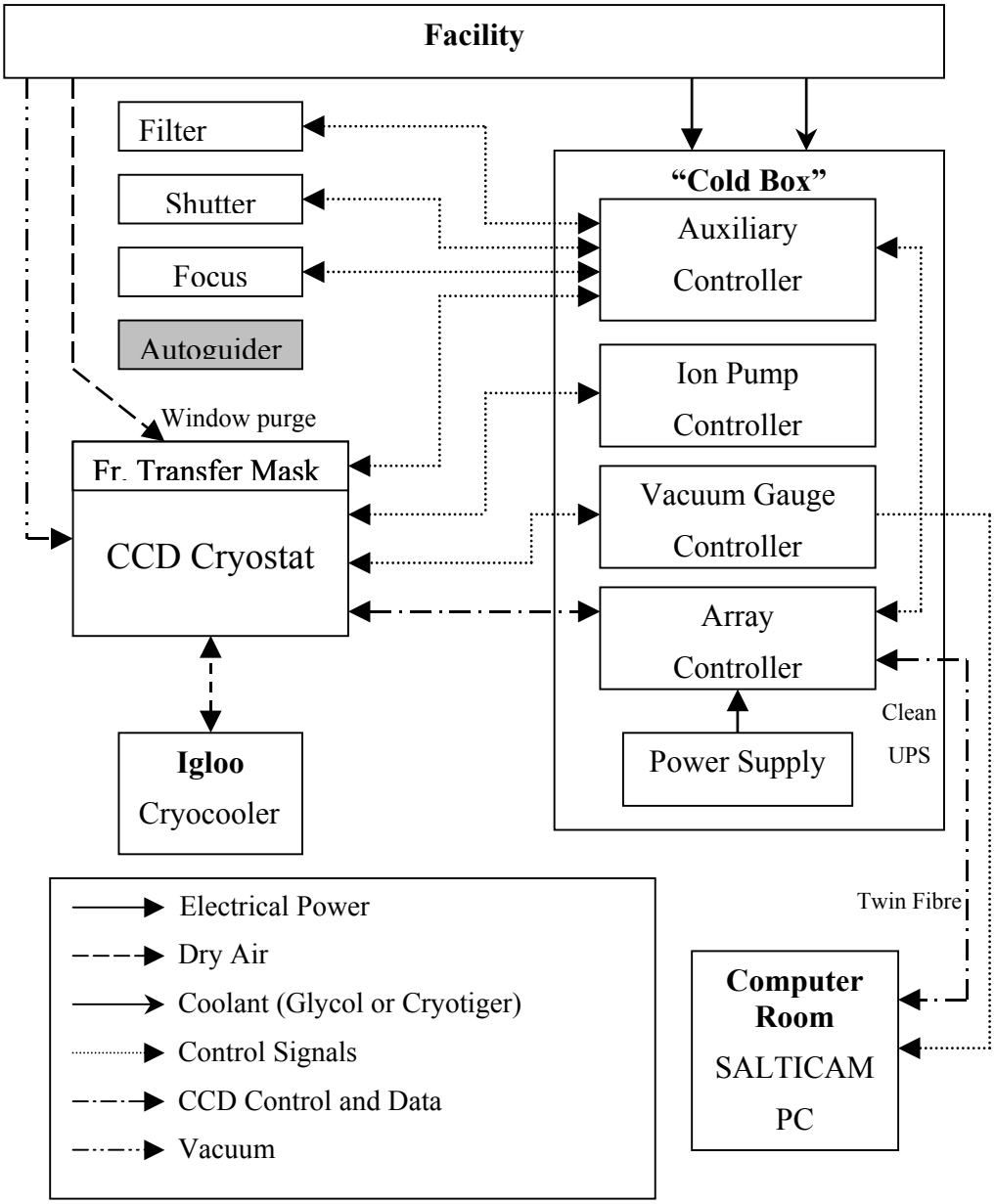


Figure 3: SALTICAM Interface Schematic

The SALTICAM Project Manager will use MS Project as the scheduling tool. The PM will modify the schedule according to progress once each month, in association with the monthly report.

6 Budget Management

The SALTICAM PM will use MS Project to track the budget, expenses, balance, and contingencies during the project. MS Project is inadequate to produce the sort of detailed, exact cost data suitable for billing and auditing, so this detailed cost reporting will be done by the administrative support staff of SAAO.

A detailed and exact accounting will be produced each fiscal quarter.

7 Statement of Work

The Statement of Work for SALTICAM, the Verification Instrument, Acquisition Camera and Science Imager of SALT, has been agreed with the SALT Project Scientist and is included in the PDR package.

This statement defines the scope of work and deliverables for SALTICAM to SALT.

8 Interface Management

Figure 3 shows the SALT system block diagram from the SALTICAM point of view.

SALTICAM has one external interface to the telescope facility as a whole. Mechanically SALTICAM is attached to the PFIS station mount point in its role as a verification instrument, and below the rho stage in its role as an acquisition system and science imager. At both these stations it requires the following interfaces: optical, mechanical, electrical, dry air, glycol, cryogen, software, and signals (both electrical and fiber optic).

These interfaces are specified in the SALTICAM ICD: 3300AS0002 ICD.pdf which is included as part of the SALTICAM PDR package, and will be updated throughout the critical design period.

