SAO Wide-field InfraRed Camera
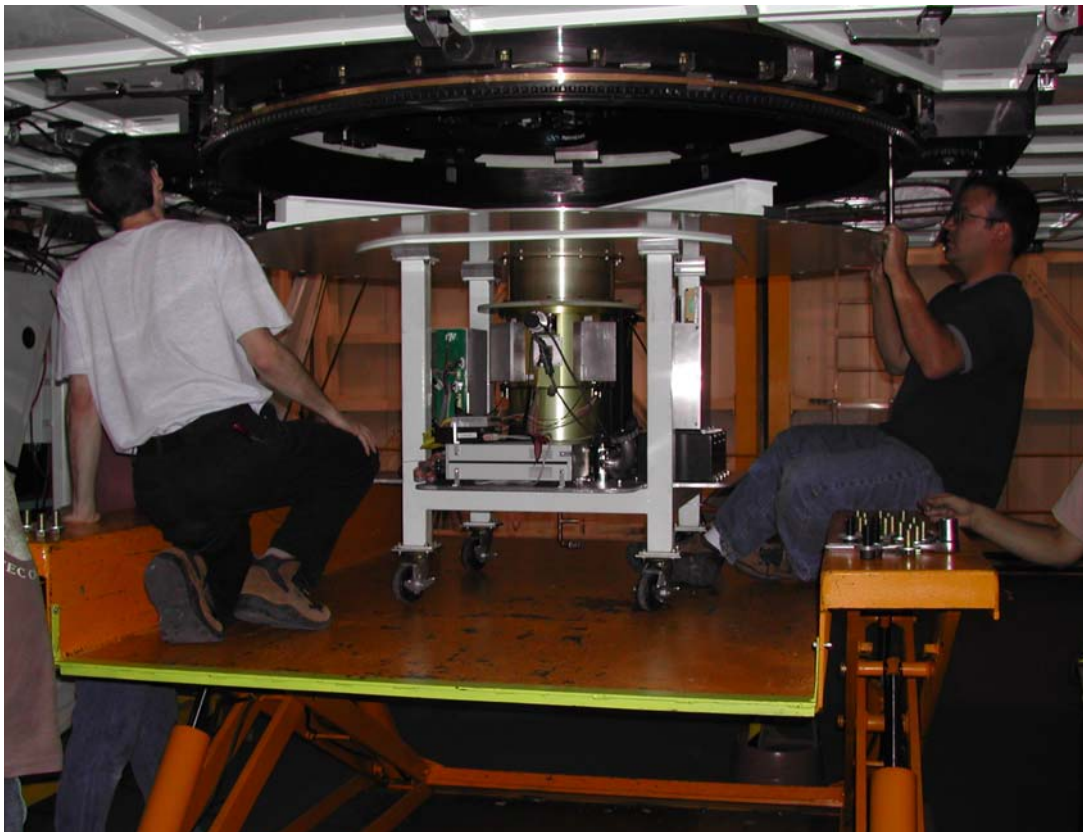
(SWIRC)

Hardware Manual

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I. COOL-DOWN PROCEDURE

Initial set-up:
0. **Evacuate the dewar** using the MMT turbo pump; a few hours will suffice.
1. While grounded to the instrument, remove grounding plug and connect cable to dewar.
2. Make sure the power switch on the large power supply box is turned OFF.
3. Plug the power strip into AC power, preferably quiet power.
4. Plug in an ethernet cord.
5. Turn on the power strip.
6. Log in to swirc@lewis.mmto.arizona.edu.
7. Run 'mice'.
8. Go to the Start/stop tab on the MICE window and start the housekeeping software:
    a. click the HSKSWIRC server
    b. click the HSKLOG logger
9. Run the script "dt2.sc" to see the K/min rates from the most recent temperature log.
(Note: logs are located at /data/log/swirc).

Cool Down: **never exceed 0.5 K/min cool-down rate on the detector/board.**
1a. **OPEN THE HEAT SWITCH**. Turn the knob CCW ~5 turns.
  b. Put filter wheel into a Dark position.

2. Take the Cplate 40 K down from ambient. (~10 min of LN fill time.)
   If dBoard exceeds 0.2 K/min, stop filling immediately.
   Wait ~3.5 hours, until Brd-Det temperature difference is no more than -1.5 K.

3. Take the Cplate 50 K down from current temp. (~15 min of LN fill time.)
   If dBoard exceeds 0.2 K/min, stop filling immediately.
   Wait ~3.5 hours, until Brd-Det temperature difference is no more than -2.0 K.

4a. Take the Cplate 50 K down from current temp. (~15 min of LN fill time.)
    Wait 20 minutes, until Filter temperature is similar to cold plate temperature.
4b. Take Cplate to 77K. (~20 min of LN fill time.)

