Thursday afternoon we reconfigured the observing system to include streaming video from our internal network camera as well as a view of the building from our external camera. SuperWASP had always been designed to be able to be run in this way, but the weather conditions had forced us to attempt this operational mode several months before we expected to. We were surprised it worked so well! For the inauguration we would attach a red ribbon to the camera cradle which would (in principle) fall to the ground as the instrument was moved. At this time our UK based guests were also arriving, including Professor Kenny Bell (Pro-Vice-Chancellor at QUB) and Professor Martin Ward (Chair of the PPARC Science Committee).

Figure 4. A moment of the remote inauguration ceremony of SuperWASP on 16th April 2004 from ING's sea-level office in Santa Cruz de La Palma.

Surprisingly the weather on the Roque on the day of the inauguration ceremony stayed fair but cold. With the remnants of the snow still around and some ice still on the road we felt vindicated in our decision to move to sea level. The event itself went almost exactly to plan, culminating with the Mayor of Garafía moving the cameras and the ribbon falling. This was just as well: there was no reserve plan, no pre-recorded videos of the instrument running. The only slight (well amusing) flaw occurred when after the ceremony the TV cameras asked to repeat the final part of the ceremony during which the ribbon stubbornly refused to fall until discreetly helped! Ironically the weather had forced us to *remotely inaugurate a robotic instrument* —a first as far as we are aware, and most satisfying given the adverse conditions we faced at the time.

SuperWASP has now moved into the operational phase. At the time of writing the facility is running automatically but not yet robotically. During normal observing SuperWASP takes 30 second integrations which after allowing for readout and telescope movements results in, on average, about one integration every 60 seconds (for each camera). Each detector produces an image of 8.3 MB in size, hence an average night with the current system results in about 25–30 GB of science and calibration data. At the end of the night this is written to DLT tape and shipped back to QUB for analysis. After reduction the brightness measurements are stored in a database hosted (and funded) by Leicester University (LEDAS). We are currently gaining valuable information on how to run this instrument efficiently with a view to running a limited (attended) robotic mode in late 2004.

New funding, obtained by Keele and St. Andrews Universities, will allow the full expansion of SuperWASP (8 camera units giving a field of view of some 500 square degrees), as well as the construction of a clone facility destined for SAAO. In this configuration SuperWASP will be able to image the available part of the celestial sphere in only 67 pointings (with these optics), while the *visible sky can be surveyed in less than 40 minutes*. Thus SuperWASP can efficiently monitor the whole sky. Do not be deceived: it may be small but it's powerful!

The WASP Consortium is composed of astronomers from the UK Universities of Belfast, Cambridge, Keele, Leicester, Open, St. Andrews as well as the IAC and ING. We are indebted and grateful to the staff of both the IAC and ING for their enthusiasm and support for this project, and look forward to a fruitful collaboration in the months and years ahead. ¤

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WHT Auto-guider/TV Upgrades

Simon Tulloch (ING)

During the last year the ageing RGO auto-guider heads have been gradually phased out and replaced with new higher performance cameras. These new cameras use ex-science camera SDSUII controllers freed up in the wake of restructuring and the same data acquisition system (UltraDAS) used by the science cameras. This gives considerable advantages with regard to spares and maintainability.

The new heads can be loaded with two kinds of detector which are pin-compatible, differing only in their number of pixels. The small format heads contain a CCD5710 which has an image area of 512×512×13µm pixels. The larger format heads use a

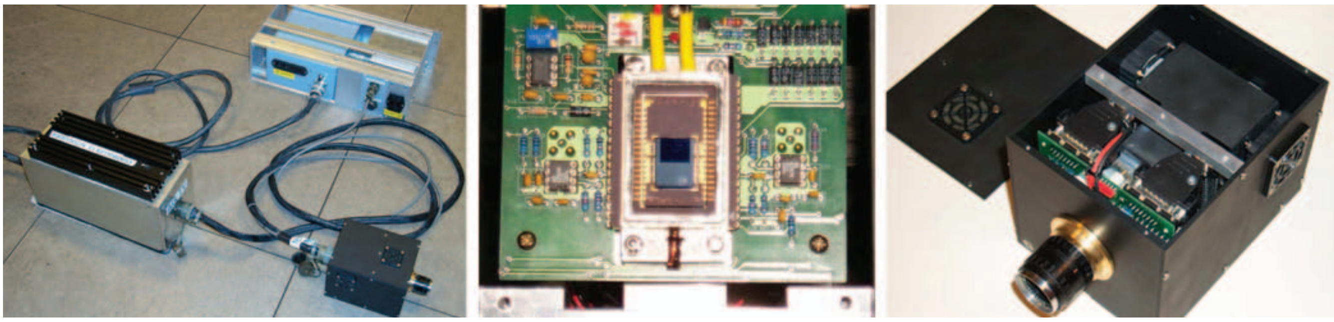

Figure 1. Left: the Auto-guider/TV hardware: Head, Controller and PSU rack. Middle: small format detector mounted on its PCB. Right: the complete Auto-guider/TV head.

