# Testing and Integrating a New SALT Acquisition Camera

**Project Level:** Honours

**Supervisor:** Dr Lisa Crause – SALT Observatory Scientist

**Institution:** South African Astronomical Observatory (SAAO)

**Email:** lisa@saao.ac.za

**Introduction**: SALT's acquisition and science imaging camera, SALTICAM, was built by the SAAO instrumentation group and served as the telescope's first-light instrument. It remains in use after almost 20 years of noble service, but it is rapidly approaching retirement age. Rather than trying to replicate this whole instrument, and in the spirit of solving problems in the right order, we have elected to upgrade the telescope's backup acquisition camera (creatively dubbed BCAM back in 2008 – see Fig. 1). SALTICAM is no longer being used for science anyway and this relatively simple BCAM upgrade will ensure that SALT at least retains the ability to acquire targets to be observed with its three spectrographs. The BCAM system's old Apogee Alta detector is barely useable and so we are replacing it with a zippy commercial CCD camera from Teledyne, known as a Sophia 4K (see Fig. 2). This project will centre on the lab testing and integration of the Sophia camera with the BCAM lens assembly, as well as incorporating it into the telescope's software ecosystem. A key motivation for this approach is that it would liberate critical spares for the long-obsolete CCD controllers used by SALT's other first-light instrument, the Robert Stobie Spectrograph (RSS). A new detector for the RSS is under development at the SAAO, but freeing up the SALTICAM controller cards in the short term will substantially reduce anxiety levels within the SALT Operations team.

**Project Description**: We will produce a detailed comparison between the specs for the Sophia 4K and the current BCAM detector (as well as the SALTICAM chips) and use these to estimate (and where possible, measure) the overall efficiency of the system. Teledyne's LightField software can be used to control the camera, but some software development will be necessary in order to populate the FITS headers with additional keywords (to match those used for all SALT instruments). Then for the system to function effectively as an acquisition camera, it will need to communicate with the telescope control system, to allow the required offsets to be sent to position targets for each instrument. Beyond the lab work and software tasks, integrating the Sophia 4K into the SALT payload will involve some mechanical and electrical effort from the Tech Ops team. If the timing works out, the student could participate in those aspects as well, and then potentially work with the Astro Ops team to obtain on-sky commissioning data to demonstrate the performance of the camera. Both the hardware and software from Teledyne are just weeks away, so the core aspects of the project will be achievable within the Honours timeframe. However, we will push to get the system installed on SALT so that initial commissioning results can also be included in the write-up.

**Requirements**: At least a year of Python + LabVIEW programming experience, resilience and enthusiasm for dealing with the vagaries of astronomical instrumentation!

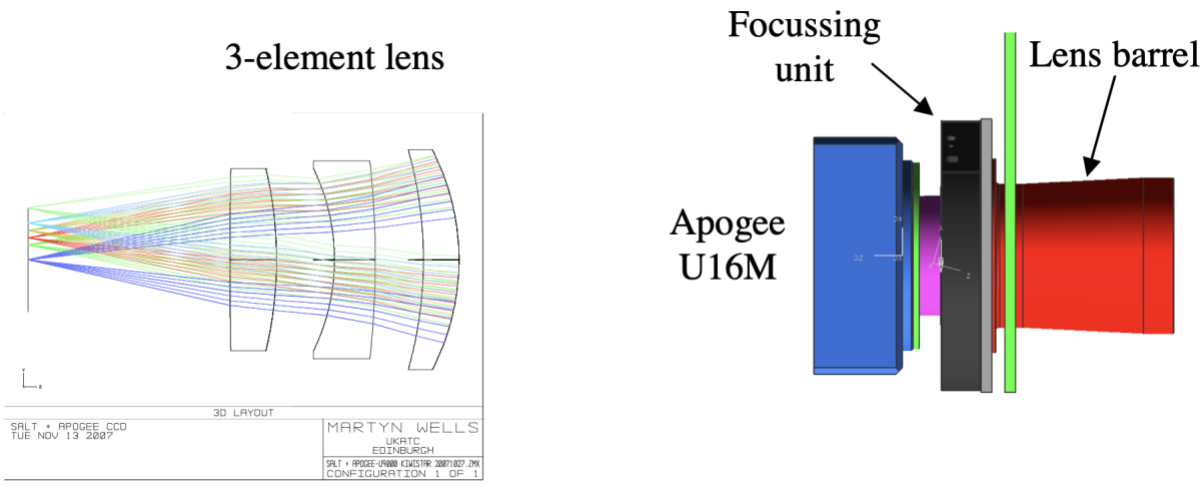


**Fig. 1:** BCAM optical layout (left) and integrated layout (right).


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**Fig. 2:** Sophia 4K camera from Teledyne.