

Real Time, Onboard-only Landing Site Evaluation for Autonomous Drones

PhD Thesis Proposal

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Presentation Structure

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Introduction



Problem Description and Motivation

- Most of drone flight has been **automated**.
 - Takeoff
 - Waypoint-to-waypoint-flight
 - Miscellaneous tasks: track/orbit an object, take a picture, etc.
- Landing is still done **manually**.



“Human-assisted landing”



State of the Art



Current Progress



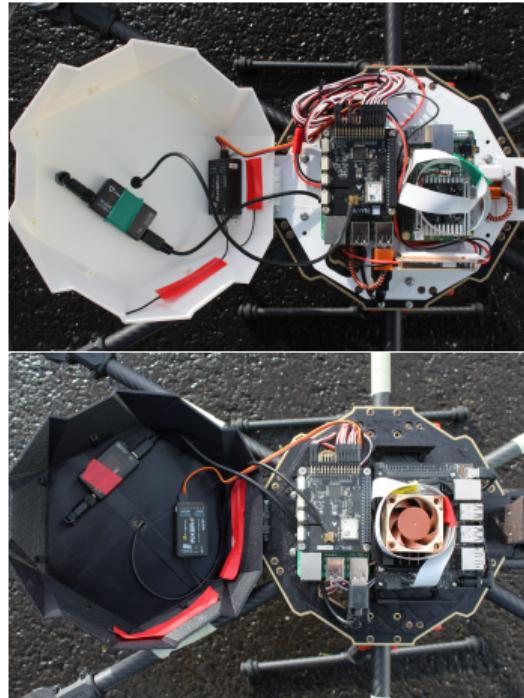
Test Hexacopters

- Two Tarot 680 hexacopters
- For real-world proof of concept of master thesis simulations.



Test Hexacopters' Components

- Navio2 + RPi 3 autopilot combo
- Companion boards:
 - Google Coral (embedded TPU)
 - Jetson Nano (embedded GPU)
- Gimbaled camera modules
- 433 MHz telemetry
- 2.4 GHz R/C control



Test Hexacopters' Performance



Fiducial System Modifications



Fiducial System Modifications: WhyCode



Fiducial System Modifications: April Tag



Fiducial System Modifications: Performance Analysis



Heavy Lift IR Drone



Autonomous Landing Proof of Concept (**FINALLY!**)



Research Plan



Data Set Generation



Terrain Classifier Creation



Testing in Simulation



Testing in the Real World



Drone Upgrades



Risk Analysis



References

