The seventh meeting of the SSWG took place on Tuesday 16th April 2002, in the SALT Boardroom at the South African Astronomical Observatory, Cape Town, South Africa.

1. Participants

Members:
- Gordon Bromage (UK Consortium)
- David Buckley (Project Scientist, Chair)
- Chris Clemens (North Carolina)
- Patrick Cote (Rutgers)
- Peter Cottrell (Canterbury)
- Rob Fesen (Dartmouth College)
- Klaus Fricke (Göttingen)
- Janucz Kaluzny (CAMK, Poland)
- Ken Nordsieck (Wisconsin-Madison)
- Darragh O'Donoghue (South Africa)
- Larry Ramsey (HET)

Ex-officio attendees:
- Matt Bershady (Wisconsin)
- Eric Burgh (Wisconsin)
- Dave Carter (SAAO)
- Kobus Meiring (SALT Project Manager)
- John Menzies (SAAO)
- Leon Nel (SALT Payload Manager)
- Jeff Percival (Wisconsin)
- Marek Sarna (CAMK, Poland)
- Bob Stobie (Chair of SALT Board)
- Arek Swat (SALT Optical Engineer)
- Gerhard Swart (SALT Systems Eng.)
2. Agenda
16 April (Tuesday)

9:00 Welcome and Minutes of the previous meeting  David Buckley
9:15 Reports on instrument PDRs              David Buckley
9:30 Status of SALT TCS, update of error budget  Gerhard Swart
10:00 Progress on the SALT Prime Focus Payload  Leon Nel
10:30 Coffee break
11:00 SALT Guidance and Focusing system    Arek Swat, John Menzies
11:20 SALT calibrations, moving baffle, etc    David Buckley, Arek Swat
11:40 Latest optical design work of SALT      Arek Swat
12:00 SALTICAM Status & Marconi CCD contract  Darragh O’Donoghue
12:30 Lunch
13:30 PFIS status report                    Ken Nordsieck
14:30 Status of fibre testing               David Buckley
14:45 “Concam” proposal                     David Buckley
15:00 Coffee break
15:30 HRS discussion                       Peter Cottrell
16:30 Call for proposals for 2nd Gen. instruments  David Buckley
16:40 Science with SALT Workshop proposal  David Buckley
16:50 Reports from partners                 All
17:30 Any other business                   All
18:00 End

Participants were welcomed by David Buckley, particularly Patrick Cote, the new SSWG representative of Rutgers University, who was attending for the first time. The following people were proxies for the official representatives: Gordon Bromage, Chris Clemens and Peter Cottrell.

The minutes for the 6th SSWG meeting (18/19 October 2001) were presented and accepted unanimously to be a true record of the proceedings. No immediate matters were arising from these minutes that were not dealt with in the main agenda.

3. Summary of PDR meetings & Instrument Budget for 2002

David Buckley presented a review of the results of the Preliminary Design Reviews for the PFIS and SALTICAM instruments. The former PDR was held prior to the last SSWG meeting in October 2001, and the results are summarized in the minutes and ancillary documents for that meeting (see http://www.salt.ac.za/images/science/restrict/SSWG_6_mins.doc)

A successful PDR was conducted for SALTICAM on 26 Feb 2002 at the SALT Offices, Cape Town. Two external reviewers were appointed and attended:

Dr Eli Atad-Ettegui  Astronomy Technology Centre, Edinburgh, UK.
Dr Phillip MacQueen  MacDonald Observatory, University of Texas, USA.

In addition the Project Scientist (Dr David Buckley) and SALT System Engineer (Gerhard Swart) also acted as reviewers at the meeting. Members of the SSWG were also afforded the opportunity to review and comment on the PDR material. The detailed report will be presented at the meeting and included in the Board minutes.

