

2011 AUTODESK INVENTOR DIGITAL PROTOTYPING CHALLENGE

In this year's 2011 Autodesk Inventor Digital Prototyping Challenge, we were given 5 categories: industry, Science, exploration, medicine, and law enforcement. In all these categories, technology is already being used to make life easier for humans, except for exploration. Upon looking onto exploration, we started thinking of ways that we could make it easier for humans to further explore earth. However, we could not come up with anything that was not already made. Then we realized that instead of exploring earth, why don't we explore outer space which is a far more difficult thing to do. So research was done into what activities are performed when astronauts go into outer space. After looking into things we found out that astronauts go out of their ships to collect samples of rock which they would like to analyze. So we thought, why not make it easier for the astronauts and have a robot collect the rock samples. Now that the idea for the robot had been decided upon, the team set to work trying to create a simple robot that would do what was required. First, we looked into what was available to us and found the claw kit. This tool would be the perfect thing to pick up the rocks. So sketches were made with this claw and the arm mechanism which would consist of a pair of linear slides that would allow the claw to extend and retract. A bucket was also placed on the robot for storage of the rock samples collected. Further sketches were made to get a larger sense of what was to be CADed. Now the CADing began. We started with the mobility of the robot. All terrain tires would be used to help the robot conquer the different terrains on the moon. High strength motors were also used and they were geared for torque to provide the robot with the pushing power. Next we moved on to the arm mechanism. It would be two towers that would come up from the chassis and hold 4 bars. The gearing on the arm would be 1:5 to provide sufficient torque to lift up the rock samples. On the four bars would be linear slides which would hold the claw. The purpose of the linear slides is to allow the claw to extend out, pick up a rock, and then retract back in to put the rock in the bucket. After that, the claw was finally attached to the linear slides. Now the only things that were left were the microcontroller, battery, camera and bucket. The bucket was a simple 4 sided box made out vex plates. The camera was mounted on top of the arm so it's view covered everything. The cortex microcontroller and battery were placed behind the bucket to make sure they were protected. And at last the Moon Expedition Rover Robot was completed!!

