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# Évitement d'obstacle dans un environnement 3D dynamique

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► **To cite this version:**

Kendric Ruiz, Serge Chaumette, Pierre Melchior, Stephane Victor. Évitement d'obstacle dans un environnement 3D dynamique. Ecole doctorale, Mar 2019, Talence, France. hal-02086978

**HAL Id: hal-02086978**

**<https://hal.science/hal-02086978>**

Submitted on 1 Apr 2019

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# Obstacle avoidance in 3D dynamic environment

Kendric RUIZ \* – Serge CHAUMETTE – Pierre MELCHIOR – Stéphane VICTOR

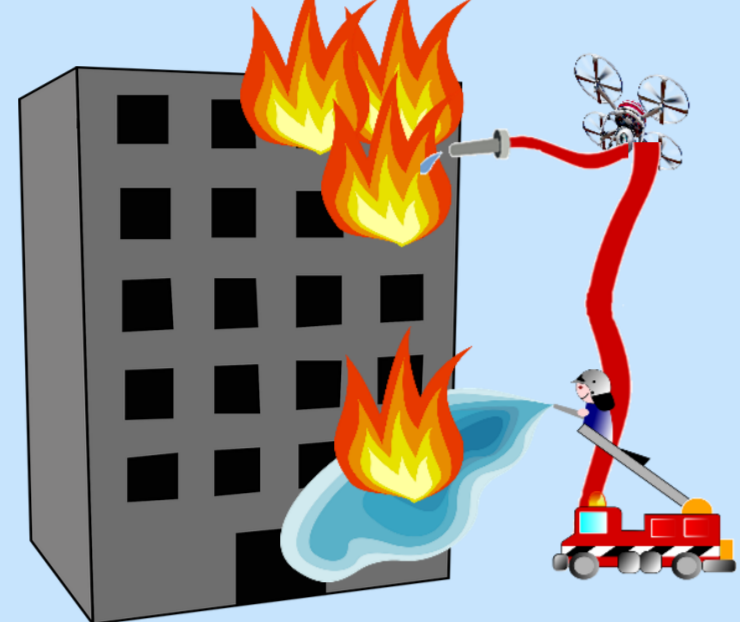
## Context

Delivery



Sampling UAV Most Informative Diagnostic Signals

Rescue

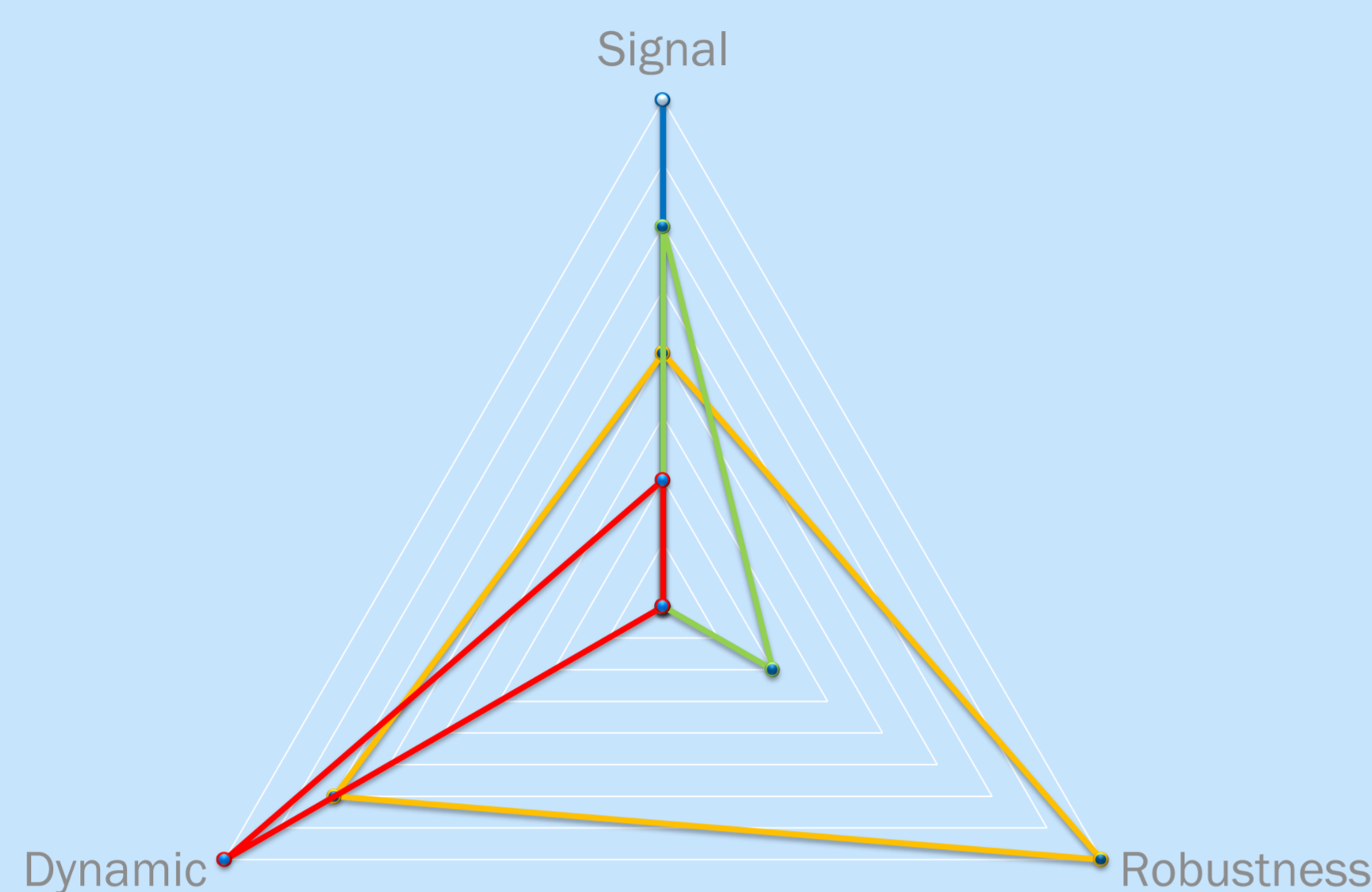


Monitoring



Our method

Efficient Optical Flow and Stereo Vision for Velocity Estimation and Obstacle Avoidance on an Autonomous Pocket Drone  
UAV online path planning algorithm in a low altitude dangerous environment