5. Wait ~36 hours, until Board temperature is <90 K.

6. Close the heat switch until firm (BUT DO NOT TURN TOO TIGHT).

7. Wait 2-3 hours until Board temperature is near 77 K.

Test exposure: (ignore this if you may interfere with an existing f/5 instrument)
a. The Megacam Science EDT is used to read out the SWIRC detector. Connect the
SWIRC electronics to the Megacam-Science EDT fiber (the one in the loading dock).
Hudson may need a reboot to properly recognize the connection.
b. After the detector has cooled, turn on the SWIRC electronics.
c. A single read (to check bias levels) is obtained by typing initswirc ; takeir ; ds9 test.fits
d. A double-correlated read (the usual data) can be obtained by re-starting the ccdswirc
server on mice and using mice to obtain a test image.

II: MMT Mounting procedure

A. Transport SWIRC and its box of accessories from the Bowl Common Building to the summit with the MMT air-ride cargo truck.

B. Carefully lift SWIRC over the loading dock threshold.

C. Place carpet on hatch to prevent bouncing SWIRC.

D. Use the crane to lift SWIRC directly up into the chamber. Holes for lifting eyes are located at the end of each I-beam.

Alternatively, the large interface plate can be un-bolted from the instrument cart and each piece rolled into the elevator. However, the interface plate must remain electrically isolated from the cart when it is re-attached to the instrument cart; check this with an ohm meter before mounting the instrument to the telescope!

To mount SWIRC:
1. Remove the existing f/5 instrument.
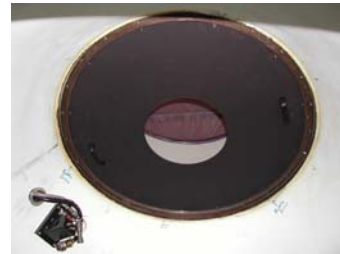
2. Remove the f/5 wavefront sensor.

3. Remove the f/5 widefield corrector.

4. Bolt the SWIRC baffle in position with ¼-28's (see ->).

5. Remove ALL fore-optics from the f/5 wavefront sensor camera. (Because SWIRC operates without the widefield corrector, we must operate the wavefront sensor without any fore-optics.)

6. Re-mount the f/5 wavefront sensor.

7. Mount SWIRC:
a. Remove the lens cover (3 bolts with 7/64, lift out).
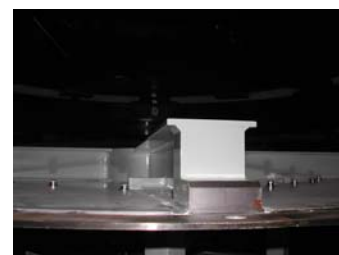b. Instrument north (shown below) should face the back wall.
c. Roll SWIRC onto lift, using a jack to level it to the MMT mounting flange.

d. Use guide pins to align the bolt holes to the mounting flange.
e. Draw SWIRC up on the **I-BEAMS ONLY**. (Only the I-beams are load-bearing!)
f. Every other bolt hole can be left empty on the shroud outside the I-beams.
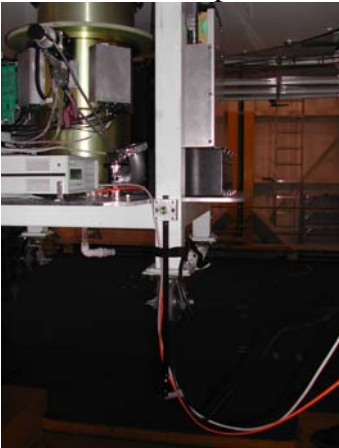
g. Lower the cable drape bar on the cart.

i. Connect the orange fiber to the Megacam Science EDT plug and to the white box on the back of the SWIRC electronics box. Tie fiber spool down as shown.

ii. Connect an Ethernet cable to the black Intelligent Instrumentations EDAS box.

iii. Connect the power cord to clean UPS power. The completed cable drape:

III: Removing SWIRC from the MMT

1. **Turn off the power** using the taped-over button on the black power strip, located near one of the wheels.

2. WHILE GROUNDED TO THE INSTRUMENT, remove the multi-colored cable from the dewar (located beneath the filter wheel motor feed-through) and replace it with the **grounding plug**.

2. **Unplug** the power cord, ethernet cord, and the orange EDT fiber.

3. Slide the cable drape bar up, so that it clears the wheels on the SWIRC cart.

4. **Store** the orange EDT fiber in the box labeled SWIRC.

5. Remove the SWIRC liquid nitrogen tube from the liquid nitrogen tank, and **store** the fill tube in the box labeled SWIRC.

6. Take out the lens cover from the box label SWIRC, and **bolt on the lens cover** once SWIRC is off the telescope.

7. Remove the SWIRC **baffle**, and it place on top of a piece of padding (i.e. cardboard) on top of the instrument.

8. **Store** the baffle ¼-28's in the box labeled SWIRC.

IV: Troubleshooting

1. It may be necessary to reboot the computer *hudson* before operating SWIRC.
　　　In January 2006 the hardware was working properly but we could not read bytes into the images. Changing the EDT fiber connection from MegaScience to MegaGuider fixed the problem. (Note: to operate in this mode required a few set-up changes, so Maureen Conroy and Bill Wyatt must be involved.) A day later, we rebooted *hudson* and found that SWIRC worked just fine with the MegaScience EDT connection.