# Getting Started

Before you begin, it may be worth checking the MOPS development page, which describes the latest upgrades to the MOPS system. (http://mopradev.pbwiki.com/). Hopefully, there won't be too much conflicting information between this page the MOPSdev wiki.

The schedule and configuration files that you will need (for programme, calibration and beam maps) are attached below, and/or kept on minos in the **~/M172/scheds/losample** directory.

# MOPS Configure

At the start of a session, you may need to configure MOPS. This is usually necessary when the previous observer has been using broadband mode. Note that this is contrary to the advice on the mopsdev wiki, but it seems to work. **Update (5 Aug):** I haven't had to do this recently.

To configure, choose **mops_138_4096_z4x** from the MOPS window, and press the **CONFIG** button. If everything has worked fine, a CONFIG xterm will appear, scroll some text, and then minimize itself. The MOPS window will then be in a normal-looking state. If not, call Dion.

# Schedule Files

The schedule files are kept in the **~/M172/LMC_INNER/scheds/losample/newvc** directory on minos. These were generated by running **writesched.sh**, which calls the perl scripts **otfsched.pl** and **positions_[h,v].pl**. These scripts don't quite reflect the state of the current system, so each schedfile needs to be fixed by hand before TCS will run properly:

1. Delete the '=' sign between the line zoomcfg and /home/atcaobs/tcs/sched/M172/m172zoomcfg in the .sch file
2. TCS sometimes has trouble reading and passing the zoomcfg file to MOPS. This does not cause TCS to fail, but you will notice that the frequencies in SPD are wrong, and the wrong window numbers appear in the MOPS log (except if - fortuitously! - the previous observer was using the same windows and centre frequency as us). The current recommendation is to use **current/tcs** with **config = mops_zoom** in your schedfile, not(!) mops_183_4096_z4x. 3. Note that the first scan of the schedule file is a dummy. Check that unit1 of the schedfile has project = "tsys", and unit2 has project = "M172".

There has been some work on implementing a "check attenuators level" observation type, with the idea to include one such scan at the start of each schedfile so you don't have to adjust the attenuators manually (see below). I tried a version of **CHECK-LEV** on 27 June 2006 and it didn't work. The GTPs and statistics could not be brought into range in time, so the schedule stopped itself. For the moment, then, the schedfiles don't include a CHECK-LEV scan, so the attenuation must be adjusted manually.

When the schedfiles are ready to go, you can put them on bigrock using the following command, e.g. **minos> schedput M172/newvc LMCinr_1547_h.sch**

For the moment, I am only copying the schedfiles over to bigrock that I am actually about to observe.

You will notice there is an **oldvc** and **newvc** area in the schedfile areas on minos and bigrock. This is because I have shifted the original bandcentre. Observations prior to the 4th of August used vc=112020.

Observations after UT2006-08-04-0000 have vc=111460. I hope this means that our estimate of the Tsys in the 12CO band is more reliable.

# Pointing

Point on the maser R Dor using the file **/nfs/online/local/tcs/sched/Point/point8_zoom.sch**. Remember you still need to choose RDor out of the catalogue (Source name --> Standard --> Sio maser --> RDor) on the TCS interface, otherwise TCS will try to point on your previous scan. You may need to twiddle the attenuation, since you are changing from ~110GHz down to ~86GHz.

To obtain the pointing solution, use **/home/atcaobs/Mopra_point/code/sio_point_recent_mops**, which should be running on a **bigrock** terminal. Follow the prompts, choose the 1st IF, then both pols.

The velocity R Dor is 11 km/s, so the silicon oxide maser line should appear around 86240MHz.

Point after every map. The global pointing solution seems quite good for mid-range elevations, but rather worse for elevation about ~50 degrees. At these higher elevations, you may need to point 2/3 times to get the corrections below ~8 arcsec. The pointing is elevation and temperature dependent. On cold days, I've noticed that the pointing remains excellent at all elevations.

