TELESCOPE

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1 TELESCOPE

1.1 PRELIMINARIES

1. Switch off lights on all floors, close the blind in the restroom.

2. In the control room, first check the **Operations Logbook** for any restrictions that may be still in force. Turn on the DOME LIGHTS from the console and raise the control room blind.

3. Make a visual inspection of the observing floor to check that the telescope is free to move *e.g.* no ladders or steps are close to the telescope or test instruments connected. Locate the **cass plug** usually left on the observing floor (black circular plate with a handle). If it is nowhere to be found, chances are that it is on the telescope. In that case call the Duty Engineer to have it removed.

4. Put the Telescope in ENGINEERING MODE by pressing the ENG/COMP push button. The button should now be illuminated with an yellow light, indicating ENG mode has been selected.

5. Clear any emergency overrides by pressing the RESET button close to the ENG/COMP button.

6. Ensure that none of the SELECT MANUAL CONTROLS buttons have been activated on the console

7. Make sure that the TCS/DAS/ICL software is running. If not, please follow this link before proceeding.

8. Turn on OIL PUMP from the engineering rack.

1.2 FILLING CRYOSTATS

- Wheel the N2 dewar close to the rotator.
- Connect the dewar to earth using the next earthing point on the rotator.
- FULLY insert the filler tube into the cryostat.
- On the dewar, **CLOSE** the VENT valve.
- **OPEN** the DECANT valve.
- **OPEN** the PRESSURE AUTO valve.
  n.b. Check the pressure does **not exceed** 15 psi.
- If the dewar is low on liquid nitrogen, the PRESSURE MANUAL valve can be opened. Use precaution when doing this as the pressure can build up very quickly if the dewar is close to full.
- Wait until liquid nitrogen is SEEN to be coming out of the cryostat.
- **CLOSE** the DECANT valve and the PRESSURE valve(s).
- **OPEN** the VENT valve. Remove the filler tube with care.
- Disconnect the earth cable and place the N2 dewar close to the wall.

VERY IMPORTANT!
Wear safety helmet (with visor) and gloves when filling cryostats!

*Always remember to leave the PRESSURE RELEASE valve on the dewar **OPEN**. If this is forgotten, pressure can build up over time and burst the relief valve on the dewar. This is especially true if the dewar is close to full.*

1.3 ZEROSET ENCODERS

1. Visually check that the telescope is near zenith park (*i.e*. vertical). The HA synchro position indicator pointers should be near the "12 O'Clock" position with the DEC indicator pointers near the "9:50" position. If the position indicators are some way off, move the telescope close to these positions using the HA and DEC [+]/[-] buttons on the engineering rack. Select quick motion (QM) if the telescope is a long way off position then go to slow motion (SM) to make the final adjustments.

2. In the TCS User window, enter:

```
USER>zeroset ha target  (or: zero ha tar)
USER>zeroset dec target (or: zero dec tar)
```

3. Using the HA and DEC [+]/[-] buttons with slow motion (SM) selected and the drive rate controls adjusted for a very slow speed, move the telescope so that the synchro dial pointers MOVE THROUGH the "12 O' Clock" position in HA and the "9:50" position in DEC.

   The TCS will beep if the zeroset is successful. The yellow LED's mounted above the synchro dials will momentarily flash also confirming that the telescope has been zeroset.

1.4 OPENING UP

1. **Opening the dome top shutter**

   On the engineering rack:

   - Use RAISE MICRO until the OVERTRAVEL indicator goes off.
   - Push RAISE MAIN until the shutter stops moving. The shutter is now fully open.

   n.b. If the dome or shutter does NOT work from the engineering rack push buttons, go up to the balcony and check the manual controls on the large grey cabinet mounted on the dome. The switches (key operated) associated with the dome and shutters must all be pointing to REMOTE, not to LOCAL.

   To operate the **lower shutter**, follow these instructions.

2. Push and hold the PRIMARY MIRROR OPEN button. Check the mirror petals open fully (petals can be seen moving through a gap in the telescope structure).

