Student and Teacher Question and Answers

Kwadropus—Mobility Arm

My team has decided to pursue the mobility arm on the robotic space duster project. One of the recommendations/qualifications for the design stated is to use "as few rigid parts as reasonable." We had planned to construct and connect multiple Stewart platforms together for the arm mechanics. If we are able to wrap the stewart platforms in a soft material like silicone or latex, would we meet that requirement?

The exterior material definitely needs to be some kind of soft material so it isn't scratching up surfaces. A Stewart platform is an interesting direction I hadn't considered. I'm not sure you would get much curl like an octopus arm but you would get a lot of movement for the tip. Are you thinking hydraulic, pneumatic or electric actuators?

Your team should be making your mobility arm a size that will allow it to grab a handrail with the dimensions as described in the presentation. Once you can demonstrate that your mobility can grab and hold a handrail, I want you to be thinking about how it will hold on for a while (lets say 10 sec) to allow the duster arm to clean that area. Next the mobility arm needs to be able to release from the handrail and shift to find another location or handrail to grab onto so the robot is moving around the room. If your mobility arm is able to add some extra motion to the robot for a few seconds while grabbing the handrail, it may help the duster arm clean a slightly larger area—just a thought.

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.