If the telescope cannot find the maser at all, the pointing solution may have been stuffed by the pesky previous observer. You can restore the global pointing solution (or your own personal pointing solution if you prefer) in the **attest** window. If that applet doesn't seem to exist, you can try a **newcain pparams** on a **bigrock** terminal.

# Zoom Setup Files

**NEWVC (post 4th August)**: There are three setup files that MOPS needs, but that you shouldn't need to edit. These are **m172newcfg** (for the actual LMC maps), m172newcal (for the orionkl calibration scans), and rdorbeamzoomcfg (for Sio beam maps). m172newcfg and m172newcal are called from **/nfs/online/local/tcs/sched/M172/newvc/**, and rdorbeamzoomcfg is called from /nfs/online/local/tcs/sched/M172/. A good copy is kept on **~/M172/LMC_INNER/scheds/losample/newvc/** if they get lost.

**OLDVC**: There are three setup files that MOPS needs, but that you shouldn't need to edit. These are **zoommode** (for the pointing scans), **m172zoomcfg** (for the actual LMC maps), m172calzoomcfg (for the orionkl calibration scans), and rdorbeamzoomcfg (for Sio beam maps). They are called from **/nfs/online/local/tcs/sched/M172/oldvc/**, and rdorbeamzoomcfg is called from /nfs/online/local/tcs/sched/M172/. A good copy is kept on **~/M172/LMC_INNER/scheds/losample/oldvc/** if they get lost.

# Attenuators

Switching to a new frequency (e.g. between your pointing and schedfile) may require adjusting the attenuators. To do you need to type **matt auto** in command input box of the MOPS window. When the samplers and GTP have settled down, then type **matt ma** to lock. Stop and restart your scan. The samplers should be ~27% and the GTP should be ~0.5-0.7.

# TCS (aka Observe)

When you think you're ready to observe...

1. In the ACTION PANEL of the TCS window, load your schedfile (click on the grey **Sched File** button and choose your file from the drop-down menu).
2. Press **Start Sched** button. Note that the first scan is a dummy for the Tsys measurement, and is called something like 2006-25-06_1734-*tsys*.rpf. The next corrfile is your data - and should be called something like 2006-25-06_1734-*M172*.rpf. Note the name of your data file in the log, and on the wiki.
3. Check the TCS log window and the TCS input fields to make sure everything looks right (no red errors, correct source name etc.)
4. Goto the SAMPLERS tab of the MOPS window, and check the attenuator stats. If necessary, twiddle and restart scan.
5. Mid-way through your map, goto the TSYS tab of the MOPS window, and note down the Tsys for the log/wiki.
6. Monitor what's going on with the SPD display.
7. Don't forget to keep track of what you're doing in the electronic log (see below).

The velocity range of the LMC is [150,350] km/s. For the **newvc**, the lines should appear around:
12CO ~ 115175 (band 4, window 13)
13CO ~ 110109 (band 2, window 5)
C18O? ~ 109690 (band 2, window 2)

If, for some reason, you are using the **oldvc**, the lines should appear here:
12CO ~ 115175 (band 4, window 9)
13CO ~ 110109 (band 2, window 1)
C18O? ~ 109690 (band 1, window 13)

# Electronic Log

Tony has written some nice tools to keep an electronic log. There are two scripts, **Comment.csh** and **Filewatch.csh**, that you should run from minos. To run either of these, goto **~/otfsuite/bin/** and simply run the script. The log files are created in the **~/OBSLOG** directory.

# Calibration Scans

Observe Orion once per night as a calibrator. The coordinates for Orion are (05:35:14.5,-05:22:29), and it has a velocity of 9km/s. It rises at about 01h20 and sets about 09h50 (LST), i.e. the LMC rises earlier, and sets later than Orion.

The schedfile for the calibrator is ...*newvc/M172-orionKL.sch*. This references a setup file called **m172newcal**. If you want to do a calibration for the old observing centre, the files are ...oldvc/M172-orionKL.sch and m172calzoomcfg.

