

SARA NORTH OBSERVATORY DIRECTOR'S REPORT

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by

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I. Introduction.

As we move into 2008, the SARA telescope has been open on nearly every clear night. However, due to the addition of the Cerro Tololo/ Lowell 24" to the SARA arsenal, the SARA telescope at Kitt Peak becomes SARA North. Thus, I have titled this report the "SARA North Observatory Directors Report", and I anticipate a similar document being prepared for the SARA South telescope written by the SARA south director perhaps for the next meeting. Until then, I will summarize both the status of SARA North, and what I know of the SARA South situation in this report.

We are expecting Butler University to be voted into SARA at this board meeting, so let me start by welcoming them into our little group. I am sure Brian Murphy and Butler University will be a productive member of the SARA consortium. Brian's enthusiasm for research and teaching, his knowledge, and the support of a University like Butler will be a great addition to SARA. I recently met Rick Brown, the other astronomer at Butler, and some of the Butler students and they will all fit in well with our consortium. Welcome!!

We now have 10 current members in the consortium and observing time at any one institution is at a minimum, at least until SARA South becomes available, then we will see a nearly 2-fold increase in observing time for everyone. It is disconcerting that Clemson University has had a very hard time coming up with the funds for their membership in SARA. We all feel for Dieter as he tries to keep SARA membership going from an institution that has not been forthcoming with financial support. This past semester was the first time any university in SARA has forfeited observing time due to lack of payment, and we all hope this will be remedied in the near future. A recent E-mail implied that Dieter has in fact come up with the dues, so I assume something will be discussed at the board meeting in regards to this situation. It was a fond farewell to Georgia, as they pulled out of SARA because Scott Shaw retired last year. We will miss Scott for all his hard work, his friendship and collegiality, and his wonderful SARA parties after board meetings.

SARA North has been working reasonably well, aside from some problems (to be outlined below) and returning excellent data. Since I will cover the problems in detail below let me just elaborate on the summer shutdown plans here in the introduction. We have allocated funds for the mirror re-aluminization this August. Since the Kitt Peak

facility was booked, so Peter suggested the mirror lab down in Tucson. We checked this out and it is actually cheaper and they can do it during the summer shutdown, so we are scheduled to re-aluminize the mirror in August. We also have planned to do the back-end refurbishment and the upgrading of the control cards. This will consist of taking off everything off the back of the telescope, including getting rid of the rotating tertiary mirror and replacing it with a sliding module. The new system apparently will require a new guider and filter wheels, but in the end will be a much more efficient way of doing it. We will at last get to see how much of the seeing problems are is due to the tertiary mirror. A conversation with Josie indicated that they were scheduling the work on SARA north.

SARA SOUTH

The MOU was signed and the dome ordered, delivered and installed as of March 26, 2008. This represented only the first step however. ACE still must schedule a trip down to remove all of the old technology in preparation for the new ACE system. As of the Spring 2008 board meeting, it looks as though Peter and ACE will make one trip down to Chile in the next month or so to remove the equipment. During the July and August, they will fabricate the new equipment and perhaps install it in October. This is considerably delayed from previous estimates.

II. Research at SARA.

We continue to use the SARA telescope every clear night for research and teaching. SARA research consists of projects ranging from binary stars to Blazars. Please continue to submit your publications to Bev Smith at ETSU. Cooperative projects highlight the remotely accessible abilities of SARA and most of all the “extended astronomy department” feeling of the consortium

III. Telescope Usage.

Bill Keel has taken over scheduling for the SARA telescopes since Ron Kaitchuck has taken on the observatory directorship for the SARA South observatory. Bill has done an excellent job is smoothly transitioning to the Alabama calendar.

I am very pleased that observers have been much more diligent in submitting observing reports after their nights, but we are not yet perfect. From examining the Sept. through March reports, the following resulted.

month	Nights reported	Data Nights	Hrs. Observed	Nights lost (weather)	Nights lost (equipment)
Sept.	27	17	88.8	7	3
Oct.	27	20	190.5	4	3
Nov.	24	18	128	6	0
Dec.	23	10	67.3	11	2
Jan.	22	11	86.5	10	1
Feb.	23	19	128.65	4	0
Mar.	24	21	130	2	1
	170	116	819.75	44	10
Possible nights	210				

Thus, out of 210 possible nights, I found 170 observer reports. Out of the 170 nights reported on, we took data on 116 nights (68%) resulting in 819 hours of observing time. Of the nights no observations were made, 44 were due to weather (25%) and 10 were due to equipment failure (5.8%). There were several nights when we lost hours due to technical problems, but what is reported above is on full nights lost.

