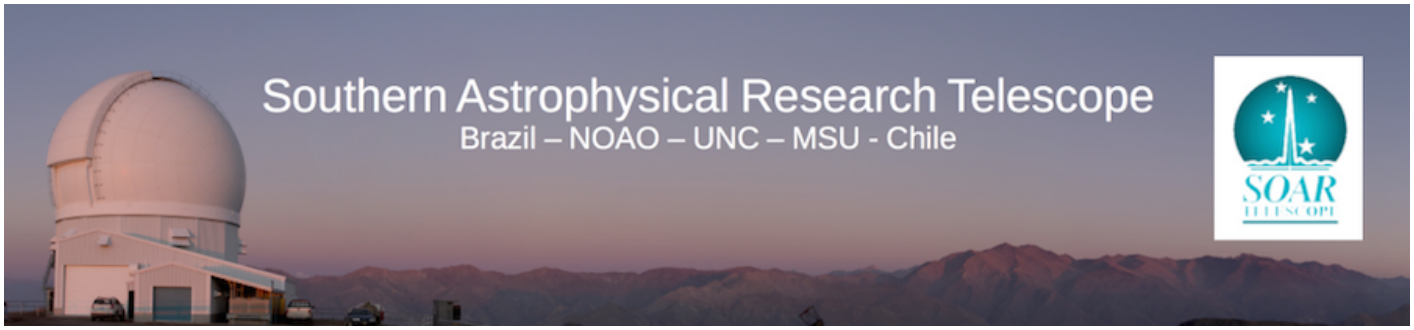

Published on *SOAR* (http://www.ctio.noirlab.edu/soar)

Introduction to SOI

Instrument Overview

The SOAR Optical Imager is a mini-mosaic comprised of two 2048x4096 E2V CCDs (4096x4096 pixels total). At the bent-Cassegrain port, the pixels subtend 0.0767 arcsec on the sky, providing a field of view 5.25 arcmin on a side.

The CCDs are read by two Leach controllers through 4 amplifiers (2 amps per CCD). Depending on binning and the gain setting, the CCDs can be read in as little as 6.1 seconds (4x4 fast readout) to as long as 106.0 seconds (1x1 slow readout). Please see the table given in the SOI Overview page for a more detailed description. The data are taken and examined via vncviewers on the SOI data acquisition computer (currently known as soaric1). From soaric1, one can transfer the data to their home institution.

Unbinned SOI images plus overscan and header information are approximately 37 Mbytes each. Most normal observations are performed in 2x2 binning mode with a binned pixel size of ~0.15 arcsec and are approximately 9 Mbytes each. A typical night produces about 2 Gbytes of data and easily transferred over the internet. This is the preferred method of the SOAR partners. If this is unfeasible, please contact Sean Points prior to your run so that other options can be discussed.

The SOI filter cartridges contain space for 4 filters, plus one blank position, so that up to 8 filters can be installed in the instrument at the same time. Filters may be up to 100mm square and up to 10mm thick. Smaller filters may be accommodated with special adapters but must be at least 64mm square to avoid vignetting.

Philosophy and Structure of this Manual

This manual is intended for an observer planning to use the SOAR Optical Imager (SOI). It is not intended to serve as a hardware or software reference document describing the inner working of SOI, although some details at that level may appear to help the observer plan observing strategies. Also, we assume that the observer is already familiar with CCD cameras, observations, and data reductions.

The SOI Overview [1] is at the front of this manual. If you've read this far, and don't plan to read any

further, be sure you understand the SOI Overview [1] pages.

This manual follows the outlines of the KPNO and CTIO Mosaic imager manuals. Therefore, we have also adopted the philosophy of bald-faced plagarism and have kept structure of those documents. We have made changes to reflect the differences of the SOI mini-mosaic to the KPNO and CTIO Mosaic imagers. We will update this version as improved data and information become available.

Development of the SOAR Optical Imager system is a continuing process. Throughout the lifetime of the instrument, filters will be added, old ones replaced, and software enhanced. This manual represents the status as of the date on the cover page. We expect to revise the manual occasionally to include information gained during engineering runs, as well as to reflect new filters.

Supplemental Information

Other useful information regarding the use of Mosaic, CCDs, and observing and reduction software can be found at:

- Direct Imaging Manual [2]
- KPNO Mosaic Web Pages [3]

Links
[1] http://www.ctio.noirlab.edu/soar/content/soi-overview
[2] http://www.noao.edu/kpno/manuals/dim/
[3] http://www.noao.edu/kpno/mosaic/mosaic.html