



Flash Talk: Autonomous Drone Landing

Joshua Springer

11 October 2022

Reykjavík University

Department of Computer Science

Overview

- ▶ Drone flight – largely automated



Overview

- ▶ Drone flight – largely automated
... except for landing



- ▶ Drone flight – largely automated
... except for landing
- ▶ Landing – hard and risky



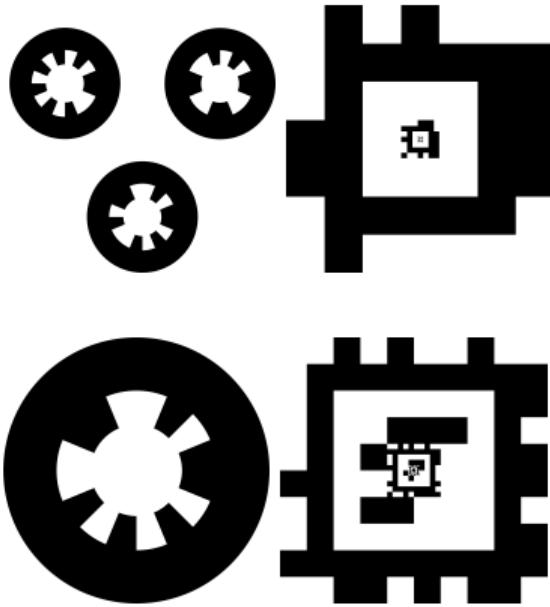
- ▶ Drone flight – largely automated
... except for landing
- ▶ Landing – hard and risky
GPS is not precise enough
Beacons require extra infrastructure



- ▶ Drone flight – largely automated
 - ... except for landing
- ▶ Landing – hard and risky
 - GPS is not precise enough
 - Beacons require extra infrastructure
- ▶ Focus: efficient processing, passive ground infrastructure



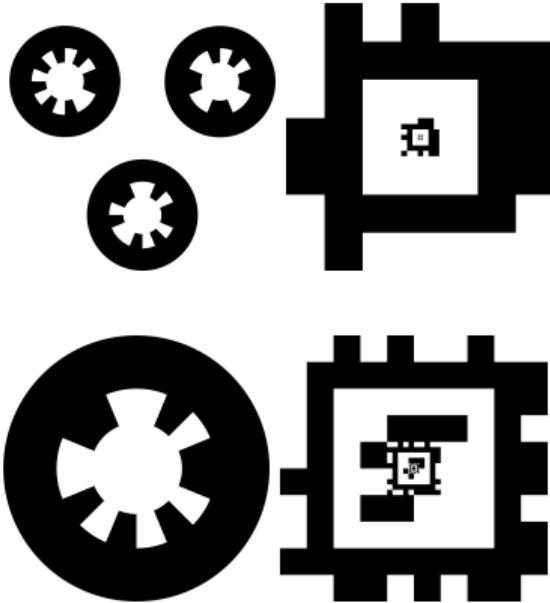
Part 1: Fiducial Markers



- ▶ Passive
- ▶ *Theoretically* only need a monocular camera



Part 1: Fiducial Markers



- ▶ Passive
- ▶ *Theoretically* only need a monocular camera
Orientation ambiguity problem
- ▶ Fixed-camera paradigm
- ▶ Contribution: moving-camera paradigm
([Video](#))
- ▶ Next: use orientation from camera IMU
(unambiguous)

Part 2: Terrain Analysis



- More flexible



Part 2: Terrain Analysis



- ▶ More flexible
- ▶ Application: Mars exploration/geology



Part 2: Terrain Analysis



- ▶ More flexible
- ▶ Application: Mars exploration/geology (RAVEN, analog research)
- ▶ Solidified lava flows



Part 2: Terrain Analysis



- ▶ More flexible
- ▶ Application: Mars exploration/geology (RAVEN, analog research)
- ▶ Solidified lava flows
- ▶ D455 Depth Camera
- ▶ Google Coral, Jetson Nano, Raspberry Pi



Depth Drone



Depth Drone



Depth Drone



[Video](#)

Ask me questions

