What's monitoring the water? In the hulls, have water level sensors. **What is measuring that?** 12-in tape.

All designed to be diagnostic (comment on sensor board)? Yes except for CAN → on sensor board.

DV9's are not weather-proof? Correct. **So this whole board will be in some sort of weather-proof enclosure?** Yes.

Xbee transceiver has an external antenna. What's it's range? Outdoor = 300m. Frequency = 2.4 GHz. **It's not roaming channel? It's fixed? So it'll be only in a receive mode?** Yes. It will be receiving from another Xbee that we have.

Is that a heat dissipation on the bottom right corner (comment on the RoboteQ FDC3260)? Will have to see when it comes in.

Which one is communications (comment on MPPT/Charger Update slide)… Would go to the Power Board but not currently in there.

What in the MPPT, you've already planned on $420?

So what battery chemistry are you focusing on now? Lithium polymer. Max has been talking to them to nail down the exact configuration.

Comment on Steering Update →Take almost no force to turn **In the water?** Yes. **Is that a pull-push force?** Yes. **Have you considered slippage on those?** Have but think this system will be just fine.

You're using the T-slot for adjustability but once you get it to where you want it, then there will be no more adjusting so it becomes convenience at that point. Crux of my comment… total price is a fair amount of money for the mounting structure. We're actually under-budget for this. We could use some sort of square tubing or rectangular. But when we looked at weight for the length that we needed, the Tslot aluminum reduced the amount of weight.

So can you tell me a little bit more about how the actuator is affixed and how you're transferring motion to the trolling motors. Used a sheet metal mount that will be mounted to Tslot. **How are you attaching it to the Tslot?** With the Tslot nuts. **Do you have a feel for what you can hold? It seems like that's great but your limiting factor will be…** If we do run into problems with the Tslot not slipping, we can drill into the Tslot. **I know that I've had team that use 8020 but yeah it sounds good until it starts slipping. So they crank harder, which might cause it to bend.** **Or could use another bracket.** Drill out wherever we need it and put a fastener in. So if we find that we need to fasten it a different way, there are other fastners that might clamp it a little bit better. **At the other end of the actuator, you have a parallel linkage… you're holding one of the motors. Just wants to understand the way the motion is getting transmitted from the actuator to the motor. So that tells me how you'll fit in the actuator to the arm to the other arm. How about the arm to the actuator? Are you transmitting torque with those Ubolts?** Yes. **And they don't shift?** Correct. It's a composite shaft so they have some give to it. **Is that little arm standard to adjust the trolling motor. Is that how you would attach a rudder?** Essentially it's a handle mounted on top of the shaft. You would steer using the same throttle. **Um so, I'm wondering if it's a flexible shaft, are you thought about that the actuator will bend the shaft instead of turning it. Another thing is torqueing the arm… have you looked at whether you're going to torque the little arm? It would be good to check.** We benchmarked this type of design. They did a similar thing with the

actuator. They did the same exact thing with clamping the shaft. **And the one link that commits to the both side instead of two links that might reduce torque so that your actuator is pulling in the middle instead of the bottom. Um, but this piece isn't what you're using.** No, well it'd be there to set the height of the motor. **I was looking more to see what type of friction you'd get.** So your concern is the torque on the moment arm. **If there's this arm sticking out, it'll want to twist because you have this other thing that has resistance on this side. So then if it does start to twist, how much force can it take before it binds. Also with the actuator?** The actuator is it's own. It has a hole through it with the bolt. **Do you have a feel for how much misalignment you can tolerate there?** Have to look into this. **How is the moment arm connected to the plate?** Welded. **Are you concerned about any fracturing that might occur there? Does one of you weld?** Yes. **We have someone who's working for Senior Design next semester and is good at aluminum welding.** We'll look into the torque and misalignment spec. **My gut tells me it would be a worthwhile investment to get your hands on 8020 and… I wouldn't expect problems in slipping in the Tslot. It's a plain carbon screw and plain carbon clamp on a very ductile aluminum so it bites down pretty good. The flat pieces that you thread into were all bent.** Could be wrong material 10 vs 15 series. **What does the manufacturer say about lateral holding force.** When we look into slippage, we'll look into that. Torque specs = 15 – 25 ft lbs.

Need to keep our weight biased towards the front. Just forward of the front cross-member is where the center of gravity is.

How do you know if you took on water or not? Opened up the flaps and didn't see any in there. There are little square plastics to add balance to each pontoon.

Will that solar panel donation suffice your panel needs? Wegmans Calkins is putting in a solar array. Jess on the people mover has a connection over there. They got an electrical box from that connection. Might want to talk to KLK. She might have connections to Wegmans.

Have a scale boat so can vet our algorithms and sensors. This way we can test during the winter. Will be able to mount motors and control systems. **So you'll be able to mock up your steerage-linkage on here?** Will be a cross-member linkage very similar to full-sized boat. Try to keep it consistent with full-scale boat. Plan on testing over intersession. **So will you be able to use this where you'll need to place things in order to keep things balance. Is it accurate according to buoyancy forces?** Main idea behind boat is if we had a boat that we can use to model then when we get to the full scale we'll have learned already how to model the boat. **Risk mitigation for not having a CE. Can make use to make sure develop software. Basically plug and play for the full model.** Should work one-to-one with the full scale (the algorithms). **So now this is just for the control system for steering and slightly navigation.** Will be utilizing an IMU, which should work just fine in the pool area. GPS won't work. **And so practically speaking, this is a more feasible demo for Imagine then your boat. Are you thinking of using this for Imagine?** We have separate hardware. The thing that's transferrable is software. Imagine = have full scale boat there for people to see it. Video of full scale test. And maybe small-scale boat in the water. Need to figure out where can do that. **Have had a pool other there in the past couple of years. 18' pool. They had to move it 3x. When you put your proposal in, do things like space considerations. Do this as one of the first things that will get done with the first weeks back. So that's something not urgent for now but I was mostly asking if you were going to go some place with this or use this to get yourself through and set it aside.** Simulated, validate on small scale, simulate again. Should be more accurate because simulated with small-scale. **Will you be able to simulate it in pieces. I mean you know given**

the constraints given there, will you be able to simulate it there. Drive it around in car with gps and see if motors are working. How do you validate gps with this and that is a very good idea. Come up with a path and see how it responds. **Right, and that's another option.**

I still see 3 feasibility items that are incomplete. Do you remember what those are? **How much can harvest, boat weight and energy storage.** Harvest – changed to be how many panels can we get. Once we get these panels, we'll have a better idea of how much we can harvest. We have some data that Matt presented before based on solar insolation in Rochester. **Sounds like the way this has morphed, this has become a moot point so ok. Are you going to close that item out. And the other two?** Energy storage is closed. Dependent upon size of battery, MPPT, panels for solar array. Amount of weight the boat can support. At least 175lbs. Can bring that into the CAD model. Kind of have those answered and haven't been able to answer those feasibility questions. So you'll have completion of some sort or nullification closure by the Gate. Have the documentation for it and just have to close it. **If you have a requirements table, what's your expected performance and where can I find the feasibility that shows that. If it's not a system level requirement, it could be a subsystem level requirement and how are you flowing that down.**

Scope redefined… I don't see any sort of telemetry in there.