In summary SALTICAM formally passed the PDR easily and will now proceed to Final Design Reviews later this year. SALTICAM has two configurations, namely as
the Verification Instrument (VI, sans optics) and as the Acquisition Camera and Science Imager (ACSI). These will be delivered and commissioned separately, namely 1 Mar 2003 delivery of VI and 1 Aug 2003 (TBC) for end of commissioning. Following this SALTICAM will have its optics integrated and will be “reincarnated” in the form of ACSI for delivery on 1 Sept 2003 (TBC) following which commissioning should be completed by 1 Oct 2003 (TBC). The FDRs for the two modes will be:

VI mode, and optical design: 29 July 2002
ACSI mode 17 December 2002

Although there were no serious issues raised at PDR, there were a number of concerns, namely:

- Compromised performance if Grade 1 chips are delivered
- Schedule risk for controller & software and cryostat
- Too broad a range of operating parameters offered (binning factors, noise, etc).
- Lack of ghost and stray light analysis
- Tight overall delivery schedule, which should be allevied by the SALT project if at all possible (e.g. if other relevant subsystems, like the SAC or PFP, slip schedule.

These will be addressed by the PI by the time of Final Design Reviews.

4. **System Specification and Error Budget Report (Gerhard Swart)**

Gerhard Swart (SALT Systems Engineer) gave a status report of the SALT systems engineering, which covered three areas:

- Design progress
- Accessing SALT data
- The Telescope Control System (TCS)

His presentation can be accessed from the SALT SSWG website:

http://www.salt.ac.za/images/science/restrict/Sys_Eng_apr02.ppt

The following is a brief summary:

a.) **Design Progress**

The following subsystems have completed reviews to the following levels:

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Level of Review</th>
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<tbody>
<tr>
<td>Dome</td>
<td>CDR</td>
</tr>
<tr>
<td>Structure</td>
<td>Trial assembly at factory</td>
</tr>
<tr>
<td>Drives and controls (structure &amp; dome)</td>
<td>Factory Acceptance Test</td>
</tr>
<tr>
<td>Mirror segment alignment</td>
<td>PDR</td>
</tr>
<tr>
<td>Mirror mounts</td>
<td>PDR</td>
</tr>
<tr>
<td>Truss</td>
<td>CDR</td>
</tr>
<tr>
<td>Tracker</td>
<td>CDR phase I (excl. software)</td>
</tr>
<tr>
<td>Prime Focus Payload</td>
<td>PDR</td>
</tr>
<tr>
<td>Mirror coating plant</td>
<td>CDR</td>
</tr>
<tr>
<td>Phase II Facility</td>
<td>PDR</td>
</tr>
<tr>
<td>Telescope Control System</td>
<td>CDR due end of May 2002</td>
</tr>
</tbody>
</table>
The first part of the Tracker CDR (excluding the software review) was successfully completed.

b.) Getting data from SALT
Gerhard summarized the situation regarding the data bandwidth for SALT, both the Cape Town to Sutherland link, and from Cape Town to the rest of the world. Current estimates are that a 2.5Mb/s link to Sutherland will cost ~$40K per annum, or ~5% of SALT’s annual operations budget. Because of the large amount of data generated by SALT in a night (estimated for normal ops to be ~2.5GB, a link of at least this capacity is required if the data are to be scrutinized and processed in Cape Town the following day. Any plan for remote observing from Cape Town (a planned upgrade path for eventual operations) will require at least this capacity.

It was pointed out (by LWR and others) that during commissioning of SALT and its instruments, this capacity will be essential for the purposes of diagnosis and problem solving from a distance.

The SSWG considered that there was a very strong requirement for PI to have ready access to their data over the Internet, and that SALT would just have to live with this expense as part of its operating budget. The SSWG would recommend to the SALT Board that it adopt a minimum bandwidth of 2.5Mb/s, which will be required from the beginning of engineering first-light, i.e. early 2004.

c.) TCS Progress
A team of people consisting of 3 software engineers (including one physics graduate), 2 astronomers, the SALT Project Scientist and the SALT Systems Engineer have been working on development of the TCS. Initial work involved the apportioning of various tasks to different individuals, and specifically to develop specifications for the various components of the TCS. These will be reviewed at the TCS PDR, to be held in May.

