SARA OBSERVATORY DIRECTOR'S REPORT

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I. Introduction.

The SARA telescope remains a workhorse instrument taking scientific data every clear night. As regular operations continue, ACE continues to make improvements to the operating system that make the observer's life much simpler. These improvements include writing pointing information to the CCD headers, weather station monitoring, etc. These improvements will be described in the *Telescope* section. The other major addition is the new large format CDD camera purchased from Apogee that will be discussed in the *Instruments* section. Dr. Matt Wood is once again submitting the SARA REU proposal to the NSF for another three-year period. We are very optimistic about our chances based on the last year's excellent REU students and projects.

The really exciting news is the possible addition of two new Universities to the SARA consortium. We decided some time ago to explore the acquisition of a telescope in the southern hemisphere, and to accomplish that goal we needed to add some new members. The SARA board will be considering proposals from Ball State University in Indiana and Agnes Scott University in Georgia. Both universities will be presenting proposals for joining the consortium at the upcoming board meeting. We are excited about adding these two quality institutions to our SARA consortium.

II. Research at SARA.

The current setup with the AP7 CCD continues to yield high quality publishable data, and some observers are also using the larger format Ap4. Martha Leake is operating her low-resolution spectrograph during visits to the dome as well. Once again, a variety of research projects are carried out at the SARA observatory. Micro-variability observations of Blazars (Webb) are routinely done in conjunction with the Dark Sky Observatory. Photometric observations Seyfert galaxies (Rumstay) are made in support of large campaigns, while white dwarfs (Oswalt) and pulsating variable stars are also monitored (Henson ETSU). Super-humping variables are observed as part a WET campaign (Wood), while binary star light curves are observed (Van Hamme and Shaw). Galaxies

are imaged (Smith) and asteroids studied (Leake). Programs involving the search for and monitoring of gamma-ray bursts (Hartmann) are extremely important and exciting. The strength of the observing programs was accented by the strong showing of the summer REU students. Virtually every poster presented by the REU students was of AAS quality, and many will eventually lead to publications.

In order to further research, the acquisition of a new large format camera is imperative for several areas of research. We also are planning to cool the dome and telescope tube to improve the image quality. The amount of science we are doing is a testament to the efficiency of the SARA telescope and how well it operates on a day-to-day basis. In view of this success, the SARA board has discussed the possibility acquiring another instrument. A second telescope would be chosen to increase sky coverage (southern hemisphere), time coverage (longitude) or increase aperture. In order to acquire another instrument, it is necessary to expand the consortium to include a few more universities in the Southeast. Although these discussions are so in preliminary stages, the addition of perhaps two new member universities would give SARA the financial stability to acquire a 0.9-meter in South America, or perhaps gain remote access to telescopes in Australia or South Africa. The idea of a larger aperture telescope, perhaps at Kitt peak, has also been discussed. Individual SARA board members are investigating and gauging the interest of several schools in Georgia and Florida who might be interested in joining.

III. Telescope Usage.

The telescope is fully subscribed and ROA coverage is adequate, although not as comprehensive as we would like. Every night where there was ROA coverage was allocated for research and nearly all clear nights were used by a Saran. The new policy that states "seasoned observers can, if the weather conditions are stable and excellent, keep observing even after the ROA has left the mountain" has been used by several observers with great success. This policy has not endangered the telescope nor caused any trauma so we are leaving it intact for the upcoming observing session. Roughly 68% of the scheduled nights were used, a total of 94 out of 139 nights. The nights not scheduled included the August shutdown and nights when no ROAs were available. Forty-five nights were not used due to weather, etc. In all, forty-four nights were affected by clouds, 13 were affected by high winds, and 11 nights were affected by equipment failure.

IV. Telescope Problems.

No real telescope problems to report. ACE continues to update the software, incorporating more and more "robotic" features. We now control the cameras from the ACE windows, and the weather station is also tied into the ACE software. This allows ACE to pas the telescope location, RA, DEC, JD, ST and filter information into the FITS headers. This also allows us to program the CCD and filters to carry out cyclic observations, cycling through different filters while recording the filter information into the FITS header. This transition went very smoothly and did not interrupt scientific observations! My kudos goes to Peter Mack and ACE for these upgrades.

V. Instrumentation.

- **Cameras**

    1. The small format AP7 Apogee camera remains the workhorse of the observatory. New shutter seems to work well.

    2. We finally took delivery of the ALTA U55 large format camera from Apogee. The camera has a very large field of view and a very short read-out time. The camera is not without problems. The bias is very high, the gain is seemingly set very low, and there is substantial fringing effects in the IR which do not flat-field out. We are ordering a filter to chop off the IR that is causing fringing. The cooling is not optimal either, reaching only about –24C. I am not a fan of the camera for my observations!

    3. The apogee Ap4 is still serviceable and useable but will not be on the telescope in normal operations.

- **Computing facilities**

  Computers continue to work well.

- **Weather Station**

  We had some problems with the wind direction on the weather station, but it appears now to be functioning well. This weather station is great, much better than the previous one. The weather station is accessible from the ACE software and Matt Wood has also connected it to the SARA web site.

- **Auto guider**

  The auto guider is on the telescope and is in regular use by observers.

- **ISTeC** - The ISTeC web site is no longer up due to a computer crash. Dr. Henson is working to restore the site.

- **REU Program -**

  The REU participants were excellent this year. The poster sessions were like a mini AAS meeting with the high quality of the papers. Great job Matt Wood! This program is a definite success we can all be very proud of. Matt Wood has re-submitted the REU proposal fro three more years. Hopefully the NSF will fund it again.

- **ROA's** - Our current group of ROA's are exceptional! Adam Block took some of the nicest pictures with SARA during the August shutdown. Hopefully we will see them in the SARA newsletter soon!

VI. Future.

Here is a list of important action items I feel we need to address in order of urgency.

1. ***Possible SARA expansion.*** Ball State University in Muncie Indiana will be presenting a proposal to join SARA at the September 2005 board meeting. The Ball State group is led by Ron Kaitchuck, Thomas Jordan, and Thomas Robertson. The Agnes Scott group is led by Chris Dupree and Amy Lovell. We are excited about the prospects of adding these two schools and look forward to working with our new colleagues. The addition of the money (buy-in) will allow us to investigate a southern hemisphere telescope. In addition to the cash inflow, the most important addition will be the talents and expertise these astronomers bring.

2. ***SARA South.*** If everything goes well with the members, we can legitimately start preparations for a "SARA south". These are exciting times for the SARA consortium..

3. ***Secondary mirror fabrication and image quality improvements.*** No one has investigated alternative funding for Secondary mirror fabrication. This is a major project and someone who has the time needs to be the driving force behind this project if we really expect developments.

SUMMARY

In my last summary, I noted that "We are perhaps poised on the brink of a new era for SARA." That "new era" is perhaps here with the possible addition of two new members. Remote observations are still normal operation. Improvements remain to the SARA 0.9-meter at Kitt peak such as thermal control, but the other things like header information is now fully functional. The SARA observatory remains a fully functional research and teaching observatory!

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