LRIS: Afternoon Startup Checklist

Quick Reference

Contact your Support Astronomer [FN]

1. **Identify your Support Astronomer.** If you do not know who your assigned SA is, you can find the name on the observing schedule posted in the Remote Ops I room in Waimea (or available online). Contact numbers for all members of the SA team are posted beside the white board.
2. **Arrange a meeting.** Your support astronomer will meet you around 2:00pm HST in Remote Ops I unless a different arrangement is made in advance.
3. **Review your program.** You should make sure to discuss the following points with your SA:
   - Plans for afternoon and nighttime calibrations.
   - Instrument issues, recent changes and latest news (e.g. focus procedures, recent problems, setups, etc.).
   - Telescope issues; in particular, devise a plan for performing telescope nighttime focus procedures (a.k.a. MIRA or Autofoc), which are optimized for your scientific needs and use of the instrument.
   - Any other questions, requests and needs you may have.

Determine your observing account

1. Consult the on-line Keck I observing schedule. Find the listing for today's date (note that the dates are HST, not UT dates).
2. The eighth column of the table will indicate the account you have been assigned. For example, if it reads `LRIS(1)`, your account is `lris1`. Enter this account name (in lowercase) when logging into Keck computers. Your SA will supply you with the password for your account.

Login and Launch VNC

Regardless of whether you'll observe from Waimea or a mainland observing site, all of your LRIS software runs within VNC desktops. VNC servers for your run should be up and running five days prior to your run. Please follow the appropriate set of steps below to launch your VNC viewers on the primary and secondary workstations. **[FN]** your SA will help you with the

first startup of the system.

Waimea Startup Procedure

1. **Log in to primary seat.** Log in to `haleiwa` in Remote Ops I using your assigned LRIS observing account (e.g., `lris1`; if needed, please contact your Support Astronomer to get the password). *NOTE:* before entering your password, please select **Options > Sessions > GNOME** in order to get the FVWM desktop.
2. **Launch primary and Secondary VNC desktops.** Once you log in, the `kvncgui` will appear on your left-hand screen. Enter the VNC password in the **password** entry field and click on **Launch Viewers** to start the VNC viewers that you will use for running the LRIS software.

Mainland Startup Procedure

The procedure for launching VNC desktops from remote sites varies from site to site, but generally follows this procedure:

1. **Log in.** Log in to primary and (if applicable) secondary machines using account and password provided by the site manager.
2. **Gain firewall access.** If necessary, follow authentication procedure for access through Keck firewall.
3. **Launch VNC.** Execute the appropriate script to bring up VNC desktops. At sites with a single 4-headed machine execute the command

   ```
   kvncall lris lrisN
   ```

   where *N* is the number of your LRIS observing account. At sites with separate primary and secondary machines, execute this command on the primary machine:

   ```
   kvnctel lris lrisN
   ```

   and this command on the secondary machine:

   ```
   kvncinst lris lrisN
   ```

About your VNC desktops

On each of your screens, you should have a pair of VNC desktops, one tan and one blue. The tan (or "control") desktops are reserved for instrument control, while the blue (or "analysis") desktops are the preferred place to launch a browser window or applications like IRAF, arcplots, Xfocus, etc. To switch between these desktops:

- Press the **Front** key at the far left of your keyboard to raise the FVWM Pager window, which will appear in the *lower* left corner of your screen (don't confuse this Pager with the one running inside your VNC desktop, which is displayed at the *upper* left corner.
- Another way to switch between the tan and blue desktops is to point the mouse to the blue haleiwa background. Next, use the scroll wheel in the mouse to switch between the different desktops.
- Note that the "virtual desktop" displayed on the Pager window is divided into four quadrants. The upper right quadrant is home to your tan VNC desktop and the lower right quadrant is where to find the blue VNC desktop.
- Click in the *upper right* quadrant of the Pager to switch to the tan desktop.
- Click in the *lower right* quadrant of the Pager to switch to the blue desktop.

Check instrument availability

You are not permitted to operate LRIS until the summit staff have completed their checkout procedure! Please follow these steps to determine when LRIS has been released for your use:

1. Launch the Firefox browser from the desktop menu by selecting **Firefox - LRIS Home Page**.
2. Click on the link labeled Instrument Ready? (available on the side menu on any LRIS webpage) to access the SIAS webpage.
3. In the upper right of the SIAS webpage check the instrument status. If the displayed message reads LRIS NOT READY on a red background, then LRIS has not been released for your use. If it reads LRIS READY on a green background, then the instrument is ready for use. If it is past the nominal instrument release time (2:00pm weekdays or 3:00pm weekends), please contact your SA for assistance.

