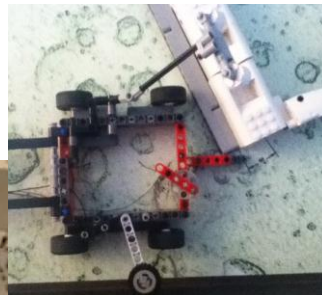


LegoAces MoonBots 2.0 Design Proposal

The LegoAces have extensive experience building robots of all types to perform all varieties of missions. This experience gives us a repertoire of different designs and processes to build upon in any situation. This design report, instead of attempting to give an exact solution, outlines three critical elements of any robot, and how the LegoAces experience can be adapted to fit the needs of MoonBots 2.0

A key element of any robot, particularly a MoonBot, is the **suspension** and drive train. The LegoAces have designed and tested many unique systems, including Rocker Boogie, 4-wheel drive, rack-and-pinion and even an entirely spherical rolling robot. For MoonBots, the extreme terrain the robot is presented with the task of surmounting means an extreme suspension system will likely be needed. Determining exactly what that system is will be impossible until more details about the board are available.



The ultimate goal of any robotic system is accomplishing its mission by using its end effectors and **actuators**. The LegoAces have used many different types of actuators to accomplish various missions. We have made end effectors that travel away from the robot, accomplish something, and then are retrieved with cargo. To collect loops, we have made an innovative pincher system that is not dependent on their orientation, along with other designs. The design that will best suit MoonBots 2.0 is dependent upon what we are retrieving, their orientation and number, and constraints posed by ground clearance.

Actuators are ineffective until the robot gets to the place it needs to be in. For this reason, **navigation** is the main cause of inconsistencies in robot performance. Our team has experience with many different methods of determining the robot's location, like compasses, ultrasonic sensors, and light sensors. We have even used camera images of grass to determine our lateral position on a sidewalk. Our favorite method of determining location, however, is to simply hit something solid. In this way, the robot knows its precise position without any possibility of sensor error or programming mistake. For MoonBots, we may also use an innovative system where the robot deploys a device that slots into the base plates and allows the robot to drive in a perfectly straight line.

The LegoAces are ready for MoonBots 2.0 Phase II. Our extensive expertise in designing innovative and reliable suspension, actuation, and navigation systems will allow us to design an out-of-this-world robot to meet the out-of-this-world requirements that we are sure to be faced with.

