

# Visual Navigation for Flying Robots

## Autonomous Landing on a Moving Platform

Final Project

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# Overview

- Goal: an Ardrone will be able to track an irregularly moving platform with a marker on it and by command initiate an autonomous landing procedure. It will detect whether this landing is successful or in the negative case cancel and restart the operation

# Challenges

There are three main parts this project consists of:

- Finding and tracking the platform with marker
- Landing on the platform
- Detecting a successful landing

# Finding and Tracking the Platform

- The robot is flying controlled manually. The user will steer it in the general landing zone
- Once the platform is localized, control will be taken off of the user. The platform will now be tracked and followed by the robot
- Platform and robot movement will be tracked independently in world coordinates. This is done by estimating position based on environmental landmarks.

# Landing

- The descent on the platform will be done smoothly, not too fast. Sensor latency is to be taken into account
- Regularity observed in the movement of the platform will be taken into account to more accurately plan further navigational commands by predicting future movement whenever possible

# Detecting a Successful Landing

- Failure detection routines will be implemented
  - IMU based: e.g. landing in a non-level pose implies a failed landing
  - Vision based: the marker leaving the FOV, together with our robot and platform estimate could imply a failed landing
- Upon failure eject and reinitiate platform seeking using platform movement prediction
- Upon success turn off the robot