The TCS software functions comprise:
- Operator interfaces
  - SALT Operator Man-Machine Interface (SOMMI)
  - SALT Astronomer Man-Machine Interface (SAMMI)
- PI Tools
  - Observation planning and submission tool (Phase 1 and 2)
  - Star Catalogue database
- Science Database (for storing science data)
- Web Server (all PI access via the web)
- TCS Server (pointing model, mode control and fault response of telescope)
- Event Logger (monitor faults, log user defined events, status display)
- Environmental Display (weather, etc, accessible via the web to other SAAO telescopes)

Related TCS function include the following:
- TCS Interlock panel (hard-wired interlocks for all safety-critical functions that travel between subsystems, overrides on certain functions, monitored by SW)
- Manual Control Panel (movement of telescope from the telescope floor or walkway, portable device with RF link)
  - Its functions include:
    - E-stop, Tracker X, Y, Z, tip, tilt, rho, Structure lift, lower and rotate,
    - Dome rotation.
- Network
- Time synchronisation
GPS NTP time server (to be procured) will provide ~10ms accuracy and 1 pps with 10Mhz signals will provide microsecond accuracy. In addition a link to the SAAO time service will provide redundancy.

Gerhard also discussed the SALT Subsystem Simulator, which will simulate data from all telescope subsystems. It uses actual data definitions used by the subsystems (i.e. no data mismatches when integrating if ICD kept current). It will provide the following functions:

- Transmit and receive data from each subsystem
- Display/change values of all data in real-time
- Log data to a file
- Draw real-time graphs of data

It can also be expanded to simulate behaviour of subsystems and will be used during the acceptance testing of subsystems.

d.) Future work
Gerhard summarized some of the near term SALT activities, which includes:
- Installation of Structure, Dome and Truss
- Installation of network
- Installation of Facility interior services
- Installation of coating plant
- TCS PDR
- PM Segment Figuring and Mount CDR’s
- Tracker Software CDR
- Contracting of Mirror alignment systems

e.) Error budget
At the request of the Project Scientist, Gerhard presented the current situation regarding the error budget.

Currently the predicted EE80 of 1.022 arcsec has crept above the specified value (<0.9 arcsec). This is of concern to the SSWG, who have asked the System Engineer to investigate:

i) the fidelity of this value
ii) possible ways to mitigate against this

In particular, it was felt that there are possibly some overly conservative assumptions being made. For example, the front-back temperature differential of a mirror segment was assumed to be <1.0 degree C, which is probably a worst case. It was suggested that the HET could provide real thermocouple data for this. Also, the fact that the delivered CTE of the segments was coming in at ~1/3 of the specified value could assist in deceasing EE80. The alignment system will also influence this value, so the final specs for the expected piston and tip/tilt errors should be updated accordingly.

5. Status of the SALT Payload (Leon Nel)
Leon Nel (Tracker & Payload Manager) gave a progress report on the SALT Prime Focus Payload (PFP), which can be downloaded from:

www.salt.ac.za/images/science/restrict/Payload_Apr02.ppt

The design of the payload has matured considerably, and incorporates the following subsystems:
• SAC
• ADC
• Moving baffle at exit pupil
• SALTICAM and its fold mirror
• PFIS slit viewing optics
• Fold mirrors to FIF/auxiliary instrument
• Guidance stages at 4 focal stations (SALTICAM, PFIS, FIF and auxiliary)

The status of these subsystems can be summarized as follows:

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Specification</th>
<th>Contractor/Vendor</th>
</tr>
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<tbody>
<tr>
<td>ADC</td>
<td>April 02</td>
<td>Zygo/Opticon</td>
</tr>
<tr>
<td>Calibration system</td>
<td>April 02</td>
<td>SALT/SAAO COTS items</td>
</tr>
<tr>
<td>Moving baffle</td>
<td>Completed</td>
<td>local</td>
</tr>
<tr>
<td>Fold mirrors</td>
<td>Completed</td>
<td>LZOS/local</td>
</tr>
<tr>
<td>Guidance and focusing</td>
<td>Completed</td>
<td>Wagner Systems/SALT</td>
</tr>
<tr>
<td>SAC coatings</td>
<td>Completed</td>
<td>LLNL</td>
</tr>
<tr>
<td>PFP structure</td>
<td>Completed</td>
<td>Aerodyne/MMS</td>
</tr>
</tbody>
</table>

In answer to a question (from MAB), Leon reported that the current mass budget for the auxiliary instrument is ~50 kg and the volume constraint is 550 mm ¥ 550 mm ¥ 300 mm. This, however, was somewhat dependent (mass wise) on what were the final masses of the other subsystems.

