

News from the JCMT

An information newsletter from the Director

Although the JCMT Newsletter is notionally a biannual publication, it has not been issued since March 2004 for a variety of reasons. The JCMT has been a very busy place since then, and I am providing this note to the observing community as an interim measure to bring everyone up to date with recent developments and future plans. The newsletter series will be re-started in 2006.

In fact, there is so much to report that this note somehow stretched into 11 pages...

1. Status of the Current Instrument Suite

The suite of common-user instruments has been stable for the last several years: SCUBA and its polarimeter; receivers A, B and W; and the DAS.

1.1. SCUBA

The community will no doubt be aware from the Board's announcement in July that SCUBA has been permanently retired from service. It had for several months been exhibiting symptoms of two faults:

- There was a leak of ^4He gas into the vacuum chamber which houses the arrays. This leak led to the cryogenic cycling behaviour first noted in Oct04, in which SCUBA spontaneously warmed up to $\sim 1\text{K}$ and cooled back down to operating temperature on a highly-repeatable cycle of 3 days and ~ 5 hours. The most likely cause of this leak, once it was diagnosed, was thought to be two indium rings which provide vacuum seals inside the cryostat. These were replaced in February, with support from the UK ATC. The repair was, however, unsuccessful: the symptoms reappeared shortly after SCUBA was returned to service. The leak was therefore suspected to be in the cryogenic insert itself, possibly at some other indium seals which were not replaced or (more likely) at a soldered joint.
- When SCUBA was returned to service after the indium seal replacement, a blockage developed in the insert. Repeated attempts to clear the blockage, by warming SCUBA to room temperature and re-cooling, were unsuccessful. This was suspected to be caused by a leak in the gas handling system external to the cryostat: air leaked into the system and froze in the insert, but cleared when SCUBA was warmed up.

While the first fault could be tolerated, given the 3-day cryogenic cycle and the short time before the planned retirement of SCUBA, the second rendered SCUBA completely inoperable.

A possible route for the repair of both faults was identified, with the assistance of the UK ATC, but because the work was of a highly-invasive nature we estimated that the repair campaign would require 17 person-weeks of effort, spread over 6 weeks of elapsed time. If successful, the repair

would have returned SCUBA to service for a maximum of 10 weeks before its planned retirement in January 2006 to prepare the telescope for SCUBA-2 (see §2.3). On the basis of these and other considerations, it was reluctantly concluded that the repair of SCUBA was not a realistic option under the circumstances, and the Board approved my recommendation that it be permanently retired.

In reporting this decision, I am well aware of the impact that it will have on many in the community. SCUBA was one of the most successful and productive ground-based astronomical instruments of modern times, and it dominated the telescope usage and productivity statistics: whilst roughly 60% of the telescope time was allocated to SCUBA projects over its 8-year lifetime, it accounted for roughly 75% of all publications based on JCMT data, and 85–90% of JCMT citations were to SCUBA papers. It has clearly provided sterling service to the JCMT community over the past eight years, and its retirement marks the end of an era.

I am considering convening a workshop to celebrate SCUBA's successes, and to look forward to the promise of SCUBA-2. Further details will be forthcoming in due course.

1.2. Heterodyne instruments

Receivers A and B continue to perform to specification, although observations exhibit occasional symptoms of IF instabilities which we have been unable to fully track down and eliminate. Investigation is ongoing. The DAS continues to provide excellent service despite its age, and even survived several circuit boards becoming wet in early 2005 when water leaked into the computer room during a winter storm.

Receiver W has been a recent success story. Going back to early 2004, I had a number of concerns: it faced stiff competition from SCUBA for rare band-1 weather conditions, the demand from the community was quite low, and it was troublesome to operate because it was used so infrequently. These issues are intertwined and led to a positive-feedback loop: the demand was low in part because of the perception that the instrument was difficult to use, and the instrument was difficult to use in part because the demand was low.

In order to break this loop, I struck a task force in 2004 to study the issues surrounding this instrument: its competitiveness against instruments at other observatories, its demand and productivity, and its operational difficulties. The task force was chaired by Harold Butner of the JAC and made a number of recommendations, most of which addressed ease-of-use considerations rather than genuine technical problems. These recommendations were all implemented and RxW has, as a consequence, been highly productive over the past year. This improvement is also due in part to the extensive downtime of SCUBA over the same period, making RxW the instrument of choice in band-1 weather conditions. RxW is down for further repairs at the moment, but it is scheduled to be returned to service in October.

