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Integrating Ranging Sensors into Finken Robots

Some Department

Bachelor Thesis

Integrating Ranging Sensors into Finken Robots

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Contents

1 Prior Art

1.1 Finken Robots

The Finken project aims to create a swarm of autonomously flying quadrocopters to research swarm intelligence beheaviour on robots. Many algorithems in swarm intelligence are based on distance-values. For this reason it is necessary to find a sensor that is capable to measure distances and integrate it into the Finken robots.

The Finken-robots are already existing and of course it is necessary to know wich kind of hardware on the robots could interfere with the ranging sensors that shall be integrated into those robots.

IMU Inertial Measurement Unit with accelerometer, magnetometer and barometer

Sonar Sensors Sonar sensors to measure distances of the nearest object in four directions (front, back, left, right)

IR-Sensor Sensor to measure distance to ground with high frequency

Optical Flow Optical flow sensor, that can be integrated to measure x-y-velocity over ground

Motors Four brushless motors that may cause RF-interfercene and noise

Telemetry BTLE-/Zigbee modules to exchange data with the ground station

RC-Control 2.4GHz based Radio Control to manually control the robots

Power-Supply Lithium polymer batteries with nominally 6.6V output voltage that is converted to 5V and 3.3V by the power distribution hardware

weight

payload

Payload The overall weight of the copter in the current configuration is about g with about g headroom for additional equipment

Size The copter has a rotor to rotor distance of 10cm, and a sensor tower that is about 4cm by 4cm wide to use the existing mounting holes would be favourable

1.2 Evaluation of Existing Ranging Solutions

2 Implementation

3 Evaluation

4 Future Work