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	Before you get started it is always a good idea to check the weather	
	all-sky camera etc	
	Local Weather Station	
	National Weather Service Forecast	
	http://10.0.1.12:7680/3hours.html at VATT	
Control room	Enable LiveView from the Dome Camera [1)]	
Control room	Enable LiveView from the new FinderScope [2)]	
Control room	Enable live view from the Axis thermal IR P12 camera [3)]	
	Once every few days it is prudent to reboot VATTtel	
Control room	Kill TCSglue if running; ensure that M2 Controller is disconnected; kill all GUIs (if any)	
TCS room	Make sure that M2 PI Controller is off	
TCS room	Reboot VATTtel: if VATTtel is running, press tiny “Reset” button, wait for the green “Run” and “Pass” LEDs. The old Guider will not be found.	
TCS room	Booting VATTtel: if VATTtel is not running, power it on **after checking that GPS is on**. Also note that prior to booting, VATTtel requires *VATTdata* server to be running. **PEPSI only:** These are the servers that need to be running: *VATTdata, VATTcontrol, VATTautoguide, VATTdev, VATTOCS, VATTarchive, PEPSI.*	
TCS room	Watch VATTtel monitor to make sure that the kernel loads from network server	
	This streamlined version assumes there is no time to turn the thermal system on for a couple of hours before opening VATT. If there is time, use the other checklist	
everywhere	Shutter all windows with blackout shades and curtains	
TCS room	*After VATTtel boots up, turn on the M2 PI Controller (just flip the switch and leave; it takes a while to boot up; you will check that it has done so later).*	
TCS room	Toggle power switches to ON on the DOME amplifier (fan will start, and amps will show on LCD readout)	
Control room	@ VATTCONTROL (console) while logged in to *vattcontrol* as *vattobs*	
Control room	Start TCS_GLUE (double click desktop icon)	
Control room	TCSglue main window: Make sure dome tracking is enabled (left-clicking on the dome-position field toggles between tracking enabled/disabled)	
Control room	TCSglue > Mount Control tab: Toggle the Telescope Control System's status bit regarding the dome slit: Click the Open Slit button (it will toggle to Close Slit). The slit will then need to be opened from the dome in due course. **The dome slit control unit is deteriorating. As a consequence, the dome slit motor must be activated in the dome.. The Telescope Control System's status must anticipate the physical change.**	
Dome	**Dome procedures**	
Dome	Open dome register vents (there are four pairs of them)	
Dome	Remove Dome Short	
Dome	At quad box on curved wall below the dome short installation position, plug dome shutters into the power socket (**note on safety: this ensures dome short is out: tether attached to cord**).	
Dome	Plugging this cord in the socket powers up a gray electric box above the quad. Open the dome slit by turning and holding the selector (aka turn) switch in the Open position until the dome slit is fully open. **If you forget to toggle the TCS status to the open-slit state, leaving it in the close-slit state, the TCS will close the slit immediately after you open it.**	

