



Introduction

Life is extremely hectic at the JCMT these days. Although we re-started the newsletter series with the issue in June of a new publication entitled *Spectrum*, the editor Gerald Schieven is completely loaded at the moment (about which more below) and we will therefore not issue the next edition until spring 2007. This document is an interim version so that the user community is kept up-to-date with developments at the telescope.

The community will be aware that the JCMT is currently undergoing a profound transformation in which its entire suite of instruments is being replaced. The June issue of *Spectrum* provided descriptions of the exciting new scientific capabilities that will be available with HARP and SCUBA-2. Management of this transformation process is a constant challenge, given the constrained resources within which we are working at the JAC and the continual evolution of instrument project schedules. Nevertheless, the timetable is obviously of great interest to users of the JCMT, and I write now to provide you with the latest information.

Heterodyne Suite

The JCMT was recently closed for six months of engineering work in preparation for SCUBA-2 (about which more below), and during this period the DAS was retired after 14 years of excellent service to the JCMT. The JCMT computer room was completely renovated as part of this work and the ACSIS computers were installed. Bringing the telescope back to a state of complete functionality after six months was not a trivial task. We currently have RxA available, with ACSIS as the backend spectrometer, all orchestrated by a new Observatory Control System (OCS). (RxB has given us some technical difficulties since the shutdown and it is not currently functional, although we are continuing to work on the problem.) Integrating all of these elements and bringing them to an acceptable level of efficiency and reliability involves a huge amount of trouble-shooting and debugging, consisting largely of small steps forward as each problem is fixed. Still, no show-stoppers have arisen and we re-commenced science observations on schedule when observers returned to the telescope on 1st October – for the first time since February.

HARP was delivered to the JCMT in late 2005, but we were unable to complete its commissioning before the telescope was closed in mid-February. This work has now resumed. We are currently in a period of integration, in which the basic functionality of the system in conjunction with ACSIS and the OCS will be proven, followed by astronomical commissioning in Nov/Dec. I therefore expect to be able to release HARP/ACIS for common-user observing in semester 07A. A number of HARP

proposals were approved for semester 06B on a shared-risk basis, and I anticipate that we will undertake these before the extended semester ends on 28th February 2007.

In parallel with the above, RxW is being modified: the C-band capability is being replaced by a B-band channel, with two spare junctions from the HARP programme being provided by MRAO; and the D-band junctions are being replaced with new junctions of the ALMA design, provided by SRON. The modified RxW will therefore be a powerful instrument, providing enhanced sensitivity in two polarisations at both bands. The rationale for this modification was to provide a dual-polarisation capability at B-band for compatibility with the eSMA. I am grateful to NWO and Dr van Dishoeck of the Netherlands for making resources available to enable this work to proceed in parallel with the JAC's other commitments. The modifications are proceeding on schedule and I expect RxW to be installed in the receiver cabin before the end of 2006. RxB, which has been the workhorse heterodyne instrument of the JCMT for several years, will be retired at that time; any unfinished B-band programmes in the queue will be undertaken either with HARP or with RxW/B.

Finally, ROVER was delivered to the JAC in 2005. ROVER is a heterodyne polarimeter for A and B bands, and will primarily be used in conjunction with HARP. It will be installed and commissioned on a best-efforts basis as time allows amongst the JCMT's other high-priority commitments.

Continuum Suite

The highlight of the development programme is, of course, SCUBA-2. As noted above, the JCMT was closed in February for six months of engineering work to build the infrastructure for support of this instrument. The shutdown ended on schedule in mid-August and although there are some outstanding tasks to be completed before the JCMT can be declared fully ready for SCUBA-2, these will be done in daywork for the most part and there will be minimal impact on science observing. Visitors to the JCMT will notice some major changes at the telescope:

- the platform which formerly supported SCUBA has been replaced by a framework on which the SCUBA-2 cryostat and two fixed mirrors will be mounted;
- a railroad has been installed for moving the cryostat across the carousel floor and mating it to its mounting frame;
- a new gallery has been built above the control room to accommodate the cryostat services; and
- the receiver cabin has been renovated in preparation for the SCUBA-2 cabin optics.