3. Push the DOME VENT FAN button to enable dome ventilation. The red light will go OFF when the ventilator is on.

4. Turn off the DOME LIGHTS from the console and close the control room blind.

1.5 SWITCHING TCS IN COMPUTER MODE

Put the telescope into Computer Mode by turning the COMP keyswitch. The green section of the ENG/COMP push button switch should illuminate showing that Computer Mode has been selected.

n.b. The HA and DEC slow motion (SM) push buttons **MUST** be set for SM mode (*i.e.* All the lower green sections of the buttons illuminated) before Computer Mode can be selected. If the yellow section of a QM button is illuminated, push the adjacent SM button to re-engage the slow motion clamps. Computer Mode should now be available.

1.6 SWITCHING TV SYSTEM ON

1. **Ensure the gain is turned all the way down**. Switch on power to the TV amplifier (black knot).

2. Turn on the black monitor under the TV amplifier.

3. Wait until the delay & reset LEDs have gone out, then flip one of the TV scan switches to ensure signal is comming through. Leave both the scan switches upwards.

1.7 CLOSING DOWN

1. Turn the TV amplifier and monitor off.

2. Bring the Telescope to zenith by typing `USER> park zen`

3. Push and hold the PRIMARY MIRROR CLOSE button. Check the mirror petals close fully (petals can be seen moving through a gap in the telescope structure).

4. Push the DOME VENT FAN STOP button to turn off dome ventilation. The red light will go on when ventilator is stopped.

5. Put the Telescope in ENGINEERING MODE by pressing the ENG/COMP push button or by typing
   `USER> eng`
   The button should now be illuminated with an yellow light, indicating engineering mode has been selected. If an audial alarm sounds, type
   `USER>ack`
   to mute the alarm.

6. **Closing the dome top shutter**

   *Always remember to bring down the **lower shutter** first*

   On the engineering rack:

   - Push LOWER MICRO until the MAIN OVER TRAVEL light goes off.
   - Use LOWER MAIN until the shutter stops moving.
   - Push LOWER MICRO to *fully close* the shutter.

n.b. There are a few rules concerning dome shutter and bad weather.
When windy and raining from behind the shutter water can penetrate into the dome; there is a seal but it isn't perfect. Therefore in this case please turn the dome to point the shutter into the wind. On the other hand with temperatures below zero we would like to avoid the build up of ice on the shutter, in this case point the shutter out of the wind.

1.8 FILLING CRYOSTATS - MORNING

As at the start of the night, the IDS cryostat needs to be filled:

1. Fill the Cryostats. These procedures are described here.

2. Turn off OIL PUMP from the engineering rack.

1.9 WRITING TAPES

There is a possibility that torn images are related to the writing of tapes while doing exposures (and the consequent reading of the chips). For this reason the following advice:
Please do not write tapes while doing observations; start writing them in the morning when observations are finished.

1. Check whether the drives need cleaning, this is the case if a LED is flashing every 4 seconds. The cleaning cartridge is placed together with the empty tapes together with instructions on how to use it.

2. Insert the DDS1 (90m) tape in the drive /dev/rmt/0n or /dev/rmt/1n

3. Logon to lpss8 as intguest and change directory to the data directory /obsdata/...

4. `lpss8>fitsinit` - follow the displayed instructions on how to initialize the tape.

5. `lpss8>fitsout` - again follow the instructions on the screen. Note that a list of missing runs will appear on the screen which you have to acknowledge before the writing process begins.

