

Video Imaging from Alvin

During the SVC cruise, a number of lighting adjustments were made to improve the performance of both the Mini-Zeus cameras mounted on the sponson above each observer's forward view-port and from the PATZ cameras mounted directly above each view-port. This lighting (including lights mounted low on the sub at the mounting bracket for the basket) was arranged to optimize lighting in the primary viewing/work-area "sweet spot" immediately in front of each observer's viewport, looking out to port and starboard, respectively, of the science basket.

Additionally, an extra LED was mounted, complete with a requisite disconnect cable, on the starboard manipulator arm to provide additional lighting when highest quality imaging is required.

The following guidelines present *one* way to get reasonable quality images, following a few simple rules, for inexperienced camera users. If you know better than what follows then please drop a line to the NDSF at WHOI and we'll happily look into updating this "cheat-sheet". But whatever else you do, please try this:

Whenever you get a nice shot lined up, hold it for 30-60 seconds if you can!

Rule 1: Positioning

The key to achieving good imagery underwater is good lighting – if you want good images, don't point the camera beyond where the pools of light from the sub are falling: show the pilot what you want to image and ask them to maneuver the sub accordingly. For example, when sampling, the best location for the pilot is to have the subject matter directly in front of the pilot's view-port (obviously) but Alvin is not a Cyclops: the cameras are located over the Observer's viewports, so for best imaging, don't be afraid to ask the pilot to scooch the sub over to port or starboard and line things up so the best view is directly ahead out of your own viewport. [Now Alvin has a lateral thruster, short sideways moves are much easier for them to achieve than they used to be.]

Rule 2: Focussing

When setting up to image something interesting, start by (a) zooming in as far as you can go and then (b) use the focus controls to get the image as sharp as you can. Even if you cannot get a completely crisp focus on full zoom, this will optimize clarity when you (c) zoom out to get the field of view you desire.

Rule 3: Aperture setting

Once you have the field of view you desire, well lit and in focus, pay attention to white-out all across your image and dial down the Iris setting on the controller. If any part of the scene you are filming is bright white then you have the capacity to turn the Iris down. While you don't want your images to be too dark, all else

being equal then the general rule of thumb is that it is much easier, long-term, to recover from images that are under-exposed than any that are over-exposed. Be vigilant on this matter and be ready to keep readjusting your Iris settings. A recurrent observation during the SVC dives was that even sequences that looked well exposed to an Alvin observer viewing what was being recorded using the monitors in the sub could still prove to be over-exposed when it came to reviewing the video files on the computers aboard ship, post-dive. When in doubt, especially in instances where the scene is really photogenic or otherwise important to you (e.g. a critical sampling operation) try holding the shot with one Iris setting for 30-60 seconds and then continuing to film at one setting darker for another 30-60 seconds. It won't waste a huge % of your total dive but could make or break whether you have nice video-documentation to share, long-term.

Rule 4: Manipulator Lighting for that Special Scene

If you have a scene that is really photogenic and you are prepared to spend the time to capture it as best you can, ask the pilot to bring the starboard arm into play and adjust lighting until you are happy with the scene you are viewing. During the SVC we managed some very pleasing shots, not just with the PATZ cameras but also with the Mini-Zeus cameras mounted on the sponson when zoomed in on photogenic targets out just in front of the science basket. There is no hard and fast rule on how to approach this – lighting from an angle is obviously better than full-on, but you can probably get multiple different effects from having the pilot move the arm (hence light) around: feel free to get creative!

Rule 5: Photo-documentation while transiting.

When transiting, you will get the best possible view by having your nose pressed up against your viewport. But here a way to capture a record of that exploration – and your discoveries! - for posterity. What we recommend, below, is easiest to do before you start your transect. If both observers do the same, the combined effect will collect a full transect equivalent to 5x width of Alvin's basket with ~33% overlap between the port and starboard observers' video-records: worth doing!

- a) Switch the monitor to record the view from the sponson Mini-Zeus camera.
- b) Line the camera up so that it is looking straight ahead, parallel with the side of the science-basket in front of your viewport, so camera heading = Alvin heading.
- c) Tilt the camera up as far as it will go, looking out far ahead.
- d) Zoom the camera all the way out so that you can see parts of the Alvin light-bar etc in the outermost top corner of your field of view (at which point, you should probably also see dark areas across the top of the rest of the field of view because that extends beyond where the lights from Alvin's light bar reach).
- e) Zoom in just far enough to eliminate the hardware from the top outboard corner of the screen then tilt your camera down slightly until the top of your field of view coincides with the far limit of the light field.
- f) Zoom in all the way to focus (see Rule 2)
- g) Zoom back out to same position as (e) and optimize your Iris (see Rule 3)
- h) Leave camera like that and go find stuff by looking out the window ☺