Safety Issues

Emergency Stop:

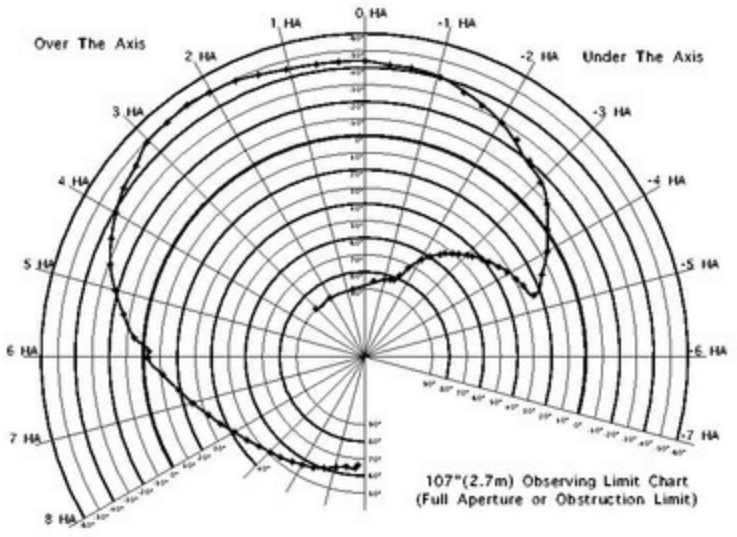
If you detect an emergency situation (runaway telescope, imminent collision with some object and the telescope, something has caught fire,...) hit one of the EMERGENCY STOP buttons.

Emergency stop buttons (sometimes labeled "E-STOP") are located at various locations around the dome. There is one on the left side of each handpaddle, one on the main control console, one on the deadman switch paddle, and one on the TCSGUI (if the TCSGUI is Active). Pressing or clicking on any of these will cause all telescope motion to stop and the amps and pumps to shut down. It also kills power to the dome motors, wind curtains, dome shutter, etc...

If you hit emergency stop, you will have to repeat the procedure above to be able to run the system again. You may need to click on the inactive button on the GUI to get it to become active again.

Limit Conditions and Collision Areas:

The 2.7M telescope currently has a software horizon limit of 5 degrees set. Obviously there are lots of other obstacles located within the dome at or above 5 degrees, so don't count on this to stop the telescope before it hits something. A graphical view of the limits is shown.



The 2.7M TCS system has an *approximate* collision ("obstruction") mask to keep the telescope from slewing into areas where it might hit something. However, this is an **approximate** mask and should not be relied upon exclusively. It is still the observer's responsibility to insure the telescope does not collide with anything and that it is operated in a safe manner.

The TCS system will check to see that the beginning and ending points of a move are in safe locations. However, it is possible for the trajectory between the two points to cross into an unsafe area. When this happens, the move will start, but will halt when it reaches an unsafe area.

The different collision masks can be selected via the main TCSGUI under the Special->Obstruction Mask menu. There are currently 4 options (basic, F9 cage, Flip Cage, User Defined).

Basic: contains only the basic collision chart which contains information about the north pier and the south collision areas (control room, High Ranger).

F9 Cage: used when the telescope has the F9 secondary cage mounted on it. It contains all information included in the basic mask as well as the location of the flip cage secondary storage location. (It is stored over the visitors viewing gallery, causing increased collisional area in the NE.) *This mask is in the process of being redone and should be used with extreme caution.*

Flip Cage: used when the telescope has the flip cage mounted on it (F18/F33). It contains all information included in the basic mask as well as the location of the F9 secondary cage which is stored over the area between the elevator and north pier (over the old control room), causing increased collisional area in the NW.

User Defined: used for special instruments that extend from the telescope and can hit additional objects in the dome. There are no general observatory instruments that use this mask at the current time.

The most common collision areas are:

North Pier: This is normally a problem when the telescope is pointing in the NE. The counterweight tubes *on the sides of the telescope* can strike the upper portion of the pier. The TCS system *should* not allow you to auto slew to any locations where this is a possibility.

Secondary Cage: Depending upon the configuration of the telescope, one of the secondary cages will be stored above the visitor's viewing area or the old control room in the north. If the telescope is at F9, the flip cage will be stored over the visitors area in the NNE and will cause an additional obstruction in this area. If the telescope is at F18 or F33, the F9 secondary will be located above the old control room (next to the elevator) and will cause an obstruction in the NNW area of the sky. This obstruction becomes much greater if the telescope is set up on the west side of the polar axis ("over axis").

Roof of new control room: Located across the south end of the dome is the new control room. Obstructions in this area only happen at very low altitudes. Things to watch out for here are additional equipment that has been stored here and the High Ranger.

Elevator: The elevator is located in the NW area of the dome and causes obstructions only if the telescope is set up on the west side of the polar axis ("over axis").

Platforms:

There are two hydraulic platforms for the 2.7M telescope (one on each side of the axis). Each platform can be an obstruction for Cassegrain instruments, the telescope, or its main counter weight. The TCS system senses whether or not the platforms are completely lowered and automated slewing of the telescope is allowed only when both platforms are completely lowered.

Note: Small moves (<31 arcmins) and handpaddle moves are still permitted with the platforms up. Tracking is also permitted. Observers should use caution when observing or performing manual moves when either platform is elevated.

Dome Crane:

The dome crane is located opposite of the dome shutter (in the squared off section of the dome). The crane should be in its stowed (fully backed out) location before any telescope movement is done.

High Ranger (Cherry Picker):

The High Ranger is located above the new control room next to the south telescope pier. It will only present obstruction when it is either not stowed or the telescope is pointed to a very low altitude in the southern region of the sky.

Service Positions:

The main service positions for the 2.7M telescope (other than normal stow positions) are at east and south service.

At east service, the telescope is "laid down" on its side pointing due east (HA = 6h east, DEC = 00:00:00). At south service the telescope is taken to a position low in the south for access to instruments mounted on the south broken cass port (HA = -00:40:00, DEC = -50:00:00).

Only experienced observers should attempt to move to these locations. If you have not been trained on moving the telescope to these locations, please ask a Mt.Locke staff member for assistance.

Close observation of the telescope should be made while moving to either of these locations as there are lots of things that the telescope can hit and cables that can be pulled out if not done properly.

Moving to either service position is done via the Special menu on the TCSGUI. The TCS system can take the telescope To the position and then safely From the position back to a safe position. The "Go Next" button is NOT pushed for a move to or from either Service Position. Do not try to move to any object or position with the telescope in one of the service positions. You MUST back out of the service position with the "From ..." moves under the "Special" menu. Failure to do so can result in the telescope colliding with objects in the dome!