1.10 PRINTING OBSERVING LOG

Fill in the observing log html form, select how many printed copies you need and submit. Please archive one copy of the observing log in our log folder.
URL: http://scorpio.roque.ing.iac.es:9999/intlogentry.html
(http://scorpio.roque.ing.iac.es:9999/intlogentry.html)

1.11 FILLING LOGBOOK

The printed logbook in the control room contains fields which *must* be filled out during the night:

1. CCD cryostats : Initials and local time for filling the CCD(s).

2. Breakdown of observing time: Fill in any downtime that was encountered (bad weather, technical problems, etc.) and note the **time lost.**

OBSERVING-SYSTEM

2 OBSERVING-SYSTEM

The INT observing system comprises four computers. These currently being:

- ICS Instrument Control System (**lpss13**) Sparc
- DAS Data Acquisition System (**lpss14**) Sparc
- DRS Data Reduction System (**lpss8**) Sparc

○ TCS Telescope Control System (**lpas2**) Dec Alpha

Normally these systems are up running after the Duty Engineer afternoon checks, but if not, or if the system has to be taken down during the night, follow these instructions.

2.1 STARTING UP THE TCS

1. On lpx22 open up a telnet window and connect to lpas2 as INT_LOGIN.
2. From main menu, type start. This starts up two other windows, the **info display** and the **user interface** window, the original window continues being active as the telescope d-task window; be patient this takes a few seconds.

2.2 STARTING UP THE ICS AND DAS

The ICS

1. On the ICS Sparc. Log on as:

   ```
   Username: intobs
   Password: ****** (as shown on monitor)
   ```

2. Two windows pop up, a pink window from where you run the observing system on this machine and an orange window which is connected to the DAS (lpss14).
   In the orange DAS window enter:

   ```
   obssys
   ```

3. Choose the menu option number for running the correct version (see white board).

4. In the same orange DAS window, enter:

   ```
   startobssys
   ```

5. Now enter in the pink ICS window

   ```
   obssys
   ```

   using the same menu option as for the DAS and

   ```
   startobssys
   ```

   to start the observing system.

6. Check you have the prompt:

```
SYS>
```

in the pink window and make sure the following windows on either the ICS monitor or it's second display screen are present:

- TALKER
- LOG of observations
- TCS INFODISPLAY (Check UTC and LST are updating)
- AUTOGUIDER
- MIMIC for the IDS

2.3 STARTING UP THE REDUCTION SPARC

1. Log on to the INT Data Reduction Sparc.

```
Username: intguest
Password: ******** (as shown on monitor)
```

2. After logging on, three windows should startup:

   - A pink Xterm
   - IRAF showing the "cl>" prompt
   - XIMTOOL

   n.b. If the IRAF or XIMTOOL windows do NOT start, bring them up manually using the procedure below:

   - Move the mouse over the background and press the right mouse button.
   - Keeping it pressed, select "Programs" and then "XGterm". A blue XGterm window will appear.
   - Repeat the above procedure and select XIMTOOL from the "Programs" menu.
   - To start IRAF, enter "ncl" in the XGterm window.

3. In the IRAF window, move into the "date" directory where the images are stored. The current date is entered in the format 'yyyymmdd' *e.g.*

```
cl> cd /obsdata/inta/19990225/
```

2.4 SHUTTING DOWN THE DAS AND ICS

1. On the **ICS** computer, enter in the pink window:

```
SYS> shutdownobssys
Do you want to wipe out the system Y/N? y
SYS> cleanup
SYS> exit
```

2. On the **DAS** console:

```
SYS> shutdownobssys
Do you want to wipe out the system Y/N? y
SYS> exit
```

This will shut down the observing system.

3. If there are any other windows seen on the ICS Sparc (or it's second display screen), shut them down too.

```
intobs@lpss13> exit
```

Graphics windows without a prompt can be exited as follows:

- Move the mouse cursor over the "-" sign at the top left corner.
- Click on it with the left mouse button.
- Choose "close" or "exit".

4. Click the right mouse button over the background and choose the "exit" option at the bottom of the menu. This will log you right out of windows.