2. New Instrument Projects

The community will be well aware that the entire instrument suite is scheduled to be replaced over the next 18 months: the DAS by ACSIS, our new multi-channel correlator; RxB by HARP, a 16-pixel heterodyne array for the 345-GHz band; and SCUBA by SCUBA-2, the next-generation continuum camera currently under development. In addition, we are developing an interferometry mode for sub-arcsecond astronomy in collaboration with the SMA and the CSO. The individual projects are discussed below. The JCMT's aggressive development programme is an essential component of the strategy for maintaining the facility at the forefront of submillimetre astronomy.

It is worth noting that, through an unfortunate combination of circumstances, all of these projects are coming to fruition within a very short space of time. ACSIS, HARP and the eSMA are all running several years behind their original schedules, whilst the slip in SCUBA-2 has been slight by comparison. The result is a compression of the development programme into a smaller span of time than originally intended. The JAC technical groups are not resourced for this intensity of work, and we have dealt with this by securing additional effort where possible and by prioritising the various projects, and the ongoing support for telescope operations, quite carefully. There will inevitably be an impact on telescope operations whilst this development is in progress, and I ask for the community's patience as we work through this difficult period.

2.1. ACSIS/OCS

AC SIS is a hybrid correlator built around 32 down-converters and samplers. It was developed and built by the DRAO in Penticton, Canada, in collaboration with the JAC and the UK ATC, and was delivered to the JCMT in December 2004. It is currently being commissioned in tandem with a new Observatory Control System (OCS), which has been in development at the JAC (in collaboration with the UK ATC) for the past few years. The OCS will replace virtually all of the software which controls the observatory and its instruments.

Although the ACSIS hardware is completely functional, commissioning of the entire ACSIS/OCS system is a highly complex endeavour. This will be completed by the end of 2005, and at that point ACSIS will become the default correlator. The DAS will be switched off and removed from the telescope in early 2006 after many years of excellent service to the JCMT community.

2.2. HARP

HARP is a 4x4-pixel heterodyne receiver array covering the 325–375 GHz window. The pixels are separated by 30'', i.e., roughly twice the diffraction-limited beam width. An image rotator (K-mirror) controls the array's position angle on the sky. In conjunction with ACSIS, the mapping speed will increase by an order of magnitude or more. ACSIS will allow much greater flexibility in integration time and observing procedures than the DAS, making the observing more efficient. For point sources the sensitivity will, by switching between pixels on the array, match or exceed the sensitivity of RxB. HARP is being built by MRAO in Cambridge in collaboration with HIA and the UK ATC, with SIS devices supplied by Delft University.

The laboratory acceptance tests for HARP are scheduled for late September, and if the acceptance is successful the instrument should arrive at the JCMT in early November. Installation and commissioning will follow immediately thereafter. It is anticipated that the scientific commissioning of HARP will be completed by the end of 2005. RxB will thereupon be retired from service.

2.3. SCUBA-2

SCUBA-2 is the next-generation continuum camera for the JCMT. It is designed to capitalise on the enormous success of SCUBA by providing a wide-field continuum mapping capability of unprecedented scope. This improvement will be achieved through three technical innovations: better per-pixel sensitivity, a large field of view, and novel scanning and sampling modes. These factors combine to enable SCUBA-2 to map large areas of the sky up to 1000 times faster than was possible with SCUBA, opening up the prospect of large-scale submillimetre surveys for the first time.

The instrument development is led by the UK ATC in Edinburgh in collaboration with the University of Cardiff and a consortium of Canadian universities. The detector technology is being developed at the National Institute of Standards and Technology while the silicon micro-machining is performed by the Scottish Microelectronics Centre at the University of Edinburgh, supported by commercial vendors. SCUBA-2 is currently scheduled to be delivered to the telescope in August 2006.

Whilst we look forward to the revolutionary capabilities of SCUBA-2, the project will have two impacts on observing of which the community should be aware.