CCD4720 with an image area of 1024×1024×13µm pixels. The CCDs were supplied in hermetically sealed packages with integral Peltier coolers which should improve reliability (the previous heads required a continuous dry nitrogen flush to prevent condensation forming on the detector). The Peltier cooling reduces detector dark current to well below $1e^-$ per second. Heat from the Peltier device is dissipated in a finned heat sink that is force cooled by two small fans located within the head. The CCDs are mounted onto a small circuit board that provides pre-amplification of the video signal as well as static protection. Even when connected to their controllers through a 2.5m cable, a read noise of $4-5e^-$ is obtained, similar to the level of the science cameras. The detectors are thinned backside-illuminated with mid-band AR coatings that give QEs of >90% at 600nm.

These in-house designed cameras will eventually replace the Cryocam TV systems also. As they use Frame Transfer CCDs they will be more reliable than the mechanically shuttered Cryocams. Their smaller format, however, means that a focal reducer must be used to obtain the same field of view and allow them to view the entire ISIS slit. A replacement for the TV scale 12 slit viewing optics barrel is currently under construction and should be delivered in September 2004. Once installed at this station the new TV camera will also be capable of slit-guiding. Its images can also be archived in FITS format with full headers to accompany the spectroscopic images obtained with ISIS.

Five cameras are now currently in use at the following WHT stations: CASS Auto-guider, PFIP Auto-guider, AF2 TV, INTEGRAL Auto-guider, NAOMI Acquisition TV, NAOMI Simplexing Camera. Stations still to be filled are: CASS TV (awaiting new optics) and Integral TV (awaiting new head). Two more heads will be built; we already have the detector for the first of these.

The cameras are controlled primarily through dedicated GUIs where the auto-guiding and TV operations can be controlled by the click of a mouse. Alternatively the user can use the standard uDAS syntax to set up windows and do runs in the normal way. Below is a selection of images obtained using these cameras during the commissioning phase. ¤

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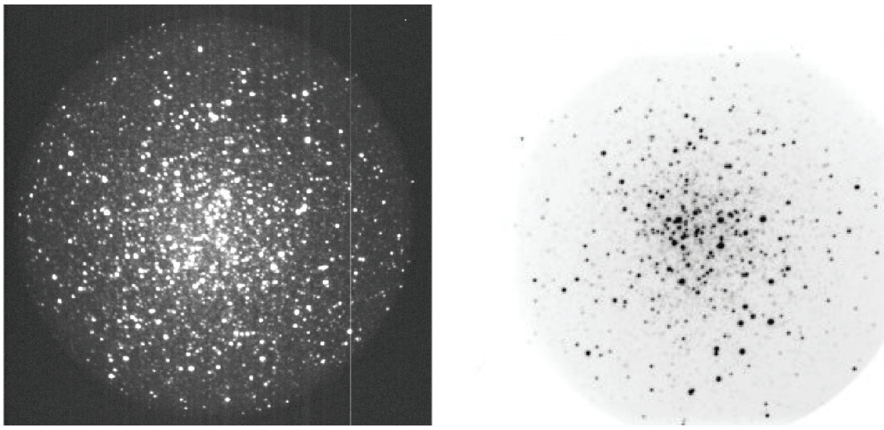

Figure 2. Left: M13, NAOMI TV. Right: M72, NAOMI TV.

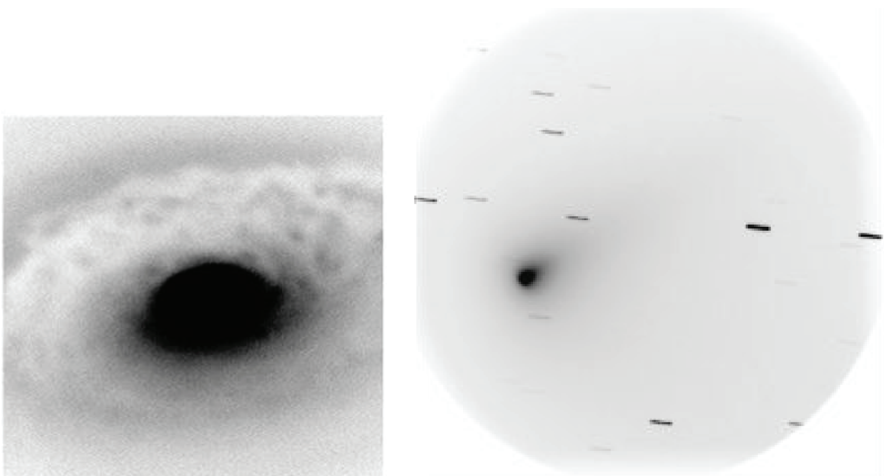

Figure 3. Left: NGC4826, CASS Auto-guider. Right: Comet C/2001 Q4 (NEAT), CASS TV (prototype optics).