2.5 SHUTTING DOWN THE TCS

The TCS is run from the X terminal in the console. In the user window, enter:

1.

```
USER> tcsexit
```

2. Exit any other windows.

2.6 SHUTTING DOWN THE REDUCTION SPARC

1. In the IRAF window, at the "cl>" (or "in>") prompt, to exit use: `lo`

2. Shut down any remaining windows and exit the system as previously shown for the ICS.

ALERT

3 ALERT

3.1 WEATHER PRECAUTIONS

The dome must be closed when

- outside humidity reaches 90%, OR
- the mirror temperature approaches within 2 degrees of the dew-point, OR
- the wind speed gusts for more than 10 sec above 80km/hr, OR
- the wetness alarm goes off.

All these alarms are indicated on the Casella MET display. In case of an alarm the field with the concerned value will turn red and the system will start beeping. This can be silenced by typing 'A' on the PC's keyboard.

Mostly you will have to close the dome due to high humidity

To give you early warning about rising humidity, an additional alarm will sound from the MET receiver box:

- Pointing left you will be warned if humidity rises over 75%,
- pointing right the alarm will sound with humidity >= 90%.
- In the middle position the alarm is muted.

n.b. Remember to re-activate this alarm before re-opening the dome!

The dome can be reopened when humidity has dropped below 80% and no other alarm (dew-point, wind, wet) is present anymore.

If there is ICE on the dome

- The telescope log book will tell you if it's OK to open the dome.
- If in doubt ask the DE/IO.
- If the shutter shows any resistance to movement (watch it while opening), don't force it.
- Always wear a hard hat when on the roof, never ever try to chip ice free on dome or shutter!

3.2 HOW TO CLOSE DOME QUICKLY

1. First close the primary mirror cover.
2. Then switch the TCS to engineering mode: press the button 'COMP/ENG' (the telescope control will start beeping, acknowledge with `USER>ack`) OR simply type `USER>eng`.
3. Close the dome. Bring the lower shutter down first: press 'lower micro' while in 'main over travel', otherwise 'lower main'.
4. Now bring the upper shutter down using the same technique.

3.3 OBSERVING AT LOW ELEVATION

If you want to observe at a zenith distance between 57 and 70 degrees (33-20 degrees elevation) then you need to rise the lower shutter. There won't be any warning from the telescope control, so you will have to check the ZD from time to time.

1. Push the yellow button under "SELECT MANUAL CONTROL", labeled "DOME SHUTRS" to get the control of the shutters.
2. On the engineering rack, under "LOWER SHUTTER", push the "RAISE MICRO" button until the "MAIN OVER TRAVEL" light underneath goes off.
3. Push the "RAISE MAIN" button on the side of the previous; while rising you hear two bangs caused by the segments of the shutter catching the next, keep the button pressed until you hear the motor stop. It takes approximately 30 seconds.
4. * Undo * the "DOME SHUTRS" button, otherwise the dome wont track the object anymore.

You can now observe below 33 degrees elevation.

Remember to lower the shutter again when you go to a new source above 33 degrees elevation. To do this:

1. Select manual control as before with the "DOME SHUTRS" button.
2. With "LOWER MAIN" bring the shutter down as far as it goes.
3. With "LOWER MICRO" fully lower the shutter, keep the button pressed some 10 seconds to be sure.
4. Undo the "DOME SHUTRS" button.

Note that if you don't lower the bottom shutter completely the upper shutter won't seal the dome at the top, so with rain and wind water will penetrate into the dome.

FAULTS

4 FAULTS

4.1 In General

Most of the faults can be cleared by typing:

SYS> startobssys

Try to avoid 'shutdownobssys' followed by 'startobssys' as in most cases such a drastic measure isn't needed. SYS> shutdownobssys should only be used to shutdown the observing system at the end of the night.

If a sub-system (DAS, TCS or Autoguider) is corrupted 'shutdownobssys' wont help. First the sub-system has to be brought back, then
SYS> startobssys
will re-establish contact between the observing system and the sub-systems.

4.2 No guide stars, bad pointing

First repeat ZEROSET at zenith in engineering mode followed by:
USER> CAL LAST

Check pointing with a pointing grid star and the TV:
USER> GOCAT pointing-star
If the star comes up within 15 arcsec from the center, the pointing is fine.