- First, SCUBA-2 will be by far the largest instrument ever installed at the JCMT, and accommodating it on the telescope as a facility instrument represents a very significant engineering challenge. The scale of the required engineering work is unprecedented at the JCMT since the initial construction of the observatory. The project consists of four components:
 - the receiver cabin will be substantially rebuilt. This includes installation of a new TMU, relocation of the WVM and its pickoff, relocation of RxH3 and its direct beam, and installation of the SCUBA-2 fixed mirrors C1, C3, C3;
 - the left Nasmyth platform structure will be replaced with a mounting frame to accommodate two large SCUBA-2 fixed mirrors (N1, N2) and the SCUBA-2 cryostat;
 - a facility for handling and servicing the cryostat will be constructed on the carousel floor. This includes reinforcing the floor and building a rail system for moving the cryostat across the floor; and
 - a new gallery will be constructed above the control room to accommodate SCUBA-2 services.

The JCMT will be closed for a period of approximately six months in order to carry out this construction work. The closure, while regrettable, is absolutely necessary for the first three components listed above (the final component can be carried out in daywork,

and will be started in October). The shutdown is currently scheduled to commence on 09Jan06, with the telescope returning to service for the beginning of semester 06B on 01Aug06. The loss of observing time represents a significant commitment of resources from all three partners in order to realise the promise of SCUBA-2.

- Second, although the project had a funding shortfall of £4.2M at the beginning of 2005, this has since been completely resolved by contributions from the JCMT operations budget and from PPARC. In order to generate the JCMT contribution, the observing schedule will change from semester 06B onwards from the current pattern of two 8-hour shifts each night to one 12-hour shift (1930–0730), thereby enabling some staffing changes at the JAC. The change of observing pattern will represent a substantial cultural shift for JCMT observers. Although this change represents a 25% loss of observing time, the science loss will be smaller for two reasons: first, observing conditions during the first two and last two hours of the 16-hour night are normally the worst because of atmospheric opacity, atmospheric stability and dish accuracy; second, we will retain the capacity to support extended observing on occasions when the weather so warrants. Thus we anticipate that the scientific impact of the reduction of observing hours will be effectively mitigated.

SCUBA-2 is the top priority in the JCMT development programme, and all of our energies are focussed on making it a success.

2.4. Subsecond astronomy: the eSMA project

Although it was originally approved by the Board in 1996, the eSMA project has been on hold until 2005 while we waited for our partners to reach a state of readiness. I am pleased to be able to report that very substantial progress has been made in recent months. Interface equipment was fabricated by the SMA and arrived in the summer. Interference fringes were obtained in July between the JCMT and the SMA, operating at 267 GHz. The first images in the 230-GHz band should be obtained later in 2005. When the JCMT resumes normal operation in Aug06 following the shutdown, the interferometry mode will be commissioned using HARP: the approved baseline for this project calls for the eSMA to operate only in single polarisation in the 345-GHz band. Once the commissioning is complete, a pilot programme will be undertaken, consisting of six weeks of interferometry spread over a year. The community will be invited to propose projects to be undertaken during the pilot programme.

I stated in the preamble to §2 that JAC technical effort is at a premium, given the number of projects to be completed over a short period of time. In recognition of this, a team in the Netherlands led by Ewine van Dishoeck applied for, and secured, additional funding for this project. The funds are being used to provide additional engineering effort to the JAC to enable this project to proceed in parallel with the other developments described above.

2.5. Other instruments

The JCMT will also be commissioning three further instruments over the next 18 months: ROVER, a heterodyne polarimeter for use with HARP and RxA; FTS-2, a spectrometer for use with SCUBA-

2; and POL-2, a polarimeter for use with SCUBA-2. ROVER was developed at the UK ATC and has already been delivered: it will be integrated and commissioned as time allows amongst all our other high-priority projects. FTS-2 and POL-2 are being developed in Canadian university laboratories (Lethbridge and Montreal, respectively) and will be commissioned roughly six months after the commencement of science operations with SCUBA-2.

2.6. *The JCMT Science Archive*

The high data rates associated with SCUBA-2 and HARP/ACIS, and the prospect of numerous large legacy surveys, demand a radically different approach to data reduction and distribution than has been used in the past. These challenges will be addressed by the development of a JCMT Science Archive (JSA). Development of the JSA is a collaborative project between the JAC and the Canadian Astronomical Data Centre (CADC), and additional resources have been provided for this by both PPARC and the National Research Council. A survey pipeline is currently under development at the JAC for the generation of advanced data products which have been requested by the legacy survey teams. These products will be stored at CADC in a VO-compatible manner. All users (surveys and PIs) will in future retrieve their data through the archive service. The architecture is sufficiently flexible that users who develop alternative algorithms or who generate different advanced data products will be able to upload them to the archive for public dissemination. The JSA project was approved by the Board in May and development is currently underway; public release of the full archive functionality is scheduled for mid-2007. An interim arrangement will be put in place to ensure that users will have timely access to their data in the intervening period.

