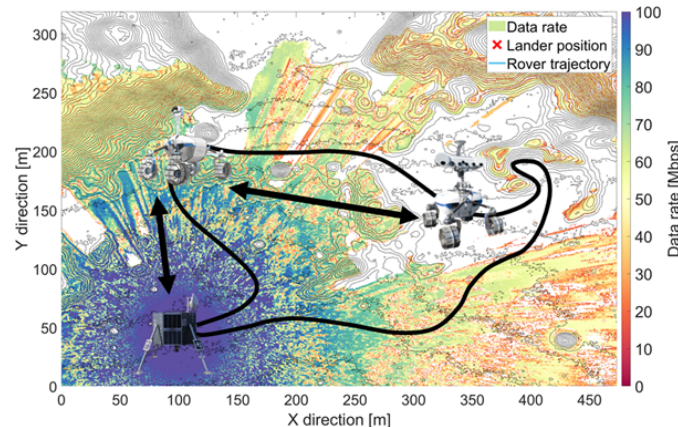


Master Thesis

Radio Coverage Prediction Aware Routing

Future space exploration missions will rely on multi-agent systems with many robots collaboratively exploring the unknown. Communication is key to enable collaboration. Through information exchange, the agents can cooperatively navigate and reason on sensed data to accelerate exploration. Communication infrastructure is in general not available, and the terrain to be explored contains radio signal blocking features such as large rocks, hills and craters. In general, the terrain is known to a certain precision, and based on radio-propagation models, the quality of a wireless link can be predicted. Wireless ad-hoc networks with decentralized architecture are required to establish communication links among all agents and deployed sensors, and to dynamically route information within the network accordingly.



Mission

DLR develops a swarm-navigation system for simultaneous communication and radio-localization for planetary exploration. Higher layer routing protocols are missing. In this work, existing routing protocols shall be identified or designed (reactive or proactive), which can exploit the real-time prediction of the wireless link based on terrain information. Routing protocols shall be evaluated in simulations and compared to ones not leveraging information from prediction.

This topic is in cooperation with the German Aerospace Center (DLR) and ComSys.

Qualifications

- C++ programming
- Simulation environments
- Knowledge about the network stack
- Independent cooperative working

Goals

- Theoretical analysis of existing routing approaches using radio coverage prediction
- Development of a specialized routing
- Evaluation of the routing approach in a simulation environment

Project type Master Thesis
Duration 1 Semester
Language(s) English, German

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