Note: you will not be able to take any dome calibrations until the *telescope* has been released; this generally occurs by 4:00pm HST.

Start primary host software

1. **Switch to VNC control desktops.**
   On your primary host computer (`haleiwa` in Remote Ops I), switch to viewing the tan VNC desktops; these are used for instrument control.
2. **Start the LRIS Software.**
   Select LRIS Control Menu > Start All LRIS Control. from the vnc desktop menu. An `xterm` window will pop up with the following message:

   ```
   Welcome to the LRIS initialization script.  You should ALWAYS run this script
   at the start of any observing nights of your run to undo any changes that the previous
   observer made to LRIS and to re-initialize hardware ans software.
   ```

   The script is self-explanatory, but in case you want to know more, follow the link.

   When finished, the script will beep and print the message:

   ```
   Instrument initialization completed --- please proceed with observing
   ```

   and the `xterm` window will disappear.
3. **Verify windows.**
   Check that the following windows appear:

Left screen (control0 desktop)	Center screen (control1 desktop)	Right screen (control2 desktop)
◦ LRIS widget ◦ CCD log window ◦ Motor log window ◦ Object.tcl window ◦ PIG - Program Interface GUI	◦ blue XPOSE gui ◦ blue DS9 image display ◦ blue DS9Relay ◦ instrument compass rose ◦ ADC Status Gui ◦ Eventsounds	◦ red XPOSE gui ◦ red DS9 image display ◦ red DS9Relay

4. **Select sounds.**
   The **eventsounds** GUI (found on your tan desktop, a.k.a. `control1`) allows you to choose which sounds to play when images are done exposing and reading out. Click on the available menus to select the sounds of your choice for your late-night entertainment.
5. **Launch Autocopy.**
   The autocopy program (a.k.a "copymon") will automatically copy new images from your summit data directory to a scratch directory at HQ. To start it:
   - Go to any *blue* VNC desktop (the tan desktops have only a limited color palette and **autocopy** windows may not render correctly if run within a tan desktop).
   - Right-click on the background pane and select LRIS utilities > Autocopy(copymon) from the desktop menu.

   The Autocopy program will create a new directory using the HQ scratch disk with the most available space, copy into it any existing images from your summit data directory, and wait for new images to appear.

Start secondary host software

Perform the following actions on your *secondary* host machine. If you are observing at a mainland site and your primary computer is equipped with four screens, then this single machine serves as both your primary and secondary host.

1. **Launch FACSUM/XMET.**
   If your team includes remote observers who cannot view FACSUM and XMET on the gorgeous wall monitors in the Waimea Remote Ops room, then launch them within VNC:
   - Switch to your tan `telstatus` VNC desktop
   - Right-click on the background menu and select K1 Telescope Status Menu > FACSUM
   - Right-click on the background menu and select K1 Telescope Status Menu > XMET

2. **Launch MAGIQ Guider Interface.**
   The MAGIQ interface requires lots of colors and must be run within a blue VNC desktop for optimal rendering of the guider images.
   - Switch to your blue `telanalysis` VNC desktop
   - Right-click on the background menu and select K1 Guider Eavesdropping > Start Observer UI

Verify instrument's setup

The following elements are loaded into LRIS upon request:

- **Verify red filters.**
  On the XLRIS widget, click the filter selector button (marked **F**), bringing up a red filter menu. Read through the list of available filters and make sure that all of the red filters you will need tonight are listed. If not, alert your SA immediately. *Note:* except for certain narrow-band filters, all available blue filters are currently loaded into the instrument.
- **Verify gratings.**
  On the XLRIS widget, click the grating selector button (marked **G**), bringing up a grating menu. Read through the list of available gratings and make sure that all of the gratings you will need tonight are listed. If not, alert your SA immediately.
- **Verify slitmasks.**
  On the XLRIS widget, click the slitmask selector button (marked **S**), bringing up the slitmask menu. Read through the list of available slitmasks and make sure that all of the slitmasks you will need tonight are listed. If not, alert your SA immediately.
- **Verify CCD parameters.**
  All CCD parametes are set via the XPOSE GUI.

