Math Into Motion: Robotic Hexapod for Hazardous Environments

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In fields such as exploration or inspection in hazardous environments, the ability to navigate terrain safely is crucial. This is often done through robotics; however, traditional systems (rovers, drones, four-legged robots) have caveats that can limit stability or traversability. Hexapods (six-legged robots) offer superior static and active stability to other legged robots, are more able to navigate terrain inaccessible to rovers, and can sustain significantly larger payloads than drones. Hexapods can be applied in fields, such as hazardous inspections, where, while eliminating human risk, stability in a rugged environment is key. The Mark V hexapod (the 5th version and current model) has proven to be an effective hexapod with all necessary core capabilities of a 15 carrying capacity, 100+ meters of effective range, and a 4-5 mph top speed. Mark V includes many advancements from previous models, such as an inverse kinematics and linear interpolation based gait system, autonomous orientation, a course correction system, an effective and complex PCB, and tetherless operation. These allow the hexapod to become a platform for specialization for a wide variety of purposes. These hexapods have the ability to feature advanced terrain adaptation, climbing & diving, auto-navigation / autonomous navigation, AI/ML incorporation for detection, specialized leg features, etc.

Awards Won:

Third Award of $1,200

IEEE Foundation: Third Place Award of $400