## Objectives

UAV path planning for surveillance in adverse and unknow dynamic environments

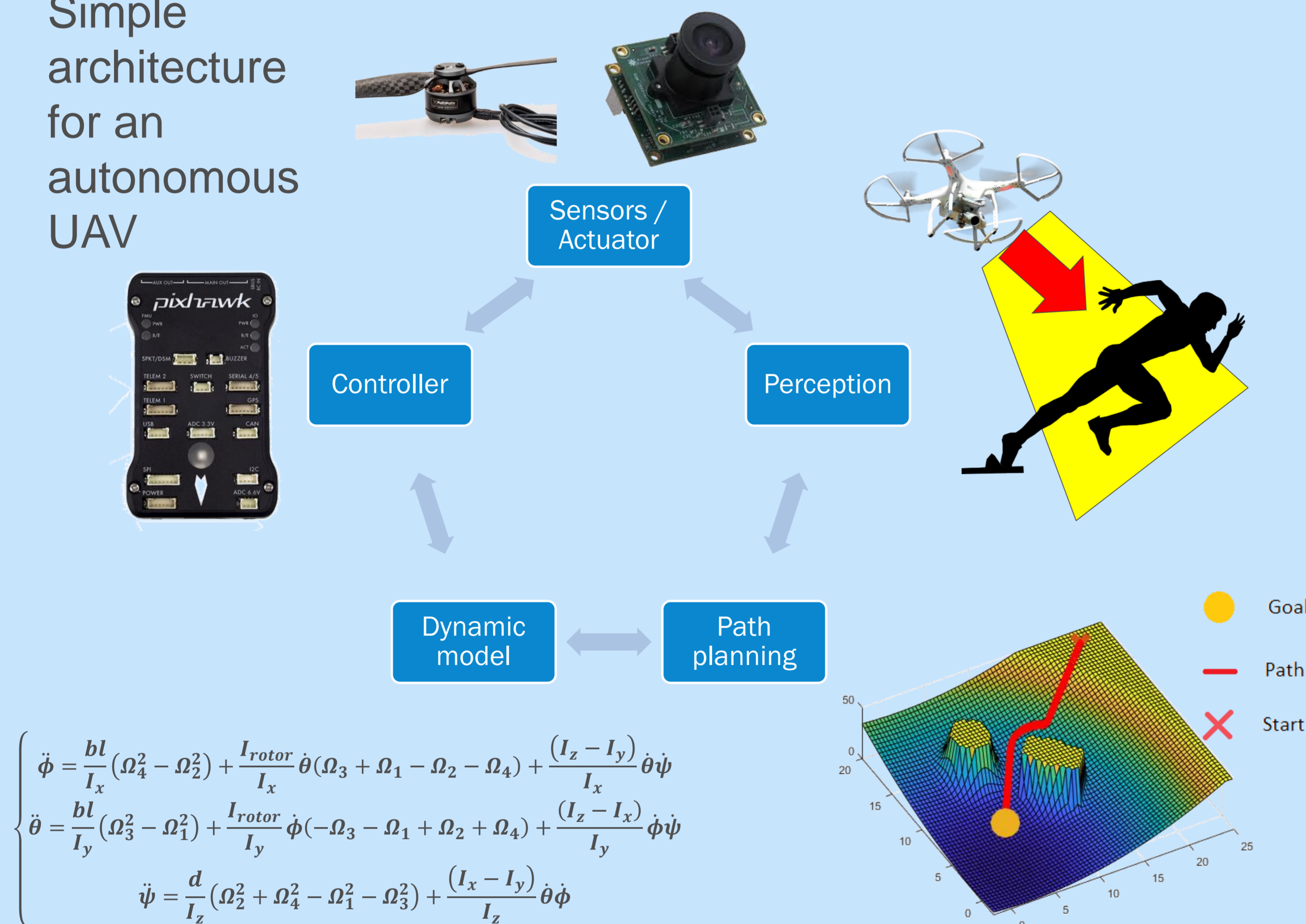
UAV make resilient to :

- parametric uncertainties (mass)
- disturbances (wind)
- signal loss (sensors, GPS)



