

Student and Teacher Questions and Answers

Kwadropus -- Controls

1. How do the arms move the robot?

Does the robot rotate about a single arm or move like a snail or slug with extension and contraction?

That will depend on the type of motion that the arms have. In the kwadropus artwork, each of the arms moves in a different fashion. That was to help students work with spreading out their ideas. I don't know what kind of arms we will have so I'm not sure what the over-all motion of the robot will be. I suspect that the final robot will have 3 arms all the same but we may be learning from the first few versions.

2. How does the robot actually clean?

Does it slowly move across the floor/wall releasing and moving the arms and actuating the suction cups continuously? Yes. I suspect it will be a combination of suction cups and the arms holding onto handrails.

Or does it have a move, clean, move, clean, process where it stops to clean and then finds a new place to move to? I don't think it will have to stop to clean. I think it will clean continuously.

3. When are the arms searching independently and how does this fit within the larger process of the general movement of the robot?

Here's a thought because I don't have it worked out—we are exploring this together. It seems like each arm should be trying to get a hold of something (handrail, suction onto surface) continuously but once it has a hold on something, it should stay attached for say,....10 sec and then search for another location. This is to allow for the duster to clean then to switch to another arm's attachment. The 10 sec. also allows for the robot to pivot to go in a different direction.

As teams are developing these ideas, do you have suggestions for what the control team should implement? Right now, it is difficult to develop a concept for a program without knowing how the robot operates.

Set up your Arduino to control at least 3 motors and receive input from sensors (attached or not attached). (what kind of sensors—pressure switches, resistance in the motor)

Set up your Arduino to relay information from motors and sensors to the central brain.

Set up central brain to have sensors (attached to wall or not) and to control the motor that activates the propulsion

How should the kwadropus know where it is?

Should there be some kind of reflectors in a module so it can locate itself?

Should it have some kind of object recognition so it can maneuver around inside the module? (this would take up a lot more memory and computing time to recognize all the objects that may be on the space station.)

Should it just move blindly around in a module with a random motion?

Could the robot be looking for specific objects—like blue handrails?

I am expecting that the first Kwadropus we make will be around 24" in diameter so that you can make your component the size you want for demonstrations of how it works. I don't want you to worry about size right now, I want to see your ideas for functionality. Eventually I expect that the Kwadropus robot we send to a future space station will need to be around 12" in diameter so it can clean in smaller nooks and crannies. I don't need you to design for this yet but keep it in mind as you develop your prototypes.