Concept review for Coral Macro Camera

Present Alana S., Paul R., Paul M., Ben E., Aaron S., Mike B., Steve L., Knute B., DJ, Chris L.

Paul's Notes

Paul R: Did you get clarification on smallest object resolution?
Chris: We want to resolve polyps.
Paul R: What exactly is meant by "resolve"? See or identify?
Alana: We'll get into it later.

Knute: Weights don't add up. You're underestimating.
Aaron: I'll check it. Solidworks says 63 lbs for whole system.
Alana: Camera weight seems off to me. Can you guys carry this?
Knute: Whether or not we can carry it depends on what else Jim wants to take down.
Mike: Swing-arm stabs are better for Ventana, with monkey fist on top.
Knute: We don't have stab system on Ricketts. We'd have to hold on front porch.
Alana: Is there max height for front porch?
Knute: Don't have a number right now, but guessing upwards of 4 ft tall. Would have to hold with manip.
Alana: What's weight limit for Ventana stabs?
DJ: A couple hundred lbs, so no problem.
Alana: Volume for Ventana?
DJ: Height is more of a limit, no more than a couple of feet. Might have to truncate tripod so we can lift w/manip. Look at examples from previous equip in Bldg. D.
Alana: Do you like tripod or cube?
Knute: Cube might be slightly better. Does it have legs?
Aaron: It has three legs.
Knute: Three is good for that terrain.
Ben: It works for Jim B's ADCP tripods.
Knute: Do what works for Ventana because Ricketts is more flexible.
Alana: What do you want for pick point.
Knute: Combination of soft line for lifting and hard point for fine positioning.
Alana: Span of light bar is ~1 m. Do you have feelings for system for folding?
DJ: There have been others, they're a little cumbersome but doable. By the way, I like tripods better than cubes. Better "stabification." Come and look at others we've done. Phobos has done this.
Knute: Build it and then we'll put D-rings where we think we need them.

Alana: Positioning will be more critical than with big camera tripod. We'll use two blinking lasers for getting range. Is there a better foot design so we can nudge it into place?
Ben: What about a pyramid? I'll draw it with Solidworks.
DJ: 4 legs doesn't work, it's never stable.

DJ: Some tripods go straight down from the bottom plate, i.e. vertical legs to reduce footprint.
Knute: If mud, might be tough. Hard rock bottom shouldn't be a problem. Lasers may be really hard to converge on a tiny sprig of coral.
Paul M: They're definitely a last resort, but better than nothing.
Alana: We're really hoping that Deepsea connect shows us what we're doing.
Paul R: Lasers should work well for tiny area of focus. I can get different colors of tiny lasers so overlap makes a third color.
Paul M: Let's talk. I don't know if they'll fit into our housings.

Alana: As far as weight and size, we'll design for max height on Ventana stabs. No fancy feet sliding for around. We'll use hard and soft points for grabs. We'll look at retractable arms, but may be non-retractable.
Knute: We end up with a lot of stuff on front porch. We'll have to work out a dive-by-dive scenario to see what all can go down on a particular dive.

Alana: Big tripod lets us reconnect any time later after deployment, but not with this data-only Deepsea connect system.
Ben: Doesn't Deepsea connect provide power transfer? I think it does.
Alana: I don't think so but we'll ask Dave F.

Paul M: Where do we want the long cable on Deepsea connect? On the ROV or tripod?
DJ: It's nice if one side is rigid, hard on the tripod frame, that we set the ROV one onto. Also the receive can is pretty big that might take up a whole drawer.
Aaron: It's like 16 in long.
DJ: Think through using this thing because they're kind of a hassle. There's an optical modem but it's not that fast.
Alana: Have you used this?
DJ: Yes, we used it with a Raspberry Shake. The paddle positioning needs to be rethought.
Alana: I'll ask Dave why the housing is so big.

Alana: What do you do for beacons when you leave something out this big?
DJ: Usually a Homer to last for a year, but nothing else needed.

Aaron: What's the preference for a tilt mechanism?
Everyone: ...
Knute: The silence is your answer. We'd like a lever sticking out the back that you can push up and down without having to grab. Placement might be critical for Ventana, but we have manips on both sides.
Alana: What are the restrictions for Ventana?
Mike: We don't want it too low.

Knute had to leave at this point.

Alana: What's the lumen rating on your pucks?
Paul R: 100 lumen per watt, 50,000 lumens per puck.
Alana: We can compare with Ken Smiths previous lights. We need to repackage your lights into a smaller bottle.
Paul R: I sent a link in the chat for a Web site with tiny lasers of different colors. Joost has source for RS-485 controllable lasers taken from laser projectors.
Paul M: We'll see how far we want to pursue that.

Alana: Paul, do you have concerns about your strobes staying at depth for a year?
Paul M: Yes. Also make sure you don't have too much light! Too short a pulse gives you a rolling shutter problem.
Alana: Can we scale the puck for less light?
Paul M: Yes, or drive it at a lower voltage. The quench may also help, but it has limitations. You could probably use two DSPL lights at 20,000 lumens.
Alana: Maybe use DSPL as primary with Roberts strobes as backup.
Ben: I know a different scheme with software connect through camera. I'll send info for a controller that might work with the Sony camera.

Alana: Sony A7r3 gives you a big resolution bump, according to our tests with AF resolution chart. Aaron designed housing for the 100 mm lens, which is the largest.
Paul R: What resolution did Jim pick on the chart when he was judging depth of field?
Alana: I don't know. Will laser work better than your eye?
Paul R: No, unless you do something like coherence with the lasers.
Chris: Remember that corals move around. Many of the photographs will be out of focus.
Paul R: Can you do a burst of images?
Alana: I don't think so with this camera. Here are the memory tradeoffs. We can store 11,000 images uncompressed RAW for one year of hourly images. Burst would blow our budget.

Alana’s Notes:

1. #pixels required to resolve a polyp
2. Fix weight in water of camera housing - done
3. Ventana best to deploy with stabs on swing arm
    a. Critical dimension is the height between stabs and pick point. Manip must have the range to lift system off stabs
    b. Can hold 200+ lbs on stabs
4. Rickets - place on porch and hold with manip
    a. Probably needs to be under 4 feet
    b. Will limit what happens the rest of the dive
5. Lift points, pilots want hard and soft lift capabilities
6. Could we use different colored lasers
    a. Paul and Joost have sources

7. The tilt mechanism should not require that the pilots grab something, works better if they just nudge something.
8. MARS phobos used retractable arms, check out their design
9. Check with Dave F. can you transmit power through DSC
10. Hard mount DSC receiver to one side, only move one antenna.
11. LEave homer near tripod no sonardyne beacon needed
12. Paul R's strobes 50K lumen and 100 Lumen/W
    a. May be too much light
    b. DSP&L may be more than enough in strobe mode
13. What resolution for depth of field calcs