If no bright star is seen may be the last pointing solution is wrong or got corrupted somehow. Before calling for help try this:
Repeat ZEROSET at zenith in engineering mode followed by:
USER> CAL DEFAULT
and check again the pointing with a pointing grid star and the TV.

To recalibrate the telescope pointing follow this commands.

4.3 The TCS disconnects

Most likely the TCS TELD task has died. To restart go to the xterminal were the TCS user interface and info display are running. Open a LAT terminal and log on to lpas2 (see label on screen for uid and passwd). From the main menu then select 'options' and 'teld' from the options menu, afterwards
SYS> startobssys
will re-establish contact between the observing system and the TCS.

4.4 Data acquisition problems

By Data acquisition we mean the management of an exposure, reading of data from the CCDs and saving to disk. This may fail in one of several stages, for example:

- Run, Finish, Abort or Re-time commands are not successful
- Run process stops after CCD clearing
- Run spontaneously aborts during readout or transfer to disk
- Transfer to disk does not complete to 100%
- Data on disk is corrupted (e.g. torn frames)

These may or may not be accompanied by a pop-up error box/alarm. If the error pop-up mentions the (ultra)DAS or "reset the camera", **and you cannot continue observing,** then the following procedure is recommended (pink window):

SYS>dasreset IDS (i.e. startobssys is unnecessary)

When this completes, try a new Run and see if the above fault recurs. If it does, then a lower-level reset of the CCD controller may necessary and you might need to move the telescope to zenith.

Power cycle the SDSU CCD controller, attached to IDS, followed by:
SYS>dasreset IDS

If you are unsure about any of the recovery procedures or if they fail, call for WHT TO, SA or DT/IO support. COMMANDS

5 COMMANDS

5.1 Object catalogue handling

`USER>incl <virgo>` - Includes a user catalog named virgo.cat, stored in /int/cat. Check that the catalog has been loaded properly by listing it from the TCS using the command:

```
USER>out term
```

To add objects to the catalog type:

```
SYS> object name 12 20 30 -10 5 40 J2000
SYS> add
```

to move to the object type:
`SYS> next` - for the last one entered or
`SYS> gocat name`

However, objects added with the object/add sequence are passed directly to the object catalogue held on the TCS computer, and are not stored on the system computer.

TO write a catalogue back to disk use:
`USER> output file int:[cat]newfile`
which saves the file newfile.cat on a disk also visible to the system computer as /int/cat.

5.2 Initial TCS commands

`USER>show focal` - Show the focal station setup. If not set to Cassegrain/IDS, run the command
`SYS>startobssys` from the pink observing window.

`USER>focus 14.45` - Set focus to a 'good' value.

`USER>calibrate last` - Load the last TCS pointing model.

5.3 Twilight Sky-Flats

Point on a blank field. Suitable fields are listed below e.g.:

`USER>gocat blank3`

`SYS> run 10 "skyflat 10sec"` - and take exposures.

5.4 Seven Star Calibrate

If the telescope pointing the previous night was acceptable, no additional action is requires as you already typed:
`USER>cal last`

To update the pointing coefficients run the seven star calibrate procedure. The values for temperature, humidity and atmospheric pressure should be updated before as they are used to calculate refraction. Check the TV probe is in the center (see IDS mimic, command tvxy 500000 500000).

- `USER>TEMP 6.0` (local outside air temperature)
- `USER>HUMI 0.1` (local outside relative humidity e.g. 10%)
- `USER>PRES 770` (atmospheric pressure)
- `USER>CAL`
- You can abort calibrate any time with 'control Z'. Center all seven stars using the TCS HANDSET in XY-mode on the slit next to the TV cross hair. Turn the TV gain down each time when you move to the next star. When the telescope is tracking again, carefully increase the gain.

If the pointing solution is ok (rms < 5-6"), type "Y" to accept.

