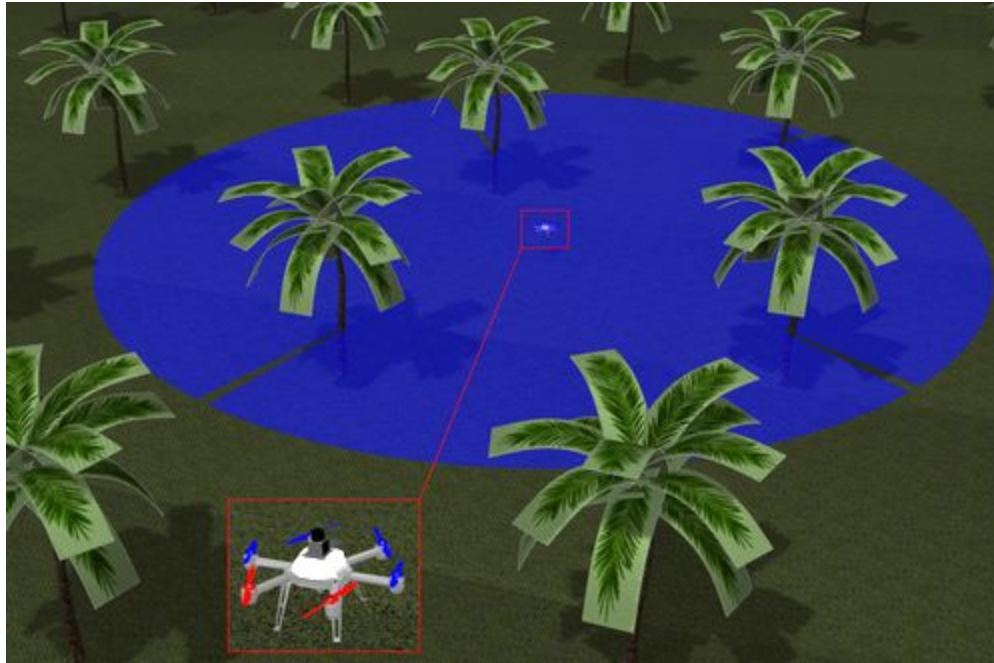# Laser Scanner based Localization in Forests

Master Thesis/Project Proposal in Automatic Control

To have robots and drones automatically navigate in, for example, Search and Rescue operations it is vital that the system knows its location while being able to perform collision avoidance and, with this aim, this project aims to be the base for robot localization in forests while utilizing a laser scanner to detect trees. The idea is to let the system use a laser scanner to estimate properties (radius, position, …) and to build a map of the trees, while simultaneously localize itself based on this map, a "Tree SLAM" system (SLAM = Simultaneous Localization and Mapping).

This project will include:

- Working with a real laser scanner to estimate the parameters of each "tree"
- Experimental evaluation in a fake forest of circular objects (simulation and lab experiments), and real world experiments in a forest
- Link the output with existing path planning algorithms for an end demonstration of a UAV autonomously navigating and avoiding trees
- What is needed?
  - Some programming experience in C++ is recommended, but not required
  - Having a background in estimation is a plus

Proposal from E. Fresk, C. Kanellakis, and G. Nikolakopoulos, Control Engineering Group, SRT

Emil Fresk: emil.fresk@ltu.se   Room A2571
Christoforos Kanellakis: christoforos.kanellakis@ltu.se   Room A2565
George Nikolakopoulos: geonik@ltu.se   Room A2556