You should point on the Orion Sio maser before taking your calibration scan. To do this, choose Orion Sio out of the catalogue (Source name --> Standard --> Sio maser --> RDor) on the TCS interface, and run the usual pointing schedfile: **/nfs/online/local/tcs/sched/Point/point8_zoom.sch**.

All the required files are on minos and bigrock, in the same directories as the project schedfiles. Note that the centre frequency for the calibrator scan is 111550MHz, whereas the project schedfiles have a centre frequency of 111460 MHz. (The oldvcs for calibrator and LMC map were 111970MHz and 112020MHz).

For the new vc, the lines should appear at:
12CO ~ 115267 (band 4, window 13)
13CO ~ 110198 (band 2, window 5)
C18O? ~ 109778 (band 2, window 2)

For the old vc, the lines should appear at:
12CO ~ 115267 (band 4, window 10)
13CO ~ 110198 (band 2, window 2)
C18O? ~ 109778 (band 1, window 14)

# Beam Maps

Make a beam map using RDor once every couple of days.

The schedfile for the beam map is **RDor_beam.sch**. This references a setup file called **rdorbeamzoomcfg**. Both these files are on minos and bigrock, in the same M172 directories. Note that the centre frequency for the beam map is 82370MHz. The maser line should appear in block 1, window 2 at a frequency of about 86240MHz (RDor has a veloctiy of 11 km/s).

-- AnnieHughes - 5 August 2006

# Attached Files

| I | Attachment | Action | Size | Date | Who | Comment |
|---|---|---|---|---|---|---|
| 📄 | M172-orionKL.sch | manage | 0.8 K | 28 Jun 2006 - 04:58 | AnnieHughes | Schedule file for calibration scan on Orion KL, records 12CO, 13CO, C18O?. Requires m172calzoomcfg. |
| 📄 | RDor_beam.sch | manage | 3.6 K | 28 Jun 2006 - 05:10 | AnnieHughes | 3' x 3' Sio beam map on R Dor. Requires rdorbeamzoomcfg. |
| 📄 | m172calzoomcfg | manage | 0.1 K | 28 Jun 2006 - 04:59 | AnnieHughes | MOPS configuration file for Orion KL calibrator scan. |
| 📄 | m172zoomcfg | manage | 0.1 K | 28 Jun 2006 - 05:27 | AnnieHughes | MOPS configuration file for the programme maps, setting up windows for 12CO, 13CO and C18O?. Important! |
| 📄 | otfsched.pl.txt | manage | 17.2 K | 28 Jun 2006 - 04:55 | AnnieHughes | Tony's wonderful script for generating OTF schedule files. Slightly modified for new MOPS. |
| 📄 | positions_h.pl.txt | manage | 20.1 K | 28 Jun 2006 - 04:53 | AnnieHughes | Perl script for generating RA scan maps. Called by writeshed.sh. Output used by otfsched.pl |
| 📄 | positions_v.pl.txt | manage | 20.1 K | 28 Jun 2006 - | AnnieHughes | Perl script for generating DEC scan maps. Called by writeshed.sh. |

| | | | | 04:52 | | Output used by otfsched.pl |
|---|---|---|---|---|---|---|
| 📄 | rdorbeamzoomcfg | manage | 0.1 K | 28 Jun 2006 - 05:10 | AnnieHughes | MOPS configuration file for R Dor beam map. |
| sh | writesched.sh | manage | 0.2 K | 28 Jun 2006 - 04:54 | AnnieHughes | Wrapper to generate all schedule files for LMC inner survey. Calls positions_[h/v].pl and otsched.pl. |
| 📄 | zoom_bMOPS.sch | manage | 0.6 K | 28 Jun 2006 - 05:14 | AnnieHughes | Pointing schedule file for MOPS zoom mode. Requires zoommode. |
| 📄 | zoommode | manage | 0.1 K | 28 Jun 2006 - 05:14 | AnnieHughes | MOPS configuration file for pointing scan. |

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