

Hybrid Robotic Mobile Platform

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As humans seek to improve society and explore the Earth, Moon, and beyond, the reliance upon technology has greatly increased. Robots and robotic platforms are used in a number of fields from manufacturing to medical to entertainment. However, there is a growing need for robotic technology in the field of exploration of space and extra-planetary terrains. Exploring these unique environments can be dangerous, thus limiting the information that can be gained. However, through the use of robotic technology, exploration and discovery of space can expand further than imagined. With the advent of soft robotics, robots and robotic systems can operate in capacities where flexibility is needed. For ventures such as exploration and inspection, a system that is flexible yet robust is necessary. This project, the Hybrid Robotic Mobile Platform, aims to fulfill this need, by creating a hybrid system utilizing liquid-based soft actuation and a rigid chassis. The platform is designed to mimic the motion of a snake to easily traverse compact areas and different terrains. The mechanism of motion, the materials, and the geometry of the actuator will be investigated, as well as, dynamic motion, electric systems, and control systems of the robotic platform. Currently, the first stage of modeling of the platform's dynamic motion is completed, resulting in preliminary motion predictions. Also, the investigation of the actuator materials is underway, thus determining the best polymer film for actuation purposes. Fabrication of the platform is also advancing, resulting in a completed prototype chassis, made using additive manufacturing methods. All in all, this project will present a biomimetic platform designed to traverse unique terrains and explore places humans cannot yet reach.