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Dome	West door (leading to ladder to the roof) is to remain closed (for efficient airflow over the telescope)	
Dome	**VATT 4k CCD Imager only:** start filling science camera dewar with LN2 (attach the grounding wire to the mirror cell first, then to the camera; insert needle into the dewar, fasten it with the bungee cord, open the valve); if using remotely controllable valve follow VATT:Jinvoo LN2 valve	
Dome	**VATT 4k CCD Imager only:** fill out LN2/camera log – listen for full dewar, cease flow when dewar is full. Do not use force when moving the LN2 hose if it is stiff: just unfasten the bungee cord, and let gravity free reign.	
Dome	Check dome home position and if necessary, correct it by lifting the encoder wheel, spinning it about ½ - turn (usually clockwise as viewed from the top) and immediately setting the wheel back down, into contact with the abrasive surface. Watch dome position until it settles down (usually overshoots at least twice, at varying velocities).	
Dome	Check derotator position (home switch magnet is showing, near sensor, to its right); check cable wrap is not twisted	
Dome	Check dome shutters are plugged into the wall power socket (if the dome shutters were left half way open, they will finish opening fully)	
Dome	Turn on power supply of finder telescope camera (on top of box on South side of East fork)	
Dome	Open finder telescope objective cover (CAUTION: check for snow on dome shutters if needed)	
Dome	Open the new finder telescope objective cover	
Dome	Andor Apogee guider camera power supply (a white inline electric switch mounted on the N side of the “guide box”): Turn power “ON”	
Dome	**VATT 4k CCD Imager only:** finish disconnecting LN2 filler hose from camera dewar, move storage dewar off of telescope platform and south, to dome silo wall)	
Dome	**VATT 4k CCD Imager only:** remove camera ground wire (first from the camera, and only then from the mirror cell) and clip it on silo, near storage dewar	
Dome	Disengage stow pins (~100 on LCD readout), note telescope is south heavy if mirror cover is closed (which it should be), and must be raised slightly in elevation towards zenith with hand pressure, until marks align. Failure to do this usually binds stow pins, resulting in failure of pins to fully release.	
Dome	Check azimuth axis “home” (pointers best visible from lower level by the entrance to dome)	
Dome	Check AZ hard stop flippers are showing green sides north (manually flip if not)	
Dome	Make sure West door (leading to ladder to the roof) is closed and locked for safety reasons (a person on the roof could get swept down by the rotating dome's shutters)	
Dome	Check all lights off (except for the floodlight operated from Control Room) and close door to elevator vestibule when leaving	
	Dome procedures complete	
Basement	**Basement procedures**	
Basement	**USE HEARING PROTECTION PROVIDED IF STAYING TO OBSERVE OPERATION OF PUMPS** (muffs are by light switch)	
Basement	Check dry air supply system dew point (typ. ~ -47°F; now tends to be 10°F warmer)	
Basement	Turn on building & pier fans	
Basement	STEP ONE (labeled as such): Pull out red switch, upper left corner of control box	

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Basement	After recirculation pump starts, check flow meter by oil tank	
Basement	Check that one chiller is “ON” (green indicator) (alternates between chillers #1 & #2, each on/off cycle). If neither indicator comes on, check the current (look at the box with the STEP ONE and STEP TWO: on the bottom right of the right side of the box there is a selector switch, its two leftmost positions allow you to monitor the current through the two chillers on the red digital ampmeter). If neither chiller is on yet at this stage, turn one of them on manually (turn the top switch to `manual` and push the `ON` button).	
Basement	Check oil temp set point (61°F)	
Basement	Check oil temp actual (should rise immediately after recirculation pump starts, then settle at or very slightly above set point)	
Basement	Check oil level light “OK” (if it's going to go out because of low oil level, it will do so after recirculation pump and/or pressure pumps have been started. May come back on after more running, as oil returns from azimuth bearing)	
Basement	STEP TWO (labeled as such): Rotate pumps switch clockwise to “ON”	
Basement	Check low side (feed pump) pressure rising	
Basement	WAIT FOR HIGH PRESSURE PUMP TO START	
Basement	Check high pressure side: pressure and flow “OK” after running awhile	
Basement	*Hydrostatic-bearing oil system active*	
	Basement procedure complete	
Silo 2nd lvl	NESLAB: First night of the run check coolant level; not necessary on following nights, unless there is a visible leak. [Access hatch is on the top of the cabinet, at the far left. Under the hatch is the hatch into the coolant reservoir, removable with two captured thumbscrews. Coolant should cover the visible, coiled pipes. DO NOT ADD COOLANT WITHOUT CONSULTING THE DAY CREW (Gary Gray): it is better to run with the coolant slightly low (i.e., ~1/4 of the diameter of the top, coiled pipe exposed) than to put the wrong coolant mixture into the reservoir.]	
Silo 2nd lvl	**Turn NESLAB on only if VATTtel is already booted so that you can turn cell fans and thermal control on without undue delay**	
Silo 2nd lvl	NESLAB: Simultaneously toggle front panel ON/OFF switch to “ON” & slowly raise manual valve lever (to minimize vibration)	
Silo 2nd lvl	NESLAB: Also simultaneously: watch pneumatic-actuated valves “OPEN”	
Silo 2nd lvl	NESLAB: Check pressure gauge (usually well above the nominal 56 psi)	
	Turn on M1 cell fans: *Legacy TCS glue does **not** control the cell fans anymore.* When in doubt, send co-observer to listen in the Dome to make sure that the cell fans will be turned on correctly because the only confirmation available will be their sound. Listening at the East fork is best.	
TCS room	Flip the switch on the quad to turn M1 cell fans on. A night light connected in parallel will light up to indicate that M1 cell fans are now powered up.	
TCS room	M2 PI Controller: make sure it is on by checking the status LEDs	
TCS room	Check both toggle switches on clear panel under VATTtel keyboard are toggled down	
TCS room	Turn on VATTtel monitor and check for error messages	
TCS room	Toggle power switches `ON`: AZ, EL & DEROTATOR amplifiers (should see some values on dome current (ampere) readout; the rest are dead) *DO NOT POWER UP COUNTERWEIGHTS AMPLIFIER*	
TCS room	Turn off light	
TCS room	Make sure bellows door is fully open after leaving the room	
2nd lvl lobby	Close doors to silo and to the instrument room (air flow management)	

