Milestones

The development of this project is split up into multiple parts ('milestones'). Generally one milestone needs to be finished before starting the next one. Some milestones can be worked on simultaneously, depending on the temperature and weather.

Overview

This list gives an overview of the defined milestones. A directory exists for each milestone, containing more information about the goals and requirements, as well as the problems & ideas and the thinking behind achieving the current goals.

Keep in mind that the definitions of the milestones (main goal, tasks to complete, …) can and will change as long as the milestone is still labeled as "work in progress".

01 - Basic Drone Functionality

Status: work in progress

Main Goal: Create a "finished" hardware- & software setup for a basic flying drone.

After completing this milestone, the drone should be able to be controlled manually (lift-off, simple flying manouvres, landing) at nice weather with no wind or other difficulties.

The drone does **not** have to use GPS to hold the current position or fly waypoint missions. Other autonomous manouvres like auto-lift-off or auto-landing are not part of this milestone.

02 - Basic Autonomous Flying

Status: *pending*

Main Goal: Incorporate GPS module and fly small autonomous missions.

After completing this milestone, the drone should be able to autonomously take off, hold a gps-location, fly small missions (follow gps-route) and land.

The drone does **not** have to perform a precision landing.

03 - Semi-automatic freight pick-up and drop-off

Status: *pending*

Main Goal: Create a mechanism that can securely attach a cargo container to the drone and safely release it.

After compelting this milestone, the drone should have a “cargo area” and a mechanism to securely attach a cargo container to it. It is ok if the drone and the cargo container have to be precisely positioned (+- 5mm in each direction). The mechanism should allow for a mid-flight drop-off.

The system can be an Arduino controlled prototype. The Arduino may be removed and the mechanism may be controlled via the Raspberry Pi or the flight controller later.

The system (drone + GCS) does now fulfill the basic cargo pick-up, transport and drop-off requirements. The cargo container attachement- / release- sequences, as well as the gps-waypoint missions, can be initiated manually.

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04 - Authentications and Verifications

Status: *pending*

Goal: Authentications and verifications of the drone, terminal and bookings through C-Chain.

The content of this milestone is still to be discussed.

optional? - 05 - Drone Control via Raspberry Pi

Status: *pending*

Main Goal: Establish a communication link between the flight controller and the Raspberry Pi. Execute simple (flight) routines with the Raspberry Pi.

After completing this milestone, the Raspberry Pi should be able to send (basic) commands to the flight controller (and read back the results). The drone should be controlled, so that it …

1. can be (dis-)armed,
2. lifts off,
3. flies left to right and
4. flies to a gps-location

optional? - 06 - Precision Landing

Status: *pending*

Main Goal: Precisely land the drone on a marker.

After completing this milestone, the drone should be able to precisely land on a marker. This marker is later to be placed on the cargo station for further development for the cargo pick-up and drop-off routines.

optional? - 07 - Fully Autonomous Cargo Pick-Up and Drop-Off

Status: *pending*

Main Goal: Fully autonomously attach and detach a cargo container to / from the drone.

After completing this milestone, the cargo station should have a mechanism that either brings the cargo container to the drone, or vice versa. The cargo container should then be fully autonomously attached / detached to / from the drone after an autonomous landing.

optional? - 08 - Fully Autonomous Pick-Up, Transport and Drop-Off Routine

Status: *pending*

Main Goal: Connect the autonomous pick-up, transport, landing and drop-off sequences.

After completing this milestone, the drone should be able to fully autonomously land, pick-up a cargo container, lift off, fly to the next cargo station, land and drop the cargo container off.