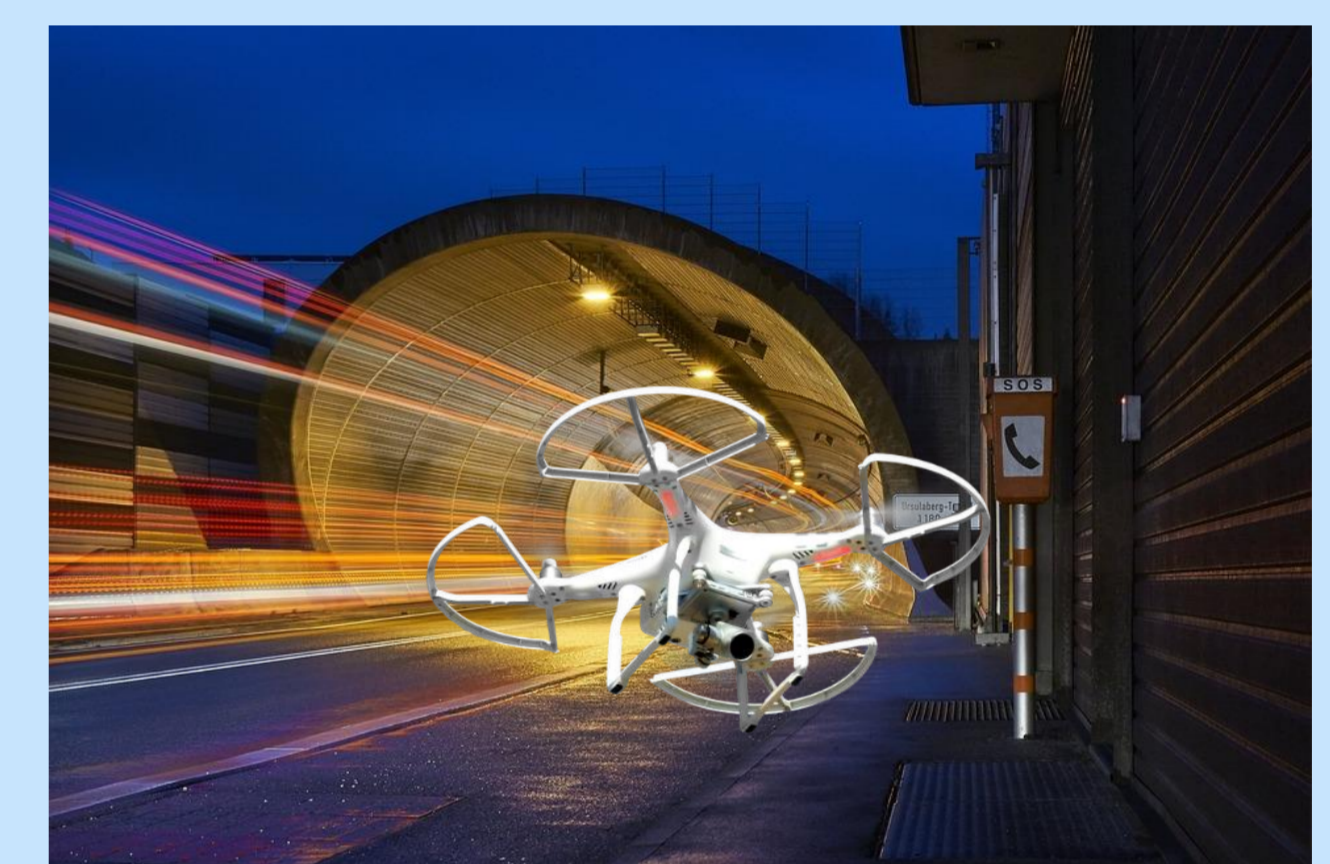
## Architecture

Simple architecture for an autonomous UAV