The SSWG emphasized the importance of a good determination of the mass budget, and particularly the necessity to keep the mass of the various subsystems to a minimum since it will impact on the final capability of the auxiliary instrument, to be defined at some future time.

6. SALT Guidance and Focusing system
John Menzies and Arek Swat discussed the recent developments in the guidance and focusing system for SALT. The analysis of guidance and focus sensitivity is included in the following document: www.salt.ac.za/images/science/restrict/JWM-draft2.ps.

John’s presentation covered the analysis of the system’s performance and the assumptions used in ascertaining this. In-focus images of guidance objects in the 4-5 arcmin annulus will be centroided to ±0.1 pixels on the guidance CCDs (equivalent to 0.08 arcsec). Guidance rates will be 1-10 Hz, depending on the brightness of the guidance star, which will be R < 19.

Details of this analysis can be found at: www.salt.ac.za/images/science/restrict/JWM-GF-text.ps (for text only)

and

www.salt.ac.za/images/science/restrict/JWM-GF-figs.ps (figures only).

Arek presented the details of the optical design for the guidance and focusing system, which included simulation of the out-of-focus images which will be used in
the auto-focus routine. Requirements for focusing are less severe than for guidance, and the bandwidth for focus control will be <0.1Hz for R < 17.

Details for the optical analysis presented by Arek can be downloaded from: www.salt.ac.za/images/science/restrict/optics_gf.ppt

7. **SALT optical design**
Arek summarized the SALT optical design work which has been completed. This includes:

- **Primary Mirror (PM)**
A model with segmented PM was developed:
  - Position, orientation and surface errors were simulated
  - Temperature effects on segments figure were analysed
  - Inputs to segment, edge sensors, actuator, mirror mounts specs
  - Global Radius of Curvature analysis
  - Alignment simulations validation of SH sensor (for example for piston correction)

- **Involvement in developing requirements for a CTE measurement system at LZOS**

- **Spherical Aberration Corrector (SAC)**
Darragh developed the design, tests and spec.
A Monte Carlo manufacturing model was developed in order to help with defining the spec and understanding the process, cost drivers, etc.
Additional analyses were performed, which included:
  - Aperture optimization was performed.
  - The virtual rotation point for the hexapod was found
  - A basic stray light analysis was performed
  - The non-axisymmetric distortion was estimated

A contract was subsequently placed at SAGEM-REOSC for the manufacture of the SAC as an entire system. CDR was recently completed and some issues requiring further refinement include:
  - M3 test and matching process
  - Analysis of off-axis performance
  - Mechanical references of the optical axis
  - The size of M4 causes increase of vignetting from 2' to 4' with respect to spec (show the nominal and actual vignetting)

- **Atmospheric Dispersion Corrector (ADC)**
Darragh’s design was optimized for non-axisymmetric distortion.

Further details of Arek’s presentation, which includes graphics demonstrating the optical modeling and an overall description of the optical system, can be downloaded from:

www.salt.ac.za/images/science/restrict/optics_work.ppt

8. **The exit pupil moving baffle**
Arek presented some analysis done regarding the position of the moving baffle near the exit pupil (www.salt.ac.za/images/science/restrict/optics_mb.ppt). The purpose of
this baffle is two-fold:

a.) to exclude scattered light  
b.) to mimic the pupil variations for an object in its calibration exposure

The analysis discussed here was prompted by the possible requirement of moving this baffle away from the exit pupil position because of the restrictions imposed on the mechanical design of the payload.