Parameter	Red CCD	Blue CCD
Readout Window	Full frame or longslit using scripts: click on CMD... Different windows can be set. See windowing and binning and the XPOSE GUI for advice and instructions.	Windowing is available in a limitted format. You may only use one of the CCDs (left or right). See windowing and binning and the XPOSE GUI for advice and instructions.
Gain	There are two gain options. Current gain settings are displayed in the upper right corner of the XPOSE GUI. To change the red gain, use the script under CMD... on XPOSE. **High gain** is the default and used routinely.	Gain settings cannot be changed on the blue side
Binning	Any binning is allowed. Click on WIN..., set the X and Y binning factors and the W and H parameters. See windowing and binning and the XPOSE GUI for advice and instructions.	

Prepare Observing Log

You now have the choice of maintaining paper or electronic logs for your observing run.

Electronic logsheets

The Keck Observing Log Archive (KEOLA) maintains an on-line log of your run which you can access through the browser window to view or edit. This log is generated whether or not you choose to use it, and is only accessible from within the Keck network, not from outside, so if you are observing remotely you must launch a browser within VNC to access the electronic logs. For full instructions, please refer to the KEOLA webpage.

Paper logsheets

If you prefer physical logsheets for note-taking, now would be a good time to prepare them. You can preview and print out copies of logsheets from the computer.

- *Local observers.* If you are in Waimea and will need logsheets for note-taking, you can print one of several preformatted logsheets available for LRIS:

1. Right-click on the background pane and select Instrument Utilities > Print Logsheets to launch the Xlogsheets GUI.
2. On the Xlogsheets GUI:
    - select your preferred logsheet format
    - if desired, click **Preview** to view the selected logsheet
    - select the desired number of copies to print
    - click **Print** to print logsheets to the Remote Ops printer in Waimea

- *Remote observers.* If you are observing remotely, you can download the logsheets from the LRIS logsheets webpage and print them to your local printer.

To assist in your logging, you may find it helpful to launch the **obslog** window which provides a summary of your LRIS exposures. From the LRIS background menu, select **LRIS Utilities > Obslog loop** to launch this window.

Optional: Take test exposures

Test exposures are taken to ensure that everything is fine with the instrument and the light path. You can skip this step if you will be acquiring afternoon calibrations (bias and dark frames, flatfield images, etc.) for your science program.

If you do not want to save the test images, turn off the write to disk option: in the Xpose GUI, click on Disk... and select Disabled for the Disk Write option (left hand side). Do not forget to re-enable disk writing when you take your calibrations!

The steps below assume that you are familiar with the use of the XLRIS, XPOSE, and ds9 GUIs. If not, then please follow the links to read more the operation of these GUIs. Your SA will also be glad to provide you with training the use of these tools.

We will be doing arcs and flats, so only need to take a bias

1. **Take test bias exposures.**

   For both red and blue side, in the XPOSE GUI:

   A. Close the trapdoor. Contol 0 Desktop Turn off recording
   B. Set exposure time to 0.
   C. Click on the Start Dark button.
   D. Once the frames are written, inspect the frames.
   E. If you see something unusual, contact your SA.

2. **Take test illuminated exposures.**

   Configure for imaging on both side. This can be done via a script: in the lrisserver window type take_test_flat and hit Enter.

Alternatively, you can configure the instrument and manually take the images:

Red-side settings	Blue-side settings
• Set grating = mirror • Set red filter = R	• Set dichroic = 560 • Set grism = clear • Set blue filter = G

- Set slitmask = direct.
- Switch on the neon lamp.
- Set red and blue exposure time to 1 sec.
- Take one red and one blue frame (Click on START in the XPOSE GUIs)
- While images are reading put switch off the Neon lamp.
- Check that light is seen in the frames.
- If you see something unusual (e.g. no light), contact your SA.

MOS: Verify custom slitmasks

Observers using LRIS in Multi Object Spectroscopy (MOS) mode should take images of their masks and verify that they correspond to what was requested. Although errors are rare, it is possible for the wrong masks to be loaded, or for the correct masks to be loaded backwards into a slitmask holder; thus, your diligence is essential to ensure that the masks are correctly loaded. If an error is caught early enough in the afternoon, there is usually time to correct it.

If you discover any problems with your masks, alert your SA immediately. Please note that you should repeat this procedure before each night of your run, even if you are using the same masks.