3. **Observatory Timetable**

It is clear from the preceding sections that there is an enormous amount of work in progress at the JCMT. In this section, I lay out a rough timetable for the next few semesters.

Semester 05B:

Both ACIS/OCS and HARP will be commissioned during the semester. There will likely be no opportunity for science observations with HARP since commissioning is expected to run right up to the shutdown in Jan06.

Because the schedule for the commissioning work is difficult to predict with complete certainty (depending as it does on such imponderables as shipping time, customs clearance, etc.), the observing for the semester will be scheduled on a month-by-month basis. The scheduler, Gerald Schieven, has been in regular contact with PIs of approved projects to facilitate this.

Motivated in part by the desire to provide a continuum capability of some sort during the hiatus between SCUBA and SCUBA-2, the Board endorsed my recommendation that AzTEC be invited back to the telescope as a visiting instrument. AzTEC will be available for shared-risk observing, as described in the 05B Call for Proposals, from 31Oct until the end of the year.

With the retirement of SCUBA and the return of AzTEC, the TAGs were asked to revise their time allocations for the semester. Two of the TAGs decided to issue supplemental calls. This exercise is now complete.

Semester 06A:

This semester is cancelled. The telescope will be closed for the entire semester for construction of the infrastructure for SCUBA-2.

Semester 06B:

A Call for Proposals will be issued on 15Feb06, with proposals due for submission on 15Mar06. I expect that HARP will be available. Whether SCUBA-2 will be offered to the community depends on the project schedule; a decision will be made at the time. According to the current delivery schedule and a best estimate of the installation and commissioning phase, SCUBA-2 would be available to the community in Dec06 at the earliest.

The community will recall that the Board-approved instrumentation policy for the JCMT calls for receivers A and W to be retired in 2006, leaving only SCUBA-2, HARP and their ancillary instruments. Observers should therefore anticipate that these two receivers will no longer be available, although I may reconsider this closer to the time. Receiver B will certainly be retired since it will have been replaced by HARP.

4. The Future

4.1. *The JCMT Legacy Survey Programme*

A comprehensive Legacy Survey Programme was approved by the JCMT Board in July. This was the culmination of a community-based process that began with a call for ideas in 2003 and proceeded, via Letters of Intent in 2004 and a very successful community meeting in Leiden in Jan05, to the submission of proposals in Mar05 and final Board approval.

The Letters of Intent had indicated a likely total request that exceeded the time available by more than 500%, supported by over 200 active astronomers in the partner countries (note that UH had declined to participate). A two-day community meeting was therefore organised in Leiden, in Jan05. It was well attended, and achieved its goals: tri-national consortia emerged and duplication was eliminated.

With the subsequent absence of directly-competing proposals and a realistic assessment by the community of the time available for surveys, the level of demand at the eventual Call was well matched to the time available. Seven proposals were received, covering the full range of weather and RA. They were:

- *Spectral line survey*: a proposal to use HARP to study the molecular inventory and the physical structure of a sample of objects spanning different evolutionary stages and

different physical environments in molecular clouds and to probe their evolution during the star formation process.

- *Local galaxy survey*: a proposal to use SCUBA-2 and HARP to study the ISM and its interplay with star formation in a sample of 331 nearby galaxies.
- *Debris disk survey*: a proposal to use SCUBA-2 to conduct the first unbiased survey of debris disks around 500 nearby main-sequence stars, providing robust statistics on the incidence of such disks.
- *Gould's belt survey*: a comprehensive proposal to map most of the star-forming regions within 0.5 kpc using SCUBA-2, to obtain HARP maps of the brightest sources in three isotopomers of CO, and to produce the first statistically-significant set of submillimetre polarisation maps using POL-2.
- *SCUBA-2 All-Sky Survey (SASSy)*: a proposal to map the entire sky visible from the JCMT (18,000 square degrees) using SCUBA-2 in band-4 weather, providing a comprehensive dataset of value for both cosmology and galactic studies.
- *Cosmology survey*: a proposal to build on the success of the SCUBA surveys (e.g., SHADES) by mapping 70 square degrees at 850 μm and 2 square degrees at 450 μm .
- *Galactic Plane survey*: a proposal to address key questions in massive star formation by mapping two-thirds of the Galactic Plane in the submillimetre continuum and in ^{13}CO , using HARP and SCUBA-2.