Question posed included the following:

• what is the optimal size of the moving baffle  
• where should it be positioned  
• nature of pupil aberrations  
• definition of the boundary  
• defining a merit function

The conclusion was that the baffle could be some distance (~40 mm) from the nominal exit pupil without seriously affecting performance. Following discussion it was apparent that the merit function which Arek employed did not take suitable cognizance of the fact that to exclude any potential scattered light from outside of the primary mirror would mean defining the baffle such that its perimeter would vignett the outer ~400 mm or so of the mirror array. Such a potential loss of light from this large area (~13 m²) should be avoided. The SSWG requested that this issue be addressed in a re-analysis of the problem and that effort be made to try to accommodate the moving baffle as close to the exit pupil as possible.

9. Calibrations

David presented a document concerning calibrations for SALT, and discussed the various options for an internal calibration screen. These include:

• a diffusing screen at the exit pupil, behind the moving baffle  
• a diffusing screen or ‘concentrator’ near the entrance to the SAC

An analysis of the etendue of calibration diffusing screens indicates that a screen near the hole in M3 is preferred from an efficiency point of view. In addition, a calibration system before the SAC will also ensure a similar vignetting of the calibration observations.

Another reason for preferring this position for the calibration system is the lack of space in the payload at the exit pupil to easily accommodate such a system. Current options being investigated for the calibration system includes:

• a translucent opal diffuser  
• a fibre optic coupled back-light  
• a holographic diffusing screen  
• an integrating sphere-like ‘concentrator’ as used in Gemini/SOAR

These options will all be investigated.

Outstanding issues under consideration include:

• a proper ray tracing needs to be done to investigate the possibility of the hole in M3 as a potential place for a diffusing screen  
• look to see if a concentrator like the Gemini/SOAR might work  
• find out the properties of fibre light guides, particularly how well they perform in the blue
• investigate image centroiding if the cal unit is at/near hole in M3
• how the mechanisms might be accommodated in the SAC, plus their requirements
• how large can the screens be made?
• what is the length of the fibre light guide?
• what are the attenuation/throughput characteristics of the fibres?

A first draft of the calibration requirements document can be downloaded from:
www.salt.ac.za/images/science/restrict/callibration_req.doc

10. SALTICAM
Darragh presented an update on the SALTICAM status. This presentation can be downloaded from:
www.salt.ac.za/images/science/restrict/SALTICAM_Apr02.ppt

Topics covered included:
• CCD procurement status for PFIS and SALTICAM
• SALTICAM Program status
• Requirements
• Design overview
• Budget & Schedule
• Discussion of major PDR issues
• Open discussion

Developments since the last SSWG meeting included the signing of a contract between SALT and Marconi on 4/1/2002 for the procurement of six CCD44-82 (2K x 4K x 15 micron pixel) chips. This was after SIte chips were investigated as a possibility and subsequently rejected, mainly because of not meeting specification (not frame transfer), but also because of delivery concerns. All chips will be identical and, following the previous SSWG recommendations, best cosmetic grades are sought. The contract prices are:

Grade 0: 60,000 Pounds per chip
Grade 1: 45,000 pounds per chip

The Marconi contract is on schedule for the delivery of 2 devices for SALTICAM on 4 Nov 2002.

The SALTICAM program status is that PDR was successfully concluded on 26 Feb, and VI final Design Review is due on 29 July. SALTICAM is currently on schedule and on budget. Darragh presented the current optical design for SALTICAM’s optics, including a discussion of lens mounting issues and anti-reflection coatings. The current mechanical designs for the SALTICAM structure and cryostat were also presented.

Finally, some outstanding issues and risks were discussed, including:

• Provision of a grism (for low res. spectroscopy) was rejected at PDR as being too expensive, inefficient and unnecessary in light of PFIS capability.
• Parasitic observations using a dichroic to feed UV light to SALTICAM while PFIS observes in the visible/red was rejected as a first-light capability to be provided.
• Current perceived risks include:
11. PFIS status report
Ken Nordsieck presented a status report on the Prime Focus Imaging Spectrograph/IMPALALS. His presentation can be downloaded from the SALT SSWG website: www.salt.ac.za/images/science/restrict/PFIS_Apr02.ppt

Optics
Final iterations on the optical design have attempted to reduce the number of elements and groups and to reduce usage of troublesome materials. The possible relaxation of the following was investigated:
- no refocus assumption
- all spherical figures
- reduction in size

The collimator optics have been redesigned to remove use of BaF2 which has increased the space available for the waveplates and also shortened the whole collimator by 75 mm.

