Linux Workstation Post-Crash Image Recovery Procedure
Updated: 2019May13

MDM4K (blue, red & OSMOS), CCDS, and TIFKAM all use a disk-based data transfer system to move images from the DOS "IC" acquisition computer to the */lhome/data* disks on the Linux workstations. While this system usually works without issue, problems can emerge when the Linux observing workstation (*hiltner* at the 2.4m and *mcgraw* at the 1.3m) hang or crash in mid-exposure.

This procedure describes the correct way to reboot the workstation so that you can quickly resume observations with no loss of data.

When the Linux workstation hangs or crashes…

Step 1: Don't Panic!

Before rebooting the workstation, check the IC to see what it is doing. If an image is queued and the IC is still running, the best thing to do is to let it finish (unless the data are garbage anyway). Watch the IC monitor screen (monochromatic, *yellow* font screen, located in the computer room). Wait for the exposure countdown to finish, then wait for readout and write to disk. When it is done, the little box in the upper-right corner of the screen should read "*IDLE*".

If the hang occurred in the middle of a sequence of exposures, wait until the next image in the sequence starts and type *ABORT* at the IC keyboard. Wait for completion so the IC has returned to an idle state.

Step 2: Reboot the Linux workstation

- Shut down all tasks related to *hiltner*. These include the weather widget, xmis2, Rotator GUI, JSkyCalc (?), Prospero, ISIS, Caliban, mdmTCS & bridge. Quit the GUIs as typical. For the others, type *quit* in each corresponding terminal window. ISIS, Caliban, mdmTCS & bridge terminals should always be found on workspace 4 of mdm24ws1 (or mdm13ws1).
- Reboot the workstation (*hiltner* or *mcgraw*). Currently, superuser privileges are required to reboot *hiltner*. Until permissions are adjusted, one can simply power down and restart *hiltner*. In certain circumstances, it might even be worthwhile to reboot the mdm24ws1 (mdm13ws1) machine as well, but only if the problem remains. After logging back in, do not restart any of the data-taking or telescope control functions.

Step 3: Last Image Recovery

Perform the following steps, in order, to recover any images that were written to the transfer disks after the computer hung.

On the Linux workstation:

1. Start the ISIS server and wait for it to connect to the IC.
2. Start the Caliban agent and wait for it to sync disks with the IC.

3. In the Caliban window, type these commands, in order:

RECOVER *n* DISK1
RECOVER *n* DISK2

where *n* is the number of images copied from each of the transfer disks into the */lhome/data* directory on the Linux workstation. A good number to try for *n* is 3, but you can go higher if you believe more files may have gone without transfer.

The RECOVER command is very drastic and rather noisy. Below is a worked example of a recovery attempt. In this example, we know that image rectest.0001.fits was successfully transferred to the Linux data disk, but mid-way through taking rectest.0002.fits the workstation crashed. We stopped data-taking after rectest.0002, and want to recover rectest.0002 before restarting the rest of the system. But we don't know whether it was written to DISK1 or DISK2 (in principle you could figure it out, but it is easier to just try both disks).
First, guess the missing rectest.0002 is on DISK1 (salient details highlighted).

```
CB% RECOVER 3 DISK1
CB% Attempting to recover up to 3 images from transfer disk DISK1
Initiating file transfer iteration #1...
WARNING: FITS file '/lhome/data/rectest.0001.fits' already exists,
writing as '/lhome/data/0901274K.0ca.fits' instead
Transferred file #1 (/lhome/data/0901274K.0ca.fits) at 526 KB in
0.52 sec (1016KB/sec)
Wrote LASTFILE=/lhome/data/0901274K.0ca.fits RATE=1016 KB/sec
Initiating file transfer iteration #2...
Transferred file #2 (/lhome/data/focus_080926.0029.fits) at 8325 KB
in 2.25 sec(3700 KB/sec)
Wrote LASTFILE=/lhome/data/focus_080926.0029.fits RATE=3699
KB/sec Initiating file transfer iteration #3...
Transferred file #3 (/lhome/data/focus_080926.0030.fits) at 8325 KB
in 2.14 sec(3897 KB/sec)
Wrote LASTFILE=/lhome/data/focus_080926.0030.fits RATE=3897
KB/sec
```

Note that the first image on disk1 is rectest.0001.fits, which was already successfully transferred to the Linux disk. In this case, Caliban warns you that rather than overwrite the existing image it is creating a copy using the unique filename "0901274K.0ca.fits". Each image acquired by the OSU data-taking system is assigned a unique filename (stored the UNIQNAME card in the image FITS headers) that is used in just such circumstances. The #1 rule of the data transfer system is "overwrite no files on the Linux host". This is that safety feature coming into play. The other two images it wrote, focus_080926.0029 and 0030 are delinquent images leftover on transfer disk1 from 2008 Sept 26. You can delete these if they are clearly junk.
Now we try DISK2:

```
CB% RECOVER 3 DISK2
CB% Attempting to recover up to 3 images from transfer disk DISK2
Initiating file transfer iteration #1...
```

```
Transferred file #1 (/lhome/data/rectest.0002.fits) at 526 KB in 0.43
sec (1213KB/sec)
Wrote LASTFILE=/lhome/data/rectest.0002.fits RATE=1213 KB/sec
Initiating file transfer iteration #2...
Transferred file #2 (/lhome/data/20081007.0037.fits) at 8198 KB in
2.09 sec (3914 KB/sec)
Wrote LASTFILE=/lhome/data/20081007.0037.fits RATE=3913 KB/sec
Initiating file transfer iteration #3...
Transferred file #3 (/lhome/data/20081007.0032.fits) at 8198 KB in
2.16 sec (3802 KB/sec)
Wrote LASTFILE=/lhome/data/20081007.0032.fits RATE=3801 KB/sec
```

Our missing image (rectest.0002.fits) was indeed on transfer DISK2, and it is now safely on the Linux data disk. As a bonus, we got a couple of delinquent images from 2008 Oct 7. Again, you can delete these junk images.

Step 4: Finish Restarting the System

Once you have verified that you've successfully recovered the missing image(s), you can proceed to restart the rest of the system and resume observing:

1. 2.4m ONLY: Start the process *bridge* either from *Applications>Telescope Control>tcsBridge* or by typing *mdmTools start bridge* in a terminal window. If it does not open the bridge terminal, try a second time (common occurrence).
2. 2.4m ONLY: In MaximDL on the TCS PC, under the *Guide* tab, click the "Settings" button. In the "Autoguider Output" portion of the window that pops up, click the "Setup" button: this opens the *ASCOM Telescope Chooser* window. Verify that "TCSGalilHybrid.Telescope" is displayed and simply click the "OK" button (do NOT click Cancel as this may cause the guider to lose link to the telescope!). Click "OK" in the "Settings" window to close it as well.
3. 1.3m ONLY: Start the TCS control panel, *TCS GUI* and make sure it initializes successfully. You may need to stop and restart the telescope server first. If so, pay attention to the telescope coordinates as it is extremely likely that you will have to zero them relative to the tilt sensors.
4. Restart *xmis2* and make sure it initializes successfully. If not, power cycle the MIS box in the computer room.
5. Start the MDM TCS interface agent, typing *tcinit* and *tcstatus* in the agent console to make sure it connects to the telescope control system.
6. Restart Prospero and do the normal *startup* commands. It's good practice to also do a *runinit* to make sure filenames and all other observing information is correct.

In rare cases, you may need to restart other subsystems, like the 1.3m telescope server, reboot the IC, etc… .