## Chapter 3

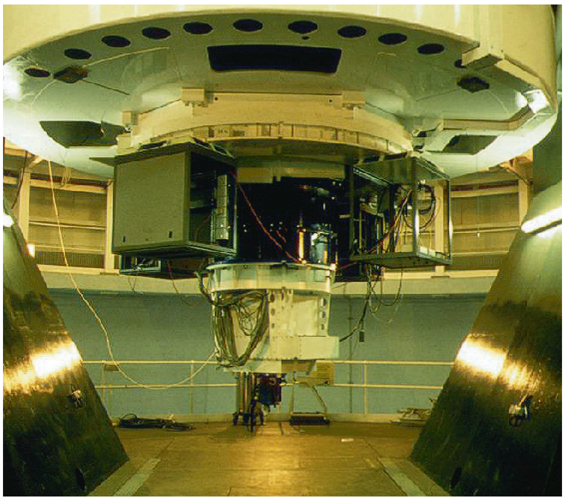
# Telescope Operation and Maintenance

The year 2000 rollover had captivated many computer users across the globe in view of the potential havoc it might cause to IT systems. ING went through an extensive programme of making its systems Y2K ready, in which formal testing was a key element. Problem areas that were uncovered were corrected. As a precautionary measure and to avoid problems with visiting astronomers not being able to travel to La Palma, the telescopes were not operational on the night of December 31st. No major problems were experienced during the year change and operation resumed as normal on the first day of the New Year.

Some of the technical failures in 1999 were the result of recurrent, intermittent problems with specific subsystems. In particular the now-aging data acquisition system on the WHT suffered a period of poor performance. Although interim fixes to faults have been put in place, the ultimate solution is to replace the existing system with a modern Unix based acquisition system, a project that is now well under way.

The panoramic IR imager, CIRSI, was used extensively for observing runs on the INT and the WHT. This instrument, built by the Institute of Astronomy in Cambridge, is currently the largest format state-of-the-art IR camera in the world.

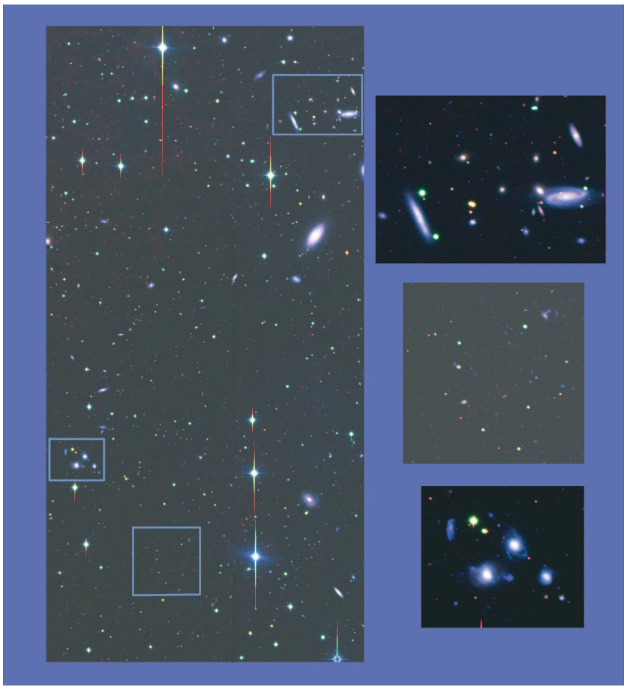
During the year it was decided to withdraw two instruments, the Low Dispersion Survey Spectrograph, LDSS, and the Fabry-Perot imaging spectrograph, TAURUS, as common-user instruments from the WHT instrumentation suite. Although both instrument offered excellent facility instruments for the community, their support required substantial observatory resources whilst the instruments were used only a relative small fraction of the time. Instead of decommissioning the instruments, university groups were invited to adopt these instruments so that their capability was not automatically lost. Withdrawal of LDSS and TAURUS will free resources for commissioning and maintenance of new instruments.


*The Fabry-Perot imaging spectrograph, TAURUS, was withdrawn as a common-user instrument from the WHT after 12 years of operation.*

The primary mirror's reflectivity on the three telescopes continues to be maintained by regular $CO_2$ snow cleaning and regular measures are made to monitor reflectivity and scattering. On-sky checks of the U-band throughput at the WHT showed little degradation over a period of 7 months, allaying fears that snow cleaning might be ineffective at short wavelengths. However, increased scattering over time is apparent, which could be improved by regularly washing the mirror. First tests with *in situ* mirror washing show very promising results.

Over the last year the INT was operated essentially as a two-instrument facility. Generally during bright time the Cassegrain Intermediate Dispersion Spectrograph was used, with a switch to the Wide Field Camera (WFC) during dark time. The observing system with the WFC was run largely without the presence of a telescope operator. As a result of various system-upgrades the complete observing system can now easily be operated efficiently and safely by a single person.

Important progress was made on the development of the new Data Acquisition System, UltraDAS, based around the SDSU-2 CCD controller technology. The new system was successfully deployed on the INT Wide Field Camera and on the WHT Prime Focus imager, with marked improvements in the detector readout time. Full implementation of the SDSU-2 controllers for all cameras and foci will take place during the next year.


*These images represent one of the fields observed in the Faint Star Variability Survey which is one of the INT Wide Field Survey programmes. Shown on the left is one of the 4 CCDs of the WFC.*

## THE INT WIDE FIELD SURVEY PROGRAMME

As a result of a special call for proposals in 1998 a substantial fraction of the observing time on the INT was devoted to imaging surveys with the Wide Field Camera in the prime focus. Since the start of the imaging survey observations very substantial progress has been made. Coverage passed the 100 square degrees mark in 1999. A data reduction pipeline came into routine use. It comprises flat fielding, fringe correction, astrometry, flux calibration, and object catalogue generation. Object catalogues are generated containing typically 1000 to 2000 objects per CCD frame, which equates to object densities of ~30,000 per square degree. Data products are being made available typically one month after the raw data are obtained.

The survey encompasses various scientific goals, one of which is the search for Type Ia supernovae to gauge expansion of the universe. Several new supernovae at intermediate redshift have already been found. Another survey project studies the variability of celestial objects of various kinds. To date over 1600 new variable objects have been discovered and light curves for some 100,000 objects have been generated. These are only two examples of the wealth of data generated by this survey. Also several square degrees of the Pleiades have been mapped in difference colours in a search for brown dwarfs.

The survey activities on the INT spawned further follow-up projects. Discussions were initiated to co-ordinate survey activities between telescopes in order to make optimal use of the data and look for options to extend the survey to other wavelength ranges and to spectroscopic surveys. A special workshop to address the progress and further exploitation of the survey data took place at the Institute of Astronomy in Cambridge in October.