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Control room	Turn on the intercom	
Control room	Turn on dome flood light (left of the SW balcony door)	
Control room	Turn on the main dome fan (green button on a strip to the right of the SW balcony door); adjust the speed to 8 by turning the knob on the top of the strip counter-clockwise to the limit (yes, 0 = the highest speed); listen to sound of proper operation over the intercom	
Control room	MOUNT CONTROL tab: Wait for “NESLAB is On” to appear	
Control room	THERMAL tab: note temperature differential (strut & mirror)	
Control room	THERMAL tab: radio button “ON” (do not use setpoint; setpoint to be used EXCLUSIVELY to change mirror temperature fast in time-critical situations ⇒ CLOSE SUPERVISION REQUIRED)	
Control room	TURN ON VIDEO MONITORS for the old FinderScope and Porch Sky Camera	
Control room	**Mandatory for remote operation:** check that Skype is running on the Samsung Galaxy Tablet A using the Skype username and password listed on the intercom unit	
Control room	**PEPSI only:** At the easternmost xterm, log in to *vattarchive* as *vattobs*	
Control room	**PEPSI only:** Open an xterm and start the VNC viewer using this command: `vncviewer –via ajarvinen@ssh.lbto.org –shared –viewonly 192.168.164.19:1` (pressing the “Up” arrow at the command prompt should load this stored command). Enter password (posted on the bottom of the xterm monitor) when prompted.	
Control room	**PEPSI only:** At the xterm closest to the old printer, log in to *vattarchive* as *vattobs* (OK to have two logins of same operator on this machine). In menu bar at top of *vattarchive* desktop start Firefox, hover near the top of the display to lower the title/URL bar enough to access, and use address bar drop-down history to open http://10.0.2.11/local/viewer/axisvid.html; click on All Sky window, then make Firefox full-screen by pressing F11 (not necessary if Firefox was left in full screen mode when last shut down).	
Control room	MOUNT CONTROL tab: Press “Open Slit” button and make sure dome shutters (slit) open (visual inspection via Dome camera), listening for sound of proper operation over the intercom.	
Control room	MOUNT CONTROL tab: Open mirror cover, listening for sound of proper operation over the intercom	
Control room	MOUNT CONTROL tab: Enable drives (automatically releases brake: listen over intercom)	
Control room	TCSglue main window: Enable Derotator tracking if disabled: click on the derotator position field, opening a small dialog box, and toggle the tracking there, then close dialog box	
Control room	**DO NOT “Calibrate”**	
Control room	**PEPSI only:** TCSglue main window: **during PEPSI runs, disable derotator tracking**	
Control room	*If applicable,* right mouse click on the dome-position field opens offset input dialog box. Enter inputs and watch dome movement (floodlight on). Kill dialog box.	
Control room	Start INDI server (double click desktop icon): a terminal appears; you may minimize it. **The INDI server must be running in order to communicate with `vatttel`, i.e., it must be running before you start `azcam`, `xephem`, `PHD2`, etc.**	