Given the high level of community demand and the compelling science cases, it is natural to consider whether the JCMT might usefully be converted to a surveys-only mode of operation. At the Leiden meeting, the community clearly and unanimously rejected this model for a number of reasons. First, several strong science areas are not covered by the legacy surveys: the exploitation of lensing clusters in cosmology, which gave SCUBA its first success, and the targeting of quasar samples are two examples. Second, it is very likely, based on previous experience at the JCMT and elsewhere, that new, innovative ideas will surface each year, and it is essential to retain the capability to accommodate these. Third, it is likely that the legacy surveys themselves will give rise to many strong PI follow-up proposals. Fourth, the community is likely to want time to exploit the eSMA. Finally, it is unanimously believed that international time should continue to be allocated. For these opportunities to be exploited, the Board decided that 55% of UK/Ca/NL time should be allocated to the survey programme, and that the remainder be set aside for conventional PI-led proposals. As a result of this decision, much of the high-profile legacy programme science has to be spread over 5 years.

The Board therefore approved a Legacy Programme requiring a total of 3,184 hr (265 nights) over a two-year period covered by semesters 07A–08B, subject to ongoing review. It also approved, in principle, a further 3,684 hr (307 nights) over a further three-year period (semesters 09A–11B), subject to review and to renewed competition. Details are provided in the table. In general, it was clear that the SCUBA-2 imaging surveys had clear legacy strength, while HARP and the other SCUBA-2 modes were somewhat better suited to focussed science follow-up. Where proposals

Legacy Survey Allocations (in hours per weather band)

		Years 1–2				Years 3–5			
Proposal	Component	1	2	3	4	1	2	3	4
Spectral	HARP	0	0	0	187	0	0	0	0
Local galaxies	SCUBA-2	0	75	0	0	0	75	0	0
	HARP	0	0	65	65	0	0	65	65
Debris disks	SCUBA-2	0	60	270	0	0	60	0	0
Gould's belt	SCUBA-2	70	210	0	0	0	132	0	0
	HARP ^{12}CO	0	0	46	0	0	0	6	0
	HARP C^{18}O	0	100	0	0	0	250	0	0
	POL-2	0	41	0	0	0	62	62	0
SASSy	SCUBA-2	0	0	0	500	0	0	0	1000
Cosmology	SCUBA-2 850 μm	0	300	330	0	0	200	700	0
	SCUBA-2 450 μm	490	0	0	0	630	0	0	0
Galactic plane	SCUBA-2	0	284	0	0	0	377	0	0
	FTS-2	0	50	0	0	0	0	0	0
TOTAL		560	1120	752	752	630	1156	833	1065

had weaknesses it was often in defining the target sample — in some cases these weaknesses could be removed by scheduling the science into years 3–5 to allow the project to exploit the output from other surveys to yield well-defined samples of targets. Due to the over-subscription pressure and scheduling needs, much of the high-profile science had to be spread over 5 years. The result is an efficient, self-contained 2-yr plan of the highest scientific calibre, but it is clear that some of the main science goals of the proposals require a 5-yr legacy programme. The goal is for all surveys to produce a *complete* dataset after two years, thus ensuring that maximum legacy value is retained.

Raw data from the 2-yr legacy programme will remain proprietary until 12 months after the acquisition of the last data. In return, allocations are subject to the consortia agreeing to provide reduced data products through the JCMT Science Archive on a similar timescale, and to staff the telescope for their time allocation. Oversight of the legacy programme will be accomplished via bi-annual reports from each survey team, with a strategic review after 10 months wherein the survey coordinators make presentations to the Board. All Legacy allocations will be subject to this review. The oversight process is currently under discussion at the Board.