5.5 Focusing the Telescope

To determine the best telescope focus select a flux standard and take e.g. 10 sec exposures at different telescope focus positions. Use focus steps of 0.1mm, 0.05mm if the seeing is very good. The focus should not change from night to night. Set the focus to the value were you obtained the smallest FWHM measured in spatial direction using the command:

```
SYS> focus 14.45
```

5.6 Finding Guide Stars and guiding

Start up a LAT session to LPVS3, login as GSS and select int->cas configuration.

To search for a guide star, use the following commands:

$ gss
GSS> config int cass
GSS> rot 180
GSS> sea 13 04 33 29 50 49 B1950
GSS> exit
$ type output.gs

The guide star search program is called 'gss'. Before searching for guide stars you need to specify the optical configuration and the rotator position.
The result is written to a file called 'output.gs'. It basically contains a list with x-y coordinates for the autoguider probe.
Select a star of 12-14th magnitude for guiding and move the probe by:

```
SYS> autoxy 430000 580000
```

Now set the exposure time and expose the autoguider to check for possible guide stars:

```
SYS> autotime 1000          - set integration time in ms.
SYS> field
```

After the field operation the stars are identified by numbers on the autoguider display. Select a star for guiding which isn't saturated and avoid hot pixels using the command:

```
SYS> guide on star 1        - pick brightest detected object and guide
```

The guide loop is closed automatically. After the observation, before moving to the next object we recommend to stop guiding:

```
SYS> guide off              - turn guiding off
USER> autoguide off
```

5.7 TCS/AutoGuider interface commands

```
SYS> focus 14.45            - set telescope focus

SYS> rotate sky 180         - move CASS rotator to 180 degrees

SYS> gocat 12+30            - go to faint pointing grid star (http://www.ing.iac.es/~pms/tonotes

SYS> gocat N12+30           - go to bright pointing grid star (http://www.ing.iac.es/~pms/tonote

SYS> offset arc -30 30      - offsets telescope with reference to the demanded
                              pointing position by -30 and 30 arcsec

SYS> autotv [on|off]        - continuous readout mode

SYS> field                  - do a field and search for potential guide objects

SYS> guide on star n        - pick "n"th brightest detected object and guide

SYS> guide on pixel x y     - guide on at position x,y on auto-guider CCD
                              default is to specify x y = -1 -1 which
                              cause A/G to guide on current guide star
                              location

SYS> guide off              - turn guiding off

SYS> autotime t             - set integration time "t" in ms.
```

5.8 Command dictionary for UltraDAS

Command dictionary for UltraDAS
(http://www.ing.iac.es/~docs/ins/das/ins-das-29/cmd_dictionary.html)

CHECK-LIST

6 CHECK-LIST

Quick Check-List]

6.1 Telescope

```
- Switch off lights on all floors, close the blind in the restroom.
- Check the Operations Logbook for any restrictions.
- Make a visual inspection of the observing floor.
- Put the Telescope in ENGINEERING MODE.
- Clear any emergency overrides.
- Ensure that none of the SELECT MANUAL CONTROLS buttons have been activated.
- Make sure that the TCS/DAS/ICL software is running.
- Turn on OIL PUMP from the engineering rack.
- Fill detector(s), wear safety helmet (with visor) and gloves when filling
    cryostat! Always remember to leave the PRESSURE RELEASE valve on the
    dewar OPEN.
- Zeroset encoders.
    Check telescope is vertical, HA synchro "12 O`Clock" position and DEC
    synchro "9:45" position.
    USER>zeroset ha target  (or: zero ha tar)
    USER>zeroset dec target (or: zero dec tar)
```

Using the HA and DEC [+]/[−] buttons with slow motion (SM) and very slow speed, move the telescope so the synchro dial pointers MOVE THROUGH the "12 O' Clock" position in HA and the "9:45" position in DEC.