Camera optics allow for refocus between configurations. The first surface (silica) has been changed to a moderate asphere. This revised design eliminates 3 elements (one NaCl) and 1 group, FK5 and crystal quartz. The filter gap is also increased, while the overall length is shorter by 75 mm.

The collimator now has a 3% pincushion distortion (above the 1% rule of thumb), however correction would require another element. The affects of this distortion (e.g. for telescope drift/nod or thermal variations are considered acceptable.

Chris Clemens asked for an investigation of how lateral colour and pupil distortion might affect the sky subtraction.

A preliminary thermal analysis implied a large (~1.7 mm) focus change over the operating temperature range (-10° to 25°C), resulting in potentially serious image quality degradation. A passive correction system is being considered (e.g. Invar tubing for camera/collimator, high CTE spacer, etc). Refocus by translating the last doublet (by up to 11 mm) is being investigated.

Opto-mechanics
Various alternatives in mounting the lenses are being explored:
- Dow-Corning grease (but potential UV absorption)
- Coupling oil (requires expansion bladders)

An RFP for an opto-mechanical consultant will be issued.

Structure design
Following PDR comments, the Swales analysis was verified after the design was imported into I-DEAS. The truss design has been updated and optimized based on the new PFP (Prime Focus Payload) interface, and it now mounts directly directly to
a 1.8m diameter steel rotator ring at the focal plane. His rotator is mounted directly to the hexapod legs. The mounts are kinematic in the x-y plane (xyz pad; yz pad), which decouples steel and invar thermal expansion. It is non-kinematic in the z direction, where there are 12 pads with a maximum deflection specification. The redesign saves 20-30 kg by optimizing beam cross-sections and provides stiffer camera and NIR mirror mounts.

Predicted flexure, during a track, is now well within spec for the visible beam, and just in spec for the near-IR.

**Mechanisms**

Designs of both the waveplate and slitmask mechanisms were presented.

**Mass budget**

Ken updated the current estimates on the instrument component masses, with the following overall result:

- **Visible beam only:** mass increase by 14.6 kg to 442.1 kg
- **Two beams:** mass increase by 19.5 kg to 489.7 kg

A limit on the total (two beam) mass budget of 500 kg is considered workable by Ken. It was suggested to fix the NIR mass allowance at 145 kg. In addition, if an added restriction was made to no more than 2 etalons in both beams, total mass could be reduced by at least 40 kg (i.e. total PFIS mass, with two beams, of 460 kg).

**Control system**

A skeleton control system has been purchased for use with LabView, as a learning tool and to answer operational questions for mechanism designs.

**Budget and schedule**

Since PDR, the budget has had to be revised as follows:

- **PDR budget errors of +$98K**, comprising:
  - Salary accounting error: +$96K
  - Indirect cost over-assessment: -$30K
  - Swales final payment: +$32K

- **Procured item deltas of -$40K**, comprising:
  - _ waveplate (going to 60mm): -$40K

- **Labor increases to address PDR deficiencies amounting to +$150K**, and comprising:
  - Drafting: +$50K
  - Management intern: +$50K
  - Optomechanical consultant: +$50K

The total currently over budget therefore amounts to $208K, or ~$183K in base dollars, which is ~ of the total available contingency, i.e. a usage of 5% contingency out of a maximum of 20%.

Contingency will be managed by the PI and the Project Scientist, and approved by the SALT Board. It is considered legitimate to use this to bring the instrument back on schedule, if need be.
12. **SALT High Resolution Spectrograph (HRS)**

Peter Cottrell presented an update on the HRS project, for which he was now the Principal Investigator. John Hearnshaw will remain on the team, chiefly concerned with the optical design. Michael Albrow is to be the Project Scientist for HRS.

The current situation regarding the funding breakdown was shown by Peter (www.salt.ac.za/images/science/restrict/SALT_HRS.doc).

In regard to the current HRS/CELESTIA design, Peter reported on John’s visit to the company Glass Fab to discuss cross disperser prisms. They were happy to manufacture the 50-60 kg prisms with tight tolerances in terms of homogeneity.