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Control room	Start “Secondary and Guidebox” GUI. A window opens: select VATT4k or VATTSpec. Another window opens. The top controls the M2 PI hexapod and the bottom controls various motors in and on the Guide box. The GUI is a browser window. The diagram and the text output box scale with CTRL+/- (or CTRL and mouse scroll wheel). Other elements scale when the window is resized.	
Control room	Start autocollimation (more detailed instructions are in a separate document): Press `Connect` button; field surrounding button should turn green; press `Reference` button; field surrounding it turns yellow(ish); wait for it to turn green; press `Auto Collimate` button; hit `enter` in Focus, TipX, and TipY boxes, to move secondary to previous night's final positions	
Control room	Connect the Guidebox part of the GUI to the hardware by pressing the `Connect` button. After any loss of power to the Guidebox you must click `Reference` (the procedure takes several minutes). Use the `Initialize` button if one of the axes becomes unresponsive (e.g., stuck in a limit).	
Control room	Start PHD2 (double click desktop icon): your main reference should be a separate dedicated document; instructions that follow here are simplified	
Control room	PHD2: Main tool bar, click icon that looks like a USB male connector: `connect equipment` window appears	
Control room	PHD2: `connect equipment`, in the camera row, click on the icon that looks like a screwdriver and wrench in an “X”: `INDI Configuration` window should appear	
Control room	PHD2: `INDI Configuration` window: click the INDI button near the bottom of the window: `INDI options` window appear	
Control room	PHD2: `INDI Options` window: select `Apogee CCD` tab (there are many tabs, and `Apogee CCD` is the right-most one; depending on the dimensions of the window, you may not see it at first; just scroll the tabs until you see it), and click the `connect` button in the `Connection` field: after a few seconds, a bunch of new fields and tabs appears. (The message “[ERROR] Model is not supported by the INDI Apogee driver” may mean that the camera is not powered up.) Check that the cooling system is on. Set binning to 8×8.	
Control room	PHD2: Close the two INDI-related windows. Back in the `Connect Equipment` window click the `Connect` buttons for `Camera` and `Mount`. Ignore error message, “Bad-pixel map does not match camera…” If the Mount does not connect the first time (there may be an error message), try clicking the “Connect” again.	
Control room	Start XEPHEM (double click desktop icon)	
Control room	XEPHEM: main window: click “Now” on top right and “Update” in bottom bar, then toggle the small “RT” button to the right of `Looping` [4]; check that the bottom bar says `Stop`	
Control room	XEPHEM: *If applicable,* “Data” menu: Load/delete local files	
Control room	XEPHEM: *If applicable,* dialog box/“filter” field: ENTER PATH TO USER FILES	
Control room	XEPHEM: Make sure that XEPHEM communicates with the telescope: In the “Telescope” pull-down menu, select “INDI Panel”, which opens, and then toggle “Connect” at the panel's bottom. Check that there is a graphical representation of the telescope's position (bull's eye) in the SKY VIEW chart.	
Control room	XEPHEM: SKY VIEW window: We used to click grid control (under Images menu) twice, turning RA–DEC grid off and then Alt–Az grid on. This does not seem to work anymore. In the “Control” pull-down menu select “Options”, which opens a new window, and toggle “Alt-Az” at the top left of the window.	
Control room	First initialization of coordinates can be performed shortly after sunset, using a bright star (<2mag) near the meridian.	