Automated Procedure

Follow these steps to verify your slitmasks slitmasks with the LRIS Slitmask Imaging Tool:

1. From the desktop menu, select LRIS Utilities > Slitmask Imaging Tool to launch the LRIS Slitmask Imaging Tool
2. Use the check boxes on the GUI to indicate which masks to image.
3. Click GO to acquire direct images of the masks.

Manual Procedure

Alternatively, if you prefer NOT to use our automatic GUI, you may manually cycle through the slitmasks. The following instructions for manually verifying slitmasks assume use of the blue side.

1. **Configure** the lris blue side in imaging mode:
    - Close the trapdoor.
    - Set grism = clear.
    - Set filter = G.
    - Switch on the Argon lamp.
    - Insert the slitmask you wish to image.
    - Set exposure time to 1 sec.
2. **Take one exposure.**
3. **Verify slits:** verify that all slits and alignment holes are in their expected positions and that all slits appear clean. If dirty slits are suspected, they can be removed and cleaned if summit personnel are alerted soon enough.
4. **Repeat:** repeat the preceding steps for your remaining slitmasks.

MOS: Identify Alignment Boxes

In this step, we define the positions of the alignment boxes and create coordinate files for use during the night.

1. **Launch SAT.**
   Start the Slitmask Alignment Tool as follows:
    - Switch to one of your blue "analysis" VNC desktops
    - From the desktop menu, select LRIS Utilities > Slitmask Alignment Tool
2. **Identify boxes.**
   Follow the Identify Boxes steps at: Identify Slitmask Alignment Procedure

Prepare the target list

1. **Create starlist.**
   This can be accomplished in either of two ways:
    - *Automatically via maskstatlist program.* Slitmask observers can generate a starlist for all of the currently-loaded user masks using a new script which retrieves the mask center coordinates stored in the slitmask database. To do so, select LRIS Utilities > Generate Mask Starlist from the background menu. This will run the `maskstarlist` program, which reads the names of all custom slitmasks loaded in LRIS, looks up the RA, Dec, and PA, then stores that information in a starlist file (named `starlist.`*`YYMMDD`*) in your home directory on the LRIS host machine, `lrisserver`.
    - *Manually*. Use your favorite test editor to create and format your starlist as described in these instructions.
2. **Transfer starlist.**
    - The preferred way to transfer your starlist to Keck is via your observer login page. Doing so will install your starlist file into the directory `/kroot/starlists/web/`*`username`*.

- If you prefer not to use the observer login page, validate and install your starlist by selecting the item Instrument Utilities > Install Starlist from the desktop menu. This script will check the syntax of your starlist and copy it into the appropriate directory. See install starlist instructions for details.

3. **Verify starlist.**
   To make sure that your starlist file is properly formatted, please do the following:

   - ~~On the Slitmask Alignment Tool's Guider Coarse Align tab, select Load Starlist and select your starlist file. Confirm that all targets load correctly and no warnings are issued.~~
   - On the MAGIQ UI, select File > Load Private Starlist and select your starlist file. Confirm that all targets load correctly and no warnings are issued.

MOS/Longslit: Determine a Central Wavelength

There are repeatability issues with using the GUI to change gratings. It is recommended to use the command line:
e.g.
grating 400/8500 8500

grating <grating> <cenwave>

Test red side with Ne/Ar lamps

Want 5852 Ne line to be visible around x=420

https://www2.keck.hawaii.edu/inst/lris/eps/ar.pdf

https://www2.keck.hawaii.edu/inst/lris/eps/ne.pdf

If this is your first night or the gratings have been swapped, you will need to determine the central wavelength for spectroscopic observations. The wavelength range on the blue side is determined by the choice of grism, while the red gratings have adjustable tilt that allows modications of the eavelength range. Check the dispersive elements web page to learn more about the accesible wavelength ranges for each grating and grism.

Each grating can be inserted in any one of the four available grating ports. Since the ports have slightly different zeropoints, the central wavelength selected by means of the XLRIS GUI can be off the mark by a few hundred Ångstroms. Accordingly, using the grating angle settings from a previous run will probably not yield the same central wavelength, unless the grating of interest was installed in the same port each time. It is therefore recommended that you acquire some test arc lamp frames and check that the wavelength range is as desired. Furthermore, it is recommended to use a wavelength script to set the central wavelength.This script is run from the command line on a LRISserver xterm.

