TRUSSES: Temporarily, Robots Unite to Surmount Sandy Entrapments, then Separate

Team Members

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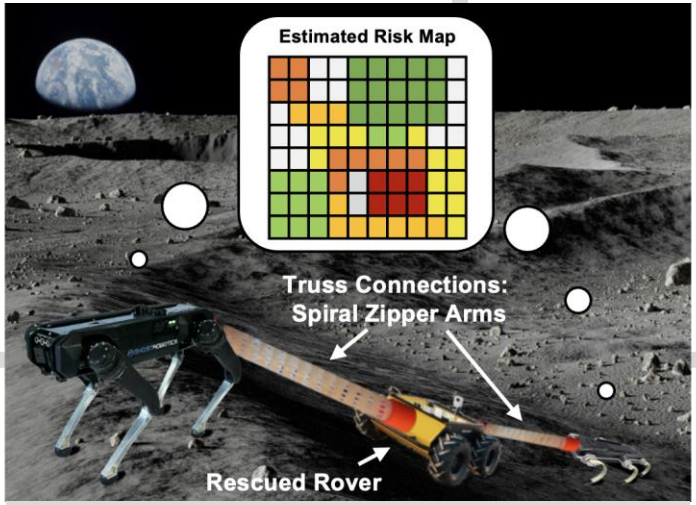
Development Objectives

Heterogeneous teams of robots will jointly overcome entrapment by attaching to form large, maneuverable structures. The main technological challenge is to plan safe maneuvers for the robots while accounting for ground interactions. The system will increase maneuverability and versatility for existing multirobot platforms, ending in a TRL-5 demonstration.



TRUSSES multirobot maneuver concept

Approach

The TRUSSES project will develop algorithms that provide robots with two main capabilities: 1) estimate robot-to-regolith interactions in order to plan safe maneuvers, and 2) plan truss formations and coordinated motions for robots to push and pull each other to safe locations. The system will be evaluated to verify risk estimation, risk avoidance, risk mitigation, and recovery from failure.

Impact and Infusion

TRUSSES will enable multirobot systems to avoid and recover from archetype failure scenarios including sinkage, entrapment, slipping, and impingement. The TRUSSES algorithms integrate into standard robot navigation architectures so that robot teams gain capabilities without disturbing their main mission. Future extensions of this work have the potential to deal with extreme terrain such as ice or vertical tubes.