

Deep Contact Graph Routing for lunar operations

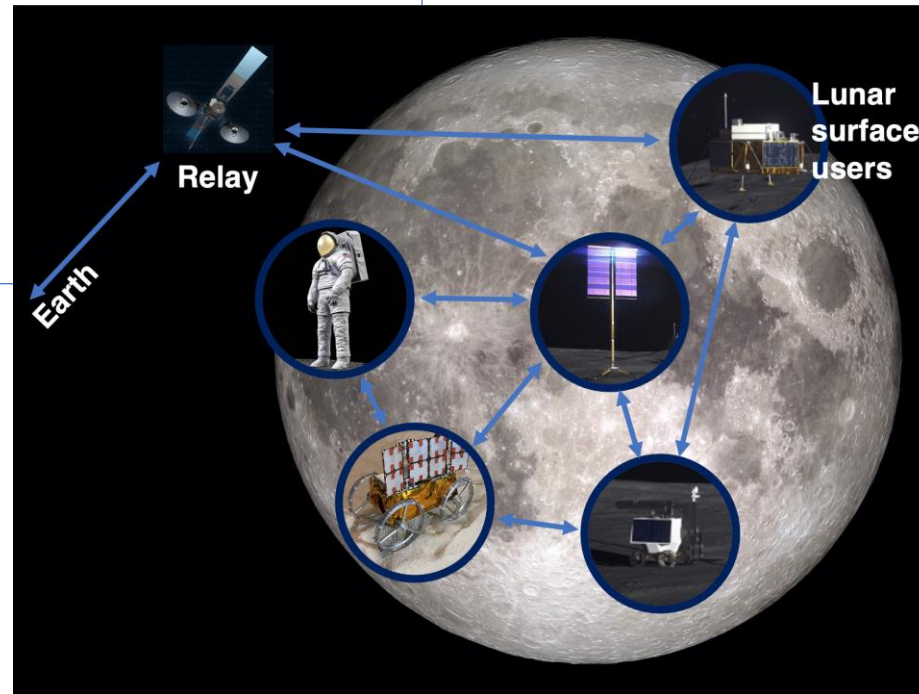
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- Start TRL 1; End TRL 3
- SOA: CGR routing does not make use of Deep Neural Network predictions of Channel State Information; existing CGR cannot plan motion of robotic assets

Approach

- Deep Neural Network (DNN) model of Channel State Information (CSI) enhances Contact Graph Routing
- Planning for data bundles enables emergent data mule & relay communications
- Multiple radios provide diversity and redundancy
- Development in lab, field testing in lunar-analogue environments using real space hardware from Astrobotic

Research Objectives

- Develop deep neural network model of CSI
- Use DNN CSI model to generalize Contact Graph Routing for increased network throughput and availability
- Develop joint robot/network planner that can command robot to improve Channel, physically transport data (data mule communication), autonomously plan data relaying



Lunar Network using Deep Contact Graph Routing

Potential Impact

- Improved throughput, availability, range
- Improved robustness to communication obstacles and increased diversity of locations that can be explored such as lava tubes
- Improved mobility & operational uptime
- Improved battery use & power efficiency