In summary, the extraordinary quality and scope of the legacy programme is self-evident: it is of the highest scientific calibre. The surveys will revolutionise our understanding of planet formation processes; they will address questions fundamental to star-formation studies, and obtain a molecular inventory of objects spanning a range of evolutionary stages and physical environments; they will produce the first large sample of local galaxies observed with good spatial resolution at submm wavelengths; the entire sky visible to JCMT will be mapped, including deep scans of the accessible Galactic Plane, placing massive star formation research onto a firm statistical basis for

the first time. Last, but not least, the cosmology programme will revolutionise our understanding of galaxy formation, yielding a survey of enormous and lasting legacy value. All the surveys promise to be uniquely powerful levers for the exploitation of the growing range of public survey datasets and a springboard for future exploitation of ALMA, Herschel, LOFAR, JWST and the SKA. The knowledge gained from the legacy programme will have far-reaching benefits for the whole of astrophysics.

The development of the Legacy Survey Programme has been managed by the JCMT Survey Steering Group. The group consisted of 9 members from the three partner countries plus the JAC, and was chaired by Dr Rob Ivison. Some of the text above was taken from the Group's report to the Board. I am grateful to all members, and to Rob in particular, for the time and energy they committed to this process on behalf of the JCMT.

4.2. Strategic Review of the JCMT

The approval "in principle" of a five-year Legacy Survey Programme raises the question of the longevity of the facility. As many users will be aware, the tripartite agreement between the three JCMT funding agencies (PPARC, NRC, NWO) expires in 2009. Now that SCUBA-2 is fully funded and the future scientific programme of the observatory is clear, it is both appropriate and timely that this issue be addressed.

To prepare the way for this discussion, the Board called for a Strategic Review of the JCMT. Its primary objective is "to consider the astronomical role of the JCMT in the era beyond 2009, with particular attention to its competitive international position in the context of other submillimetre facilities". A review panel has been set up for this purpose: Martin Harwit (chairman), Karl Menten, Ian Smail and Chris Wilson. Some of the community have already been involved in this process, through questionnaires or through meetings with the panel members. The panel has just visited the JCMT, and their report will be submitted to the Board in early October. The process from that point forward is a matter for the three agencies. I will keep the community informed as this situation evolves.

5. Other Topics

There have been a number of staffing changes since the last Newsletter was issued:

- The required complement of TSSs to support 16-hour operations is five. Thomas Lowe resigned in Jun04 to pursue a research career in Canada. Ben Warrington joined us in Oct04: Ben holds a BSc in astronomy from the University of British Columbia, and he has integrated seamlessly into JCMT operations. This brings our complement of full-time TSSs to four (Ben, Jim Hoge, Jonathan Kemp, Ed Lundin); the fifth is made up from a combination of Jeff Cox, who is with us on a part-time basis until the January shutdown, and the support astronomers, who function as occasional restricted operators. When we revert to 12-hour operations in Aug06, Jonathan will be split 50:50 between JCMT and UKIRT.

- Two support astronomers have departed during the period: Bernd Weferling in Dec04 and Vicki Barnard in Jun05. Both were enthusiastic and dedicated in their support of JCMT operations, and we shall miss them. They will not be replaced. Users may recall that we were scheduled to lose two support astronomers in 2006 as part of the restructuring of the JAC following the PPARC accession to ESO; in fact, we lost these two positions by attrition rather than by redundancy. The downside of this is that we are short-staffed until the era of survey operations, with its lower support demand, takes effect.
- The Chief Engineer, Dean Shutt, retired in Jul04. He was replaced in Mar05 by Simon Craig, who joined us from the UK ATC where he had been the systems engineer for the VISTA project. Long-time users of the JCMT may recall Simon from his previous tenure at the JAC as a mechanical engineer. Simon is now in charge of the infrastructure project for SCUBA-2, amongst many other things.
- The Head of Software and Computing Services, Nick Rees, resigned in Dec04 to move to the UK. Whilst we had ample notice of this move, his departure was a challenge for us because of his long experience with the JAC. Craig Walther was promoted into Nick's position, and he is currently leading the commissioning of ACSIS/OCS software.

Whilst the departure of staff is always regrettable, it is a fact of life and the JAC is fortunate indeed to have replaced Dean and Nick with such capable individuals.

Finally, following an in-house competition won by Iain Coulson, a new logo has been designed and adopted for the JAC. It can be viewed on our website.

I trust the community will find this newsletter informative. Some profound changes are taking place over the next year or so as we integrate a new suite of instruments and move to a new observing pattern, and it is vital that the community be aware of these.

*Professor Gary Davis
Director JCMT
22 September 2005.*