The issue regarding the optimal number of sky fibres was raised. Peter summarized the results of an analysis done by John Hearnshaw (this can be downloaded from: www.salt.ac.za/images/science/restrict/JBH_sky_fibre.doc).

Larry Ramsey presented some details of recent HET HRS results. These indicated that for certain conditions, which are often encountered (e.g. moonlit cirrus), that several sky fibres gave superior background subtraction. He cited the example of a V = 14.5 star ~10° from the Moon, which had a significant background. A similar example was given of an 18th magnitude Cepheid in M31, which for a 15 min exposure in mediocre seeing (~3 arcsec) suffered from substantial sky emission line contamination.

Apart from analyzing the noise based solely on Poisson statistics, it was emphasized by Larry that even for bright objects, for which line profile studies are important, that contamination by a Solar spectrum from the sky will have an impact on things like radial velocity accuracy. Larry also mentioned that as far as radial velocity stability is concerned, the HET HRS, with its white pupil design and being bench-mounted inside a controlled environment, was far better than Keck HIRES.

Larry’s presentation, and an earlier analysis, can also both be downloaded: www.salt.ac.za/images/science/restrict/LWR_sky_fibre.doc and www.salt.ac.za/images/science/restrict/LWR_sky_fibre2.ppt

Because there was a lack of agreement on the issue of sky fibres (i.e. how many should be accommodated), and on some other design issues (e.g. whether the inter-order spacing in the current CELESTIA design was sufficient, how to ameliorate the effects of the moving pupil), it was suggested that a subcommittee of the SSWG be set up to resolve these (proposed: Darragh; seconded: Larry). This was unanimously agreed, and the Project Scientist was charged with the task of setting up this group, moderating the discussion and reaching some recommendation by July.

13. **Fibre Instrument Feed**

David Buckley summarized some of the results of the fibre testing done in Larry’s lab by Nicholas Session and himself. Analysis of the results in terms of FRD indicate that the results are dependent upon exactly which image quality parameter is considered (i.e. FWHM, EE50 or EE80). This was result was on the first batch of test of the Polymicro STU fibre, and will be expanded to the other fibres (12 in total).

The uniqueness of the testing procedure was the simultaneous recording of both the input and output beam profiles on the CCD. The respective f/ratios are calculated.
depending upon which parameter is of interest, and corresponding FRD curves generated.
A description of the test method and some early results are included in David’s general SSWG presentation:
www.salt.ac.za/images/science/ restrict/SSWG_Apr02.ppt

14. Proposal for a SALT CONCAM
David tabled a document (www.salt.ac.za/images/science/ restrict/CONCAM.doc),
which he was intending to put before the SALT Board, which is a proposal for
installing a “CONTinuous CAMera”, or CONCAM. This is a compact, robust, off-the-
shelf CCD system with fisheye lens, manufactured by Dr Niemeroff of Michigan
State, and is being installed at a number of observatory sites around the world (e.g.
Mauna Kea, La Palma).

The reasons for SALT to have one are:

• Provides a quick assessment of sky conditions (all-sky coverage to naked eye
  visibility)
• Provides a graphic demonstration of where SALT can look/is looking. This
  would be useful for EPO if it were linked to the SALT website.
• Monitors the entire sky every few minutes, which has good scientific spin-offs
  (e.g. Gamma Ray Bursters, transient events)

This stand-alone item could be provided to SALT at a (discounted) price of $15K.

The SSWG agreed that CONCAM would be great asset to SALT and endorsed
David’s continued efforts to see one is installed.

15. Proposal for another “Science with SALT” workshop
David suggested that it was time for another meeting, like the SALT/HET workshop
held in March 1998. That meeting covered generic potential science programs with
SALT, but was held before the project actually began, involved only some of the
SALT partners and came before the make up of the first-generation instrument suite
was known.

