NRI:INT: Ad-hoc collaborative human-robot swarms

Award #1830471

Friday Poster #16

Verifiable Robotics Research Group, Human-Robot Collaboration & Companionship Lab, and the Collective Embodied Intelligence Lab

Cornell University

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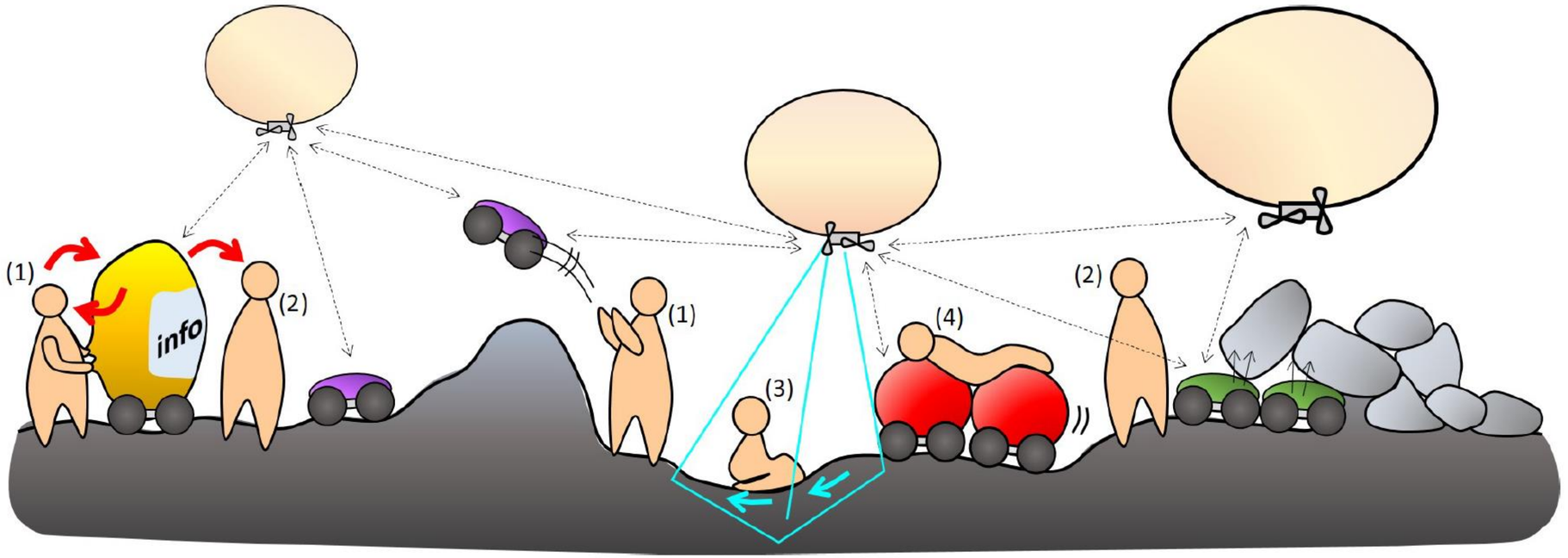
Goal: Design the autonomy, interaction, and hardware that will enable an ad-hoc collaborative swarm of robots and non-expert humans to accomplish a high-level task without central coordination.



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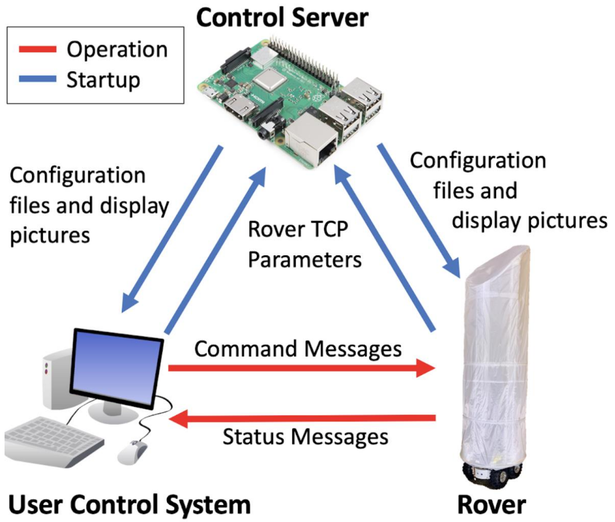
Hardware



Control

Simulation

Interaction

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Hardware: Mobile and inflatable rover for visual, tactile and audible interaction

The rover base is designed to keep up with humans at jogging speeds over relatively uneven terrain; low weight further permits easy handling and transport.

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Control: Robot tasks described using Event-based Signal Temporal Logic

We automatically synthesize controllers to satisfy high-level, timed tasks including reaction to environment events, collision avoidance and reaching goals.

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Simulation: Virtual evacuation with cooperative and resistive swarm members

With the simulation environment, we test the robot's strategies for guiding people in a virtual emergency scenario.

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Interaction: Bi-directional touch interaction with ShadowSense

ShadowSense uses shadow image classification for a detailed, hardware-light, full-body human-robot interaction. Together with an internal projector, the inflatable bladder allows for bi-directional visual and touch interaction.

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Thank You!

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