Small PLaNS Towards Mars: Exploiting Ultra-wideband for Self-localizing Rover Navigation

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ThalesAlenia
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Space

1 Lander Descent

The lander descends onto the Mars surface, e.g., using a parachute system.

2 Anchor Deployment

During or after descent, the lander ejects a set of anchors to cover the operational area.

z

y   x

Ranging

3 Initialization

The lander and the anchors form a multi-hop UWB network and perform anchor-to-anchor ranging. Ranging information is used by the lander to build a coordinate system and assign the position of each node.

4 Navigation

The lander releases the mobile rover. The rover performs ranging with the anchors in range, computing its location on-board or offloading the computation to the lander using a dedicated long-range link.