Topics for discussion at the next meeting could include:

• A discussion of the expected full operational capabilities of SALT and the first-
  light instruments
• Specific observational opportunities afforded by SALT
• Proposed observing programs from individual astronomers/SALT partners
• Formulating potential collaborative programs
• Discussion of potential focus areas, or ‘key programs’ designed to maximize
  scientific impact of SALT in its initial year(s) of operation
• Planning for Second Generation instruments
• Potential role of other SAAO facilities in supporting SALT science

It was suggested by David that the meeting should be held in Cape Town in late
2003 (> Oct), maybe timed to coincide with Board/SSWG meetings. There was broad
support for such a meeting, although there was some uncertainly about the best time
to hold such a meeting. This proposal (www.salt.ac.za/images/science/ restrict/SALT_Workshop.doc)
would be put to the SALT Board by David.
16. Reports from SALT partners

The meeting concluded with brief summaries regarding recent activities or status reports from the partners.

Dartmouth College (Rob Fesen)
Most interest at Dartmouth resides in the use of PFIS and SALTICAM, although some high resolution spectroscopy would also be of interest, depending on the capability of the instrument.

Göttingen (Klaus Fricke)
Klaus Beuremann’s (retiring professor) position is being advertised.

Poland (Janusz Kaluzny)
Janusz reiterated Poland’s interest in HRS/CELESTIA, and possibly being involved in the building of the instrument in some manner.

South Africa (Darragh O’Donoghue)
Darragh reported that an extra R1.2M (~$100K) was given to SALT from the government in order to help fund SALTICAM.

Hobby Eberly Telescope (Larry Ramsey)
Larry reported that HET is now routinely doing science for 3 weeks out of 4. Louvres have been installed in the ringwall to improve seeing. Image stacks and seeing have generally been improving as a result.

UNC (Chris Clemens)
A new hire (Dan Riker) was recently appointed, who is an expert on GRBs and ToO observations. This means that the expectation of a new instrumentalist has not yet been realized.

The Lincoln Lab chips look very promising, which brings up the possibility of future collaborations in CCD detectors.

Wisconsin (Ken Nordsieck)
PFIS is the major activity at Wisconsin, which is funding this through departmental loans. A submission has been made to the Keck Foundation for support of PFIS, which would alleviate the department’s funding burden.

Rutgers (Pat Cote)
Three new faculty had been hired over the last 18 months. Instrument interest centers on PFIS and SALTICAM.

UK Consortium (Gordon Bromage)
A 5 year research assessment exercise was recently completed in the UK, with the result that the standings of three of the UK SALT Consortium member improved: UCLAN, Nottingham and Southampton.

Canterbury (Peter Cotrell)
Peter repeated their strong desire for HRS/CELESTIA to proceed, which was expected by a number of the partners.
Peter expects to devote more of his time, as PI, now that he is no longer Head of Department.

17. **SSWG recommendations (summary)**

The following is a summary of the major SSWG recommendations and decisions to be reported to the SALT Board:

1. The error budget should be constantly re-evaluated and every effort be made to decease EE80, which is currently over spec.

2. Data transfer rates between Sutherland and Cape Town, from commissioning, need to be at least 2.5Mb/sec.

3. The importance of the LLNL coating in delivering the specified performance is re-emphasized.

4. The implication of increasing payload subsystem masses is that the future Auxiliary Instrument is potentially compromised.

5. The situation regarding the instrument budget, and the current lack of provision of agreed-upon contingency for PFIS, amounting to ~$730K, needs to be emphasized to the Board.

6. The placement of the moving baffle could impact the telescope performance if mirror collecting area is sacrificed. The SSWG urges a re-analysis of the merit function in light of this.

7. The issue of possibly stopping down M4 to trade more vignetting for improved image quality should be reassessed, after M4 manufacture and testing.

8. SALTICAM passed its PDR and will now proceed to CDR. Several issues brought up by the review panel would be addressed by the PI in consultation with the Project Scientist.

9. A sub-committee of the SSWG, should be set up and chaired by the Project Scientist to resolve issues regarding the SALT HRS design, particularly the issue of number of sky fibres. This should be completed by July.

10. The SSWG endorses the proposals by the Project Scientist to procure a CONCAM for SALT and also to hold a “Science with SALT” workshop sometime in the near future (< 2 years).