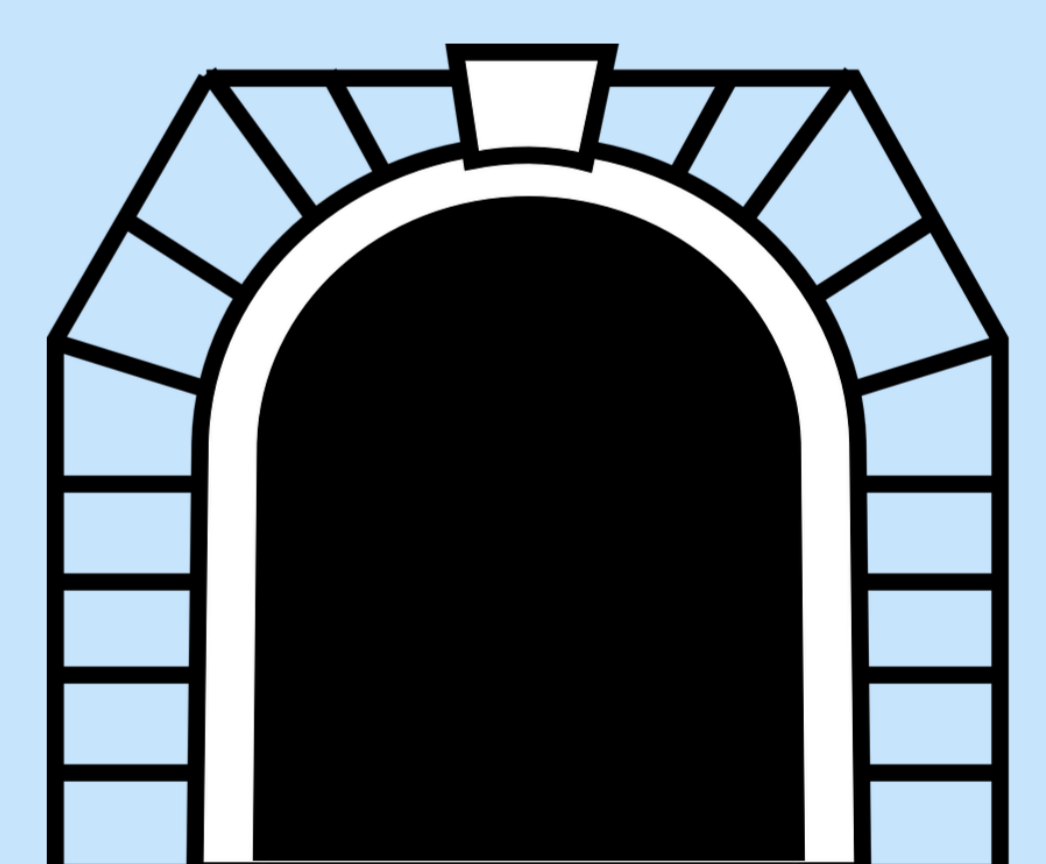
Analysis:

- Sensor data
- danger of the environment



Path choice:

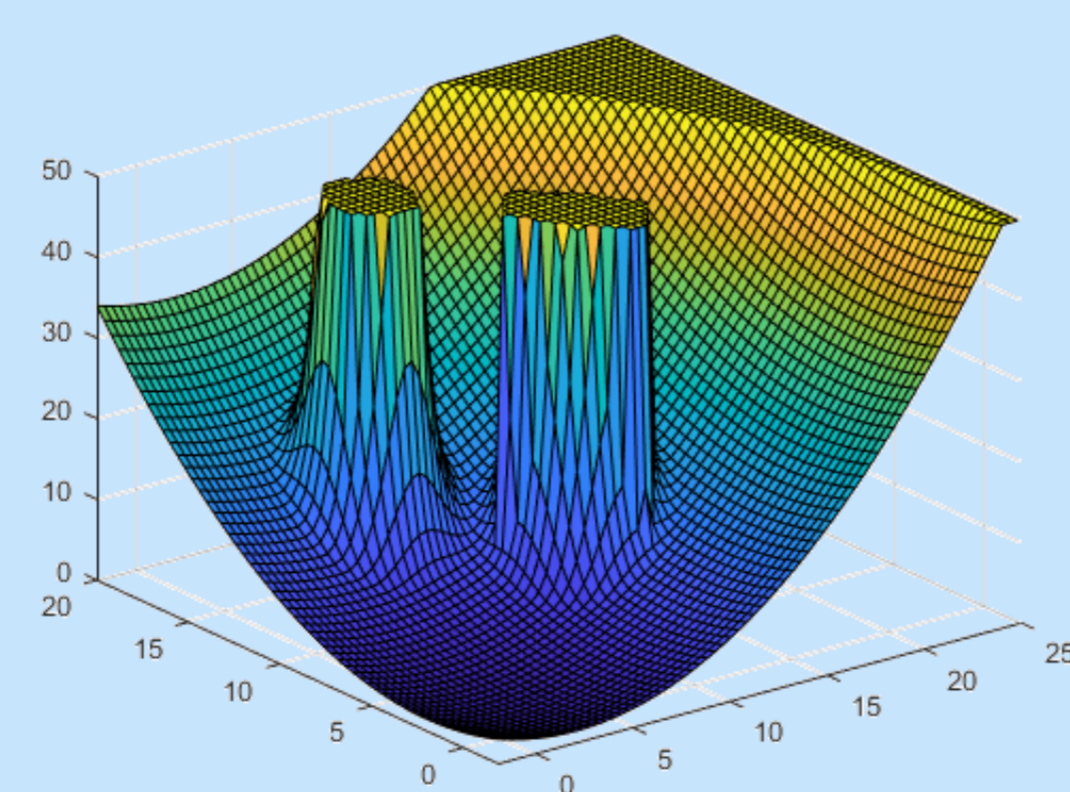
- efficient path
- safe path



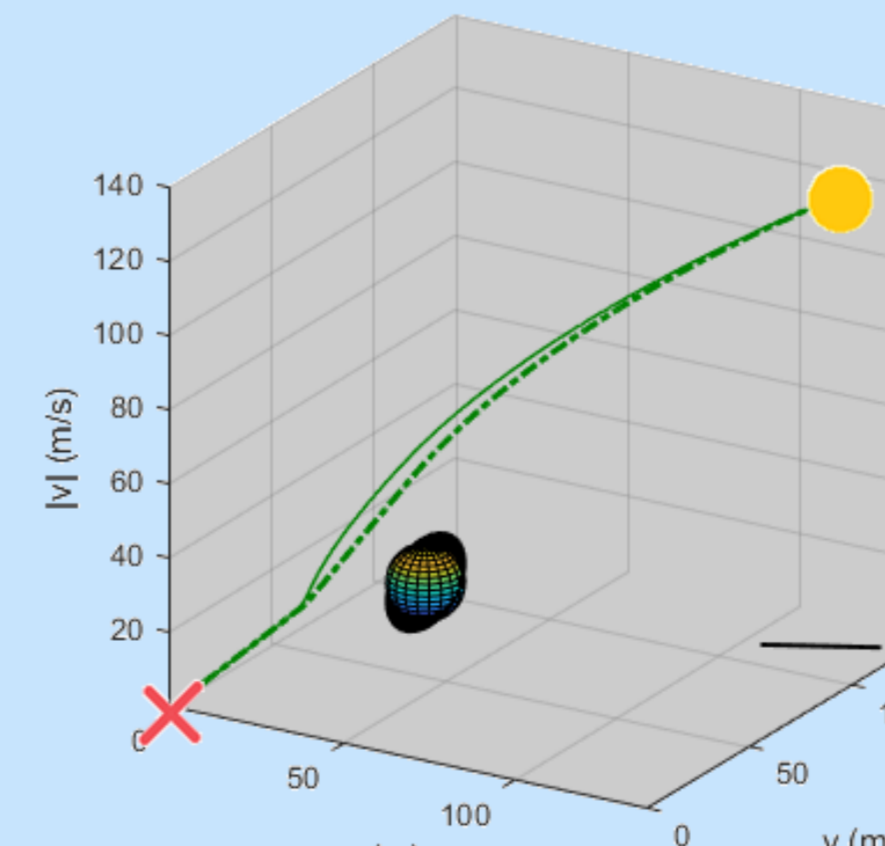
## Research approach

Several scenarios like :

- path tracking
- road crossing with GPS failure
- road crossing without lighting



Addition of 2 potentials fields :  
- attractive potential: target is the lower potential  
- repulsive potential: obstacles are the greater potentials



The UAV goes towards the lowest potential.

Validation by simulation



on prototype



Study of several situations

Simulation on Matlab

Simulation on ROS

Implementing a UAV

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(\*) thesis funded by IDEX