The JAC engineering staff have worked extremely hard under difficult conditions to bring us to the current state of preparedness, and I am very grateful for their efforts.

SCUBA-2 offers tremendous scientific promise, but realisation of that promise entails a very high risk; in particular, the leading-edge detector technology has been developed in

parallel with the instrument design and construction. The risk in this unconventional approach was recognised from the beginning of the project, but was judged to be worth taking in view of the potential scientific gain. Against this background, it should come as no surprise when the programme suffers delays due to unforeseen technical problems.

I stated in the June *Spectrum* that SCUBA-2 was expected to arrive at the JCMT in late 2006. I regret to report that this has now slipped to April 2007. There are a number of factors which have contributed to this slip, some of which were known risks in the programme, and others which could not have been foreseen. An example of the latter was a lengthy delay at an industrial contractor which had received a large and high-priority order, as a result of which a critical step in the SCUBA-2 array fabrication was essentially put on hold for several weeks.

The community will recall that the design of SCUBA-2 includes four detector arrays at each of two wavelengths, 450 μ m and 850 μ m. The field-of-view provided by these large-format arrays is one of the major factors contributing to the huge increase in mapping speed that SCUBA-2 will provide. The instrument will be delivered to the JCMT with a subset of these arrays, probably one at each wavelength, with the remaining devices to follow some time later. This strategy is advantageous in several respects: the commissioning and optimisation of SCUBA-2 on the telescope will no doubt throw up a new set of challenges, and getting these sorted out in parallel with the fabrication and test of the final arrays is an efficient way in which to proceed. Thus I expect to be able to release SCUBA-2 for shared-risk observing, and possibly even for common-user observing, some time during semester 07B. Moreover, even in its minimum configuration with only one array at each wavelength, SCUBA-2 will still be a uniquely powerful instrument: the field-of-view (12.5 sq arcmin) will be three times larger than the original SCUBA.

In addition to the above, the JCMT will also be taking delivery of two ancillary instruments which will operate in conjunction with SCUBA-2: a polarimeter (POL-2) and a Fourier transform spectrometer (FTS-2). Both are being developed in Canadian universities using Canadian funds, but will be made available to the entire JCMT observing community on a common-user basis. The formal position is that these instruments will not be commissioned until SCUBA-2 has been delivering science for six months, but the situation will be kept under review as the instrument schedules evolve.

Sub-arcsecond astronomy

Commissioning of our interferometric mode, in collaboration with the SMA and the CSO, has resumed following the infrastructure shutdown. When this commissioning is complete, the agreement between the three observatories calls for a Pilot Programme in the 345 GHz band, consisting of 42 nights spread over 12 months, to fully characterise the system. The Pilot Programme will commence in 2007 and the JCMT community will have access to this time through a conventional proposal process. A workshop is being

organised by Michiel Hogerheijde for early 2007 to present this important opportunity to the community.

Staffing News

Commissioning of so many new capabilities within a short space of time places a very heavy demand on JCMT staff. In order to provide leadership and coordination for the commissioning of the heterodyne suite of instruments, I have appointed Remo Tilanus as the “commissioning manager” on a temporary basis. Some of his normal duties have been transferred to Gerald Schieven, who is the interim Head of JCMT Operations in addition to retaining his usual portfolio of responsibilities as Scheduler. These arrangements are temporary and Remo and Gerald will return to their normal positions when the commissioning of HARP is declared complete, nominally at the end of 2006. I am grateful to them both for the additional responsibilities they have taken on during this hectic time.

Many of you will have seen the advertisement for an Associate Director for the JCMT. The rationale for creating this position was two-fold: first, to provide additional effort within the observatory for implementing and supporting the Legacy Survey Programme; and second, to take over some JCMT responsibilities from me so that I can split my time more equitably between JCMT and UKIRT. (Users of the JCMT might not be aware that I am equally responsible for both JAC telescopes.)

I am pleased to report that Dr. Antonio Chrysostomou, of the University of Hertfordshire in the UK, has accepted this position and will be taking up the post in January. His primary responsibility will be to deliver the science programme of the JCMT, and in this capacity he will be the main point of contact between the observatory and the legacy survey teams. I very much look forward to having Antonio on board.

Professor Gary Davis
Director JCMT.