- Open up dome top shutter.
  Use RAISE MICRO until the OVERTRAVEL indicator goes off, RAISE MAIN until the shutter stops moving.
- Open up primary mirror cover.
- Switch dome vent fan on.
- Turn off dome lights and close control room blind.
- Switch telescope into Computer Mode.
  The HA and DEC slow motion (SM) push buttons MUST be set for SM mode (i.e. All the lower green sections of the buttons illuminated) and the oil pump must be on before Computer Mode can be selected.

6.2 Commands

- Object catalogue handling.
  ```
  USER> incl catalogue
  USER> out term
  SYS> object name 12 20 30 -10 5 40 J2000
  SYS> add
  SYS> gocat name
  USER> output file int:[cat]newfile
  ```
- Initial TCS commands.
  ```
  USER> show focal
  USER> focus 14.45 (or from the observers console)  SYS> focus 14.45
  USER> calibrate last
  ```
- Finding Guide Stars.
  ```
  $ gss
  GSS> config int cass
  GSS> rot 180
  GSS> sea 13 04 33 29 50 49 B1950
  GSS> exit
  $ type output.gs
  SYS> autoxy 430000 580000
  ```
- TCS/AutoGuider interface commands.
  ```
  SYS> rotate sky 180
  SYS> offset arc -30 30
  SYS> autotv [on|off]
  SYS> field
  SYS> guide on star n
  SYS> guide on pixel x y
  SYS> guide off
  SYS> autotime t
  ```
- Commands listed alphabetically A&G Box.
  ```
  SYS> ascf        Move above slit colour filter
  SYS> asnd        Move above slit neutral density filter
  SYS> autofilt    Change the autoguider filter wheel
  SYS> autocentre  Centres the autoguider XY probe
  SYS> autopark    Parks the autoguider XY probe
  SYS> autoxy      Move the autoguider XY probe
  SYS> change_agb  List contents of all filter wheels and allow a change
  SYS> compfilta   Move comparison filter wheel A (formerly afarc)
  SYS> compfiltb   Move comparison filter wheel B (formerly bfarc)
  SYS> complamps   Control comparison lamps
  SYS> compmirror  Move comparison mirror - and TV shutter
  SYS> compnd      Move comparison filters A and B to get desired nd
  SYS> flipmirror  Move the flip mirror
  SYS> tvfilt      Change the TV filter
  SYS> tvcentre    Centres the TV XY probe
  SYS> tvpark      Parks the TV XY probe
  ```

```
    SYS> tvxy        Move the TV XY probe
- Commands listed alphabetically IDS.
    SYS> bscf        Move the below slit colour filter
    SYS> bsnd        Move the below slit neutral density filter
    SYS> camshut     Move the IDS camera shutter
    SYS> cenwave     Change grating angle to give the give central wavelength
    SYS> change_ids  List all exchangeable optics and allow changing
    SYS> collimator  Move the position of the collimator
    SYS> dekker      Move the dekker slide
    SYS> gshut       Move the grating shutter
    SYS> hart        Move the hartmanns
    SYS> slit        Set the slit width in microns
    SYS> slitarc     Set the slit width in arcseconds
- Command dictionary for UltraDAS.
    arc, abort, bias, bin, dark, dasreset, finish, flash, flat, glance,
    keep, multarc, multbias, multdark, multflash, multflat, multrun, multsky,
    newtime, obssys, promote, rspeed, run, scratch, sky, startobssys,
    udas_camera_mimic, udas_detect_ro, udas_hct, udas_server, ximtool
```

6.3 Observers handover check

Ready to go it alone? Please check you are familiar with the following tasks:

- use of Intercom and Telephone
- safety precautions when using liquid nitrogen
- weather precautions, knowing when the dome must be closed
- observing at zenith distance between 57 and 70 degrees
- opening and closing the dome
- moving the telescope in engineering mode
- starting up and shutting down the observing system
- knowing about the most common faults and how to solve them
- writing your data to tape at the end of every night
- filling in fault reports
- filling in log book in control room
- producing the observing log
- filling in observing feedback form at the end of your run

Quick Check-List]