The arcplots tool can generate custom arc line plots for any combination of grating, dichroic, lamps, and central wavelength, and thus is useful for wavelength determination.

The following instructions assume use of the red side.

1. **Configure** the red side in spectroscopic mode, as required by your science program
   - Select one of your slitmasks or the chosen longslit.
   - Select the grating you will be using for your science.
   - Select the filter you will be using for your science.
   - Specify your desired central wavelength.
   - Close the trapdoor.
   - Turn on the desired arc lamps. The Ar lamp in particular has a spectrum well-suited to wavelength calibration.
   - Set exposure time to 1 sec.
2. **Take an exposure** in spectral mode with the red-side detector system.
3. **Make a row plot** in ds9 (click and drag left mouse to create a vector plot) and check the peak counts. If needed, increase the exposure time and take another exposure to get sufficient signal.
4. **Compare** a row plot from your image to the plot displayed by ARCPLOTS for the same instrument setup. Identify key features and estimate the central wavelength. If the wavelength coverage is not optimal, adjust the Wavelen or MSWavelen settings as required and take another exposure.
5. **Repeat** the procedure for each slitmask/grating combination needed for your science program.

Optional: Create setup files

If your science program requires multiple instrument setups during the night, it is recommended to create setup files.

There are various ways to create setup files. We present here the two simplest ones:

1. **Instrument State files**
   It is possible to save and restore snapshots of the LRIS status using the scripts **save_state** and **restore_state**. These scripts are run from the lrisserver window. For a complete description of the options see the save_state and restore_state scripts.

   Note:

A. The script save_state generates ASCII files which can be easily edited.
B. The snapshot may also include CCD keywords and other parameters, unlike the XLRIS scripts
C. The restore_state script can generate error messages in case of failures. If it is run with the -verify flag then it will actually verify that the new setup has been applied to LRIS.

2. **XLRIS setup files**
The XLRIS GUI allows saving the current state of LRIS to file for later recall:

A. Configure the instrument as desired.
B. Click on WRITE (lower left).
C. Type in the name of the setup and click on WRITE
D. Click on DISMISS

To recall the setup:

A. Click on GO
B. Select the desired setup

Note:

A. These setup files are saved in the `~/setups` directory on the summit LRIS host computer and can be edited with caution, since the setup file is actually a C-shell script. Modifications are needed if you want to change one value without having to recall the setup and save it again (e.g., you want to change the camera focus values).
B. The files do not save the trapdoor status or the lamp settings.
C. The files do not include the CCD parameters.

We saw a vertical line of points (rather than a parabola) on the red side. This is because the focus mechanism didn't move
This happens sometimes when you restart the software. SA fixed it and we re-ran the focus

Determine Instrument Focus

Both the red and the blue cameras need to be re-focused daily.

As the observer, you're responsible for determining the nominal focus of the red and blue cameras using the following procedures. Remember that if the cameras are not properly focussed, the telescope focus will be determined incorrectly!

The focusing process might be a little complicated due to the large number of different focal planes of LRIS, and the confusion between the instrument focus and the telescope focus. Due to the way it is designed, LRIS has three main instrument focuses:

1. the imaging focus
2. the longslit spectroscopy focus, and
3. the MOS spectroscopy focus.

Each focus depends on the instrument configuration. The imaging focus depends critically on the filter. Both the longslit and the MOS focuses vary with grating/grism, central wavelength, and possibly the selected order-blocking filter. If your observations include a combination of imaging and spectroscopy and multiple configurations, the afternoon focusing procedure can be extremely time consuming, and needs to be started as soon as possible. On the other hand, there are two main shortcuts that allow for shorter focusing procedures:

1. Once the imaging focus has been determined for one configuration, the focus for other filters can be obained using the focus table. The procedure is described in detail in the Imaging focus section below
2. Once one of the two spectroscopy focus has been measured (either MOS or long-slit), the focus for the other mode can be obtained by using the focus table, provided the instrument configuration is exactly the same (wavelength, grism, grating, filters)

There are now three different methods for focusing the instrument:

- Imaging mode. *All LRIS observers should run this step,* which will measure the blue-side G-band focus needed to run the MIRA focusing procedure at night.
- Long & Multi-slit mode. Complete this procedure if your program includes non-polarimetric spectroscopy.
- Spectro-polarimeter mode. Complete this procedure if using the polarimeter.