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Control room	XEPHEM: SKY VIEW window: Find a bright star near the meridian, at Elevation 30°-60°; based on RA and DEC, picture 1st move in ALT–AZ telescope will make; after selecting star in Sky View window, hit “Telescope GoTo”; WATCH telescope to see whether it is moving as envisaged. BE READY with software stop (hover mouse over “STOP” button); Watch for target star on the finder telescope monitor.[5)]	
Control room	Watch the telescope behavior immediately after commanding the motion, to make sure the motion seems to be appropriate and that the telescope is not accelerating to slew-speed, non-commanded co-ordinates (i.e., “running away”).	
Control room	If the telescope runs away (an exceedingly rare phenomenon), immediately click the red Stop button at the top of the TCS Information Window. If the telescope still continues to accelerate, hit the red Emergency Stop button on the console, to your right, above the phone.	
Control room	Paddle: push telescope until object is in grease pencil cross-hairs circle	
Control room	TCSglue main window: Left-click the `Init. coords.` button (this can be done at any point, and more than once)	
Control room	Turn up the main dome fan to speed 6 (strip to the right of the SW balcony door)	
Control room	turn intercom down	
Control room	Start Trouble Report (TRVATT): In menu bar at top of *vattcontrol* desktop, start Firefox; Trouble Report page will open (https://cbtest.as.arizona.edu/mtnops-trouble-report/). Open new tab in Firefox, and open VATT Weather Dashboard from Bookmarks bar. Click 3 Hours tab. Fill in pertinent fields along top (Observer(s), Instrument, Operator(s), etc.).	
	TELESCOPE “Go Live” SEQUENCE COMPLETE	
Control room	It is highly advisable to collimate the telescope using a star in the vicinity of your science target field.	
Control room	*If applicable,* WATCH telescope to see whether it is moving as envisaged. BE READY with software stop (hover mouse over “STOP” button).	
Control room	XEPHEM SKY VIEW WINDOW: Identify a collimation object (magnitude < 7). Use XEPHEM **GoTo** function.	
Control room	Paddle: Jog selected object into finder telescope monitor cross hairs	
Control room	TCSglue main window: Init co-ords (do this again because it will improve localized pointing: collimation object is in the vicinity of the science target)	
Control room	*Check/optimize telescope focus with science instrument prior to collimation*	
Control room	*“Autocollimation” must be running throughout the collimation & focusing procedure!*	
Control room	Adjust focus with Secondary GUI, taking an exposure with the science camera, and **when using the 4k CCD Imager**, evaluate the distribution curve fit in IRAF xgterm	
Control room	Guidebox GUI: insert Center field pickoff mirror	
Control room	Use PHD2 to observe the object. If the image is noisy, you may need to check whether PHD2 is correctly processing the image. Open the `Darks` pull-down menu and select `Use dark library`. A tick-mark appears to the left. Refer to PHD2's help files.	
Control room	Paddle: push collimation object to center of guider monitor @ rate of 5 sec/sec. DO NOT USE GUIDER STAGES TO CENTER OBJECT.	
Control room	Guidebox GUI: defocus to obtain “donut” (offset -30)	
Control room	Secondary GUI: adjust TipX, TipY to even out light distribution in “donut”, re-centering object with paddle	

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Control room	Guidebox GUI: refocus (eliminate/adjust offset; it will be a value close to 0)	
Control room	Guidebox GUI: select U-mirror	
Control room	Check/optimize telescope focus with science instrument (after collimation)	
	Collimation & focusing completed	
Control room	Select target and use XEPHEM **GoTo** function. Monitor the telescope motion during slewing.	
Control room	Use Paddle to center target in the Finder	
Control room	**VATT 4k CCD Imager only:** Take image with main science camera to check the field; use paddle to adjust; re-initialize coordinates as required	
	Target acquired	
Control room	Instructions for guiding are provided in a separate document. Briefly, once you have a guide star, click on it. A yellowish frame appears. Open the `Tools` pull-down menu, select `Modify calibration` > `Clear calibration data`, answer in the affirmative when asked whether you know what you are doing, and click on the green `Guide` icon in the main tool bar. PHD2 will perform a calibration of the corrective motions and start guiding.	
Control room	*IRAF* In order to work with multi-extension fits files in IRAF, load mscred in IRAF (typing `mscred`), and use `mscexam` command to interact with ds9 (rather than imexam).	

1)

Use the Internet Explorer browser on a Windows machine, connected to network via ethernet or via wifi (SSID="VATT" not "VATT_Guest") and go to 10.0.2.30 with the standard VATT Observer user and password combination, or use the smart phone app Hik-Connect from HikVision HQ; also available on the Samsung Galaxy Tablet A.

2)

See the footnote above but IP=10.0.2.29.

3)

See the footnote above but IP=10.0.2.28, and you obviously cannot use HikVision software: just use a browser or the "IP Cam Viewer Lite" on Samsung Galaxy Tablet A.

4)

These steps were unnecessary at one stage of software development.

5)

FIRST POINTING: The star will be in the new Finder Scope's field. Place the target to the right of the tiny orange arrow using the MOUNT CONTROL tab: Open paddle, select 100 arcsec/sec rate, and push telescope (usually NORTH) until object is near the mark on the monitor. Pick a slow speed (1"/sec or 5"/sec) and then use paddle to center it, first by the mark in the Finder Scope and then also on the Offset Guider Andor Apogee camera monitored via PHD2.