

Heterogeneous Swarms of Autonomous Robots for Improved Situational Awareness in Mitigation of Building Fires

Carlo Pincioli, RBE/CS

Albert Simeoni, FPE

David Cyganski, ECE



Objectives/Value Proposition



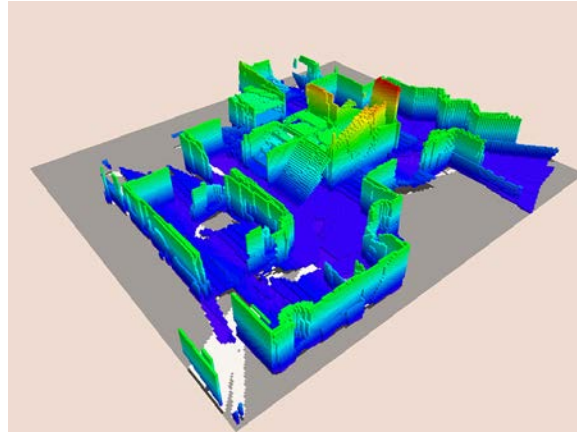
Objective:
quick situational awareness of building integrity and victim location

Motivation



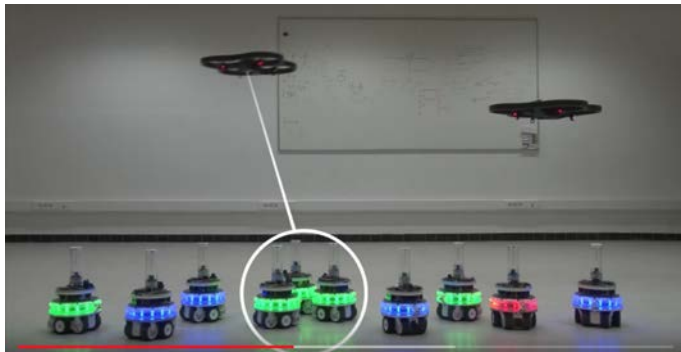
Current robots are expensive, slow, cumbersome to deploy, have limited sensing

Approach



Distributed 3D reconstruction of internal structure and victim locations

Virtual-reality human-robot interface

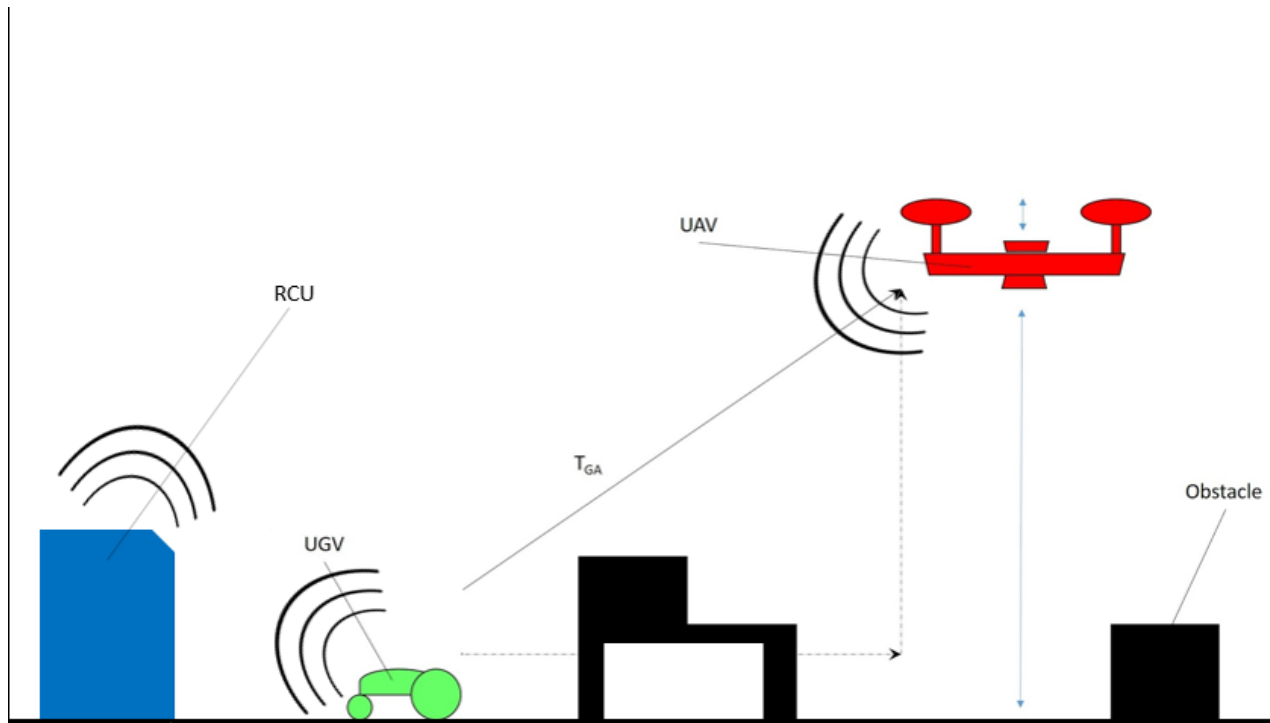


Heterogeneous swarm of new types of throwable robots →

- Fire sensing robots (CO2 detectors, thermal cameras..)
- Victim location (microphones, thermal cameras...)
- Structural assessment (ultrasound, LIDAR, ...)

Seed Grant Activities

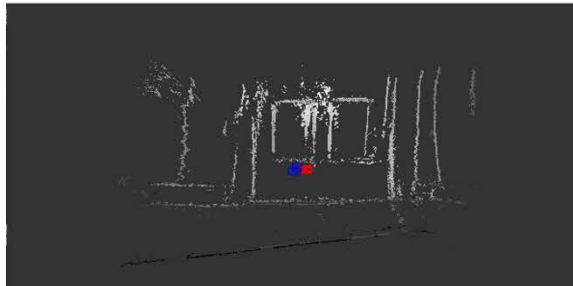
Feasibility study: drone – throwable ground robot mapping



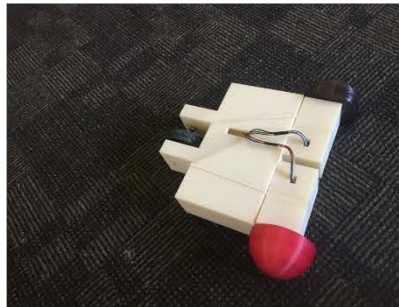
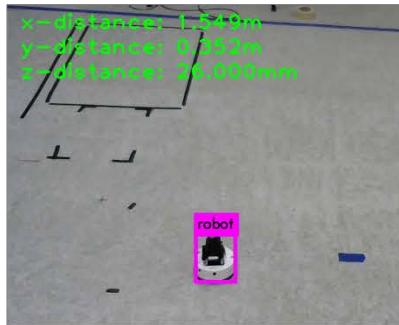
Seed Grant Activities

Feasibility study: drone – throwable ground robot mapping

Mapping Visualization



Robot Recognition



ARGoS Swarm Simulation