At the end of the critical design period, the ICD will be signed off by the SALTICAM PI and the SALT Project Manager (external interfaces).

8.1 Interface Modifications

Each interface will be detailed, and changes negotiated, during the critical design phase. Each update will be categorized as follows.

1. Refinement of detail, all parties in agreement

2. Modification of interface, no effect on performance, cost or schedule.

3. Modification of interface, with an effect on performance, cost, or schedule.

Category 1 and 2 items may be approved by the SALTICAM PI and PM alone. Category 3 items must be further analyzed to determine exactly what the effect will be on the delivered system, and changes can only be made with the mutual agreement of the SALT Project Scientist, the SALTICAM PI, and the person responsible for the other side of the interface (SAAO PI, or Tracker and Payload manager).

8.2 Project Interface Issues

A number of interface issues exist at the time of the PDR. The main issues that must be resolved immediately after the PDR involve the mounting of SALTICAM and its associated electronics. This is due to recent design changes by SALT to the payload envelope.

8.3 Management Interface

The SALT Project Scientist communicates directly with the SALTICAM PI.

9 Facilities, Equipment Control and Non-deliverables

Capital equipment (e.g. optics, actuators, electronics) will be procured and delivered to the SAAO during the critical design and fabrication phases.

Materials for SALTICAM will be checked in, stored in secure areas, and handled in clean areas where necessary. SAAO has secure storage and assembly rooms, with restricted control of keys.

SAAO has a clean room on site, with a laminar flow bench. The clean room is large enough for optical integration.

SAAO has a large machine shop.

SALTICAM deliverables are governed by the SALTICAM Statement of Work. The SALTICAM PI will procure, as a part of SALTICAM design and fabrication, some items that are not deliverables. Such items include test equipment not suitable for shipment to, or useful in, Sutherland. For example, such items will include optical bench fixtures for component level assembly and testing, tooling and metering equipment for mechanical integration of the instrument, optical elements for acceptance testing of individual optical components, and miscellaneous mechanical and electronic components for assembling and testing SALTICAM mechanisms and assemblies.

10 Quality Assurance

SALTICAM will receive reports from vendors about the fabrication and testing of optical components, which we will supplement with tests and measurements at the component, assembly, and system level (full details are available in the 3300AE0006 testing.pdf). Connectors will be strain relieved, and wire harnesses will be properly secured.

11 Risk And Contingency Management

Brief mention of risk is scattered throughout the PDR document package. This discussion focuses attention on risk.

11.1 Technical

We identify the optics as the major technical risk: none of the project team at SAAO have experience of optics of this kind; the optical materials are fragile and require sophisticated mounting. There is a significant risk of breakage of lenses before delivery.

To mitigate the first of these risks, a significant fraction of the cost of the instrument has been spent on retaining the services of Dr. Bruce Bigelow of Opto-Mechanical Research and Development. Dr. Bigelow is a graduate of University College London's Optical Sciences Laboratory and comes highly recommended by Professor Harland Epps, doyen of astronomical optical designers in the US, and David Hilyard, Master Optician at Lick Observatory. Dr Bigelow is called upon to review instruments for large telescopes (e.g. the Elmer instrument for Grantecan). In addition to his design activities, Dr. Bigelow has provided enormous input on the optical side thus far: he has suggested a highly economical route to fabrication, has commented extensively on the optical design from the opto-mechanical point of view, and has interacted with James O'Connor on the design of the lens barrels and cells.

To mitigate the second of these risks, the procurement of the optics should begin as soon as possible so that breakage of lenses will not impact the schedule for delivery of the ACSI. In addition, a spare blank for each of the optical materials (CaF_2, BaF_2 and fused silica) will be procured from the outset.

Another technical risk is the poor quality of software supplied with the SDSU II controller. Mitigation of this risk is through the assignment of two project team members to work on software (DBC, DOD), and collaboration with engineers elsewhere (Rutherford Appleton Lab and the ING telescopes on La Palma) faced with the same problem. This collaboration is already in progress and working well.

11.2 Budget

We consider that budget risk is not significant. Budget details are discussed more fully in 3300AE0010 budget.pdf. As mentioned in that document, even if SALT use

$42.6k to pay for Grade 0 CCDs from Marconi, there remains $50k. The most significant budget risk at present is the uncertain cost of mosaicing the CCDs.

11.3 Schedule

We judge the most significant risk to be schedule risk on delivery of the Verification Instrument. As this is on the critical path for SALT commissioning, this is of particular concern. As discussed in the 3300AE0009 schedule.pdf, the critical path is initially determined by the mechanical final design of VI structure and cryostat, moving on to cryostat electronic work. Mitigation of this risk will be through scheduling multiple mini-final design reviews of the VI structure and cryostat as soon as design and drawing packages are complete, and stringent monitoring of these phases of the project.

12 Descoping Plan

Proposals for descoping by restricting the field of view of the Acquisition Camera/Scientific Imager were discussed at the Salt Science Working Group's meeting in Madison, Wisconsin in October 2001. Options to remove the lenses or use only one CCD were mentioned and all were rejected as undesirable by the committee.

Discussions about descoping will be invoked whenever a technical, cost, schedule, or interface change is deemed to be significant by the SALTICAM PI and the SALT Project Scientist.