- **Note 1:** Large focus variations on both cameras have been observed. Thus, it is important to focus the instrument each night.
- **Note 2:** We recommend that observers focus for every configuration and use the focus table as a backup. Also, please remember that the focus table only gives approximate values.
- **Note 3:** The instrument is focused in the afternoon. Therefore, we assume that this value will be stable throughout the night. We find that the focus fluctuations during the night are

about 30 steps in the blue and 0.01 in the red which are much less than 0.01arcsec in fwhm.

- **Note 4:** It is important to set the proper focus for MIRA. So please set the blue-side G-band focus derived during the imaging mode focus procedure before the OA will run MIRA.

Remember to uncheck the masks and keep only the long-slits you want to calibrate

Remember to trim the CCD before starting calibration

Acquire Arcs and Flats

Afternoon calibrations are required to determine wavelength calibration and flatfielding. In spectral mode, these data can be obained in several ways, as described below.

Automated calibrations

Acquire a spectral calibration sequence automatically with the Slitmask Calibration Tool, which you launch from the background menu via Background Menu > LRIS Utilities > Slitmask Calibration Tool.

This tool is rather self-explanatory, and produces flats and arcs for all your slitmasks. If you run it in the morning, check the `Do end-of-night shutdown` box to complete the instrument shutdown procedure when datataking is completed.

Note that you will need to select the appropriate exposure time for your flats. A table with the currently suggested exposure times can be found here .

Manual arc calibrations

If you prefer to take arcs manually, follow this procedure:

1. Configure LRIS for spectroscopic observations.
2. Close the trapdoor.
3. Turn on the desired arclamps.
4. Acquire spectra for each longslit or multislit setup.

Manual flatfield calibrations

If you prefer to take flats manually, or if you want to manually check the proper exposure level:

1. Wait for the telescope to be released and in the dome flat position. If the telescope is released:
    - View the **K1 Status** on the SIAS Page. If the line is green, the telescope is released.
    - Telescope Elevation = 45° (see FACSUM).
    - Dome and Azimuth are 90° apart (see FACSUM).
    - If the telescope has not been released and it is after 4:00pm HST, please contact your SA to determine when the telescope will be available.
2. Select K1 Telescope Status Menu -> Dome Lamp Control GUI and allow a few seconds for the widget to appear.
3. Select ON and then set the power level 0 to put the lamps on high power.
4. Configure LRIS as desired and take images.
5. **WARNING: Please remember to switch off the lamps when you are done by selecting Quit.**

Until the telescope has been released (which typically happens by 4:00 PM), it's not possible to take dome flats. While waiting, you can take bias and dark frames. Note that the dark current on the CCDs is quite low, so most observers do not bother with darks. Also, the LRIS bias is basically featureless, so bias frames are generally not necessary either. Remember that LRIS is not light tight. Useful dark calibrations can be taken only of the dome is completely dark. Check with your SA to determine whether this is the case.

Coordinate with the OA

Observing Assistants customarily arrive at the summit around 5:30pm in winter and 6:00pm in summer. Once they arrive, you can do one or more of the following:

1. **Greet the OA.**
   Introduce yourself to the OA and alert them to any immediate needs that you will have. Tell them if you are taking calibrations and inform them about your calibration plans.
2. **Wait for the OA to get settled.**
   Setting up computers and bringing up all of the telescope control systems requires some

time, and things go wrong much more often than we would prefer. Be patient while the OA prepares the telescope for operation.

3. **Inform the OA about your starlist.**
   Now would be a good time to let the OA know where your starlist is, so they can verify that they have access to it.
4. **Inform the OA of your plans for the night**
   It is always good practice to inform the OA of your science plans: depending on the LRIS modes you plan to use (longslit, MOS, imaging), the OA will make decisions on how and when is best to focus the telescope. The OA can also be asked about specific observing techniques you are interested into (e.g dithering, offset pointing, etc). Just before opening, your SA will also be available to help with these issues. Do not be shy and ask.

Dinner

If you are reading this, you're probably very tired and hungry. Moreover, the real work is still ahead of you. Now it is a good idea to go get dinner and all other sources of sustainment you may need during the night. In each remote ops room there is a folder labelled **Restaurant Guide** for you to consult. Please also note that Starbucks (across the road, in the Foodland food court) closes, mercilessly and irrevocably, at 9:00 pm.

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Send questions or comments to:LRIS Support

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