IV. Telescope Problems.

Most of us are now using RADMIN instead of VNC for telescope control and data transfer. RADMIN seems to be much more stable, resulting in fewer network disconnections, and allows us to use the same program to download data.

Mirror Petals continue to be a problem. The redesign by ACE apparently did not work out, and the telescope has been left open for nearly 2 months, increasing the dust deposition. The mirror is in desperate need of cleaning and/or re-aluminization. Josie Mack said it appears to be a limit switch problem and they will look at it in early April and perhaps change out the limit switches.

Dome cameras – Only one camera functioning properly most of the period, but as of late March both cameras were in working order.

Ghost problems – We occasionally run into intermittent or “ghost” problems with the telescope and computers. They include:

- CCD Computer shuts down (fixed)
- Filter wheel freezes (on-going)
- ACE stops responding (on-going).
- Tracking stops (on-going)

V. Instrumentation.

- **Cameras**

1. U42 is still the main imaging CCD camera. The latent image problem and the lack of cooling power makes this camera's background noise unacceptable for really high precision photometry.
2. Finger Lakes camera with SITE chip is our backup camera but it hasn't been used very much lately as our primary camera has been doing well. It has a notoriously high dark count and some imperfections that make it less desirable than the U42.
3. The apogee Ap4 is still serviceable and usable but will not be on the telescope during normal operations.

We are in desperate need of a new CCD camera which will cool to a lower temperature and that has a lower dark current than the Apogee cameras. Estimates from a number of vendors have been received and we finally decided on a Bob Leech camera, in spite of the nearly \$73,000 price-tag, and were ready to buy one when added uncertainties in the SARA south budget became worrisome. We decided to put off the major purchase until we could determine the budget was solid enough. The uncertainty in the budget due to Clemson was another important factor in postponing the purchase. I would like to thank Todd Hillwig from Valpo and Stefan Vennes from FIT for their efforts in securing CCD estimates.

- **Computing facilities**

New CCD computer is finally operating well. It has more storage than previous computer and a hard backup. Originally, it would be found in a dormant state and would have to be re-booted regularly. It was taken back down to Tucson, and although there was never a clear diagnosis, it appears to work well now and the problem has not occurred again. The RADMIN program is much better than VNC and has really helped with data transfer and consistency of connections.

- **Weather Station**

The new weather station has been fairly reliable. It is functional for most of the nights and is accessible from the SARA web page as well as from a RADMIN window. The addition of the ACE All Sky camera in February has been a real positive. We can now see effectively the cloud situation at Kitt Peak using our own equipment. The web site address for the weather station is:

<http://www.saraobservatory.org/wx/sara.html>.

- **Autoguider**

The auto-guider has been working very well. It is not clear what its future will be once we get the new back end of the telescope on.

- **REU Program -**

The past REU program seemed to go very well, with lots of great interns and great research. Matt Wood also got the JSARA journal going with the 2006 REU papers in issue #1, and we are anxiously awaiting issue #2 with the and 2007 intern's papers.

- **ROA's** - Our current group of ROA's are exceptional. I would like to formally thank Elaine, Chuck and Roy for their excellent work. It is always a pleasure to work with them, even though the telescope is operating so efficiently only rarely does there need to be much interaction. Due to the departure of Adam Block, there was a rather severe hole in the ROA coverage. A combination of the new more lenient rules and ACE stepping up and providing ROA services has really lessened the impact of losing Adam. Thanks ACE!

VI. Future.

These are some of the challenges we face starting this week and in the near future.

1. ***New SARA North back and control cards.*** We need to refurbish the back end of the telescope with the new instrument arrangement. This is now scheduled for summer shutdown along with mirror re-aluminization and the installation of the new control cards
2. ***SARA South CTIO 24-in.*** The dome has been replaced and we now await Peter to go down and take out the mirror, remove all of the motors and prepare for installation of the automation system.
3. ***Image quality improvements SARA North.***
No one has investigated alternative funding for secondary mirror fabrication. This is a major project and someone who is interested needs to be the driving force behind this project if we really expect developments. The board should consider hiring an optical expert to evaluate the current SARA 0.9 after the back end replacement and the air conditioning are in place,.

VII. Summary.

Action on the following items:

- 1) SARA south automation order with Peter
- 2) SARA North and South CCD camera proposals

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