PROBLEMS AND COLLABORATIONS

The staff at the Swarm Robotics Lab consists of people from various places across the world, working within the fields of computer science, electrical, mechanical, and space engineering. The following projects are products of a collaboration with engineering students from Luleå University of Technology, in Sweden.

SHELTER SEEKING FOR FLYING SWARMS OF ROBOTS

This project investigates how groups of quad copters autonomously can seek shelter in case of bad weather. The proposed method is inspired by the shelter seeking behaviour observed in cockroaches, where previous experiments done on real roaches have given rise to a randomized local search algorithm known as Roach Infestation Optimization. One of the many challenges of this project is to tackle the balance between exploration and exploitation. Other major difficulties are faced when the robots are in environments without local reference points, and when GPS positioning is unavailable. We therefore propose alternative methods that address these issues.

AUTOMATED TAKEOFF AND LANDING FOR QUAD COPTERS

An automated takeoff and landing system for quad copters is being devised and implemented as a self-contained, real time, on-board system. Using only high level commands is important to be able to fly multiple units at the same time, since a bottleneck otherwise could develop at the ground station side. The system will also work as a platform for future work to implement more autonomous functions. By adding more sensors, the quad copter will be able to calculate where it has the highest probability to make a successful landing regarding to obstacles, ground angle, etc. This is an important step to be able to fly without constant human supervision, useful for search and rescue missions.