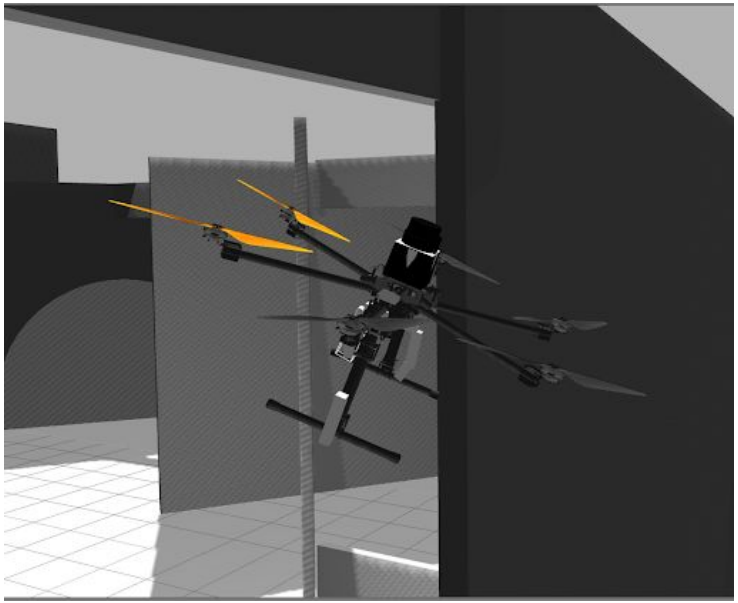
Multirotor Repartidor

Autores:

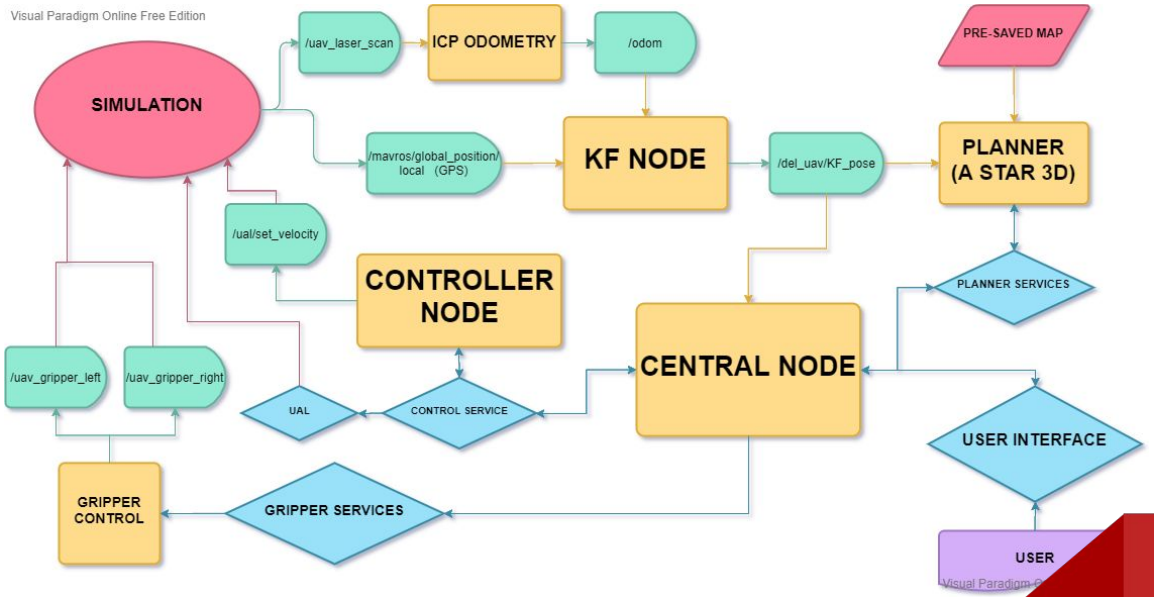
-Eduardo Sotelo Castillo
-Jorge Rodríguez Rubio
-Alejandro Rodríguez Armesto

Introducción



Introducción

ROS



Introducción

Crazyflie

PX4

DJI

...
(Otros)

UAL

ros

ual/take_off	services
ual/go_to_waypoint	
ual/go_to_waypoint_geo	
ual/land	
ual/recover_from_manual	
ual/set_home	
ual/set_pose	topics in
ual/set_velocity	
ual/pose	topics out
ual/velocity	
ual/odom	
/tf, /tf_static	
ual/state	

grvc

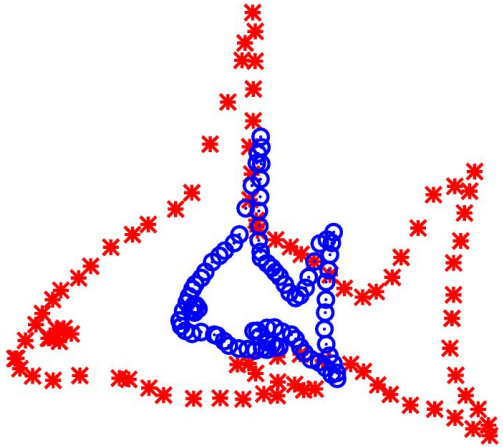
Objetivo

Localización:

- Lidar odometry (ICP)
- GPS
- Filtro de Kalman

Control:

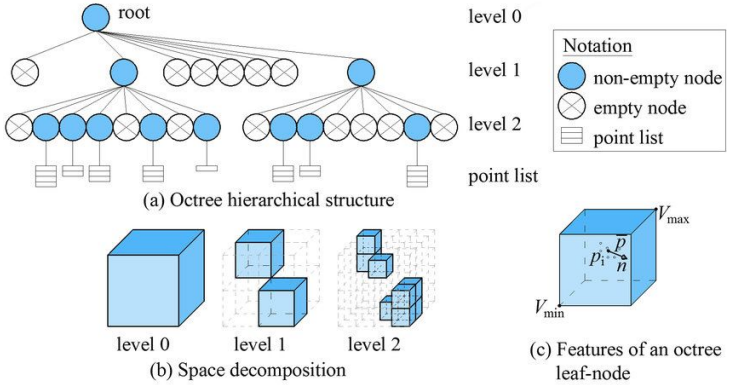
-Utilizamos el topic /ual/set_velocity
-Implementamos control PID
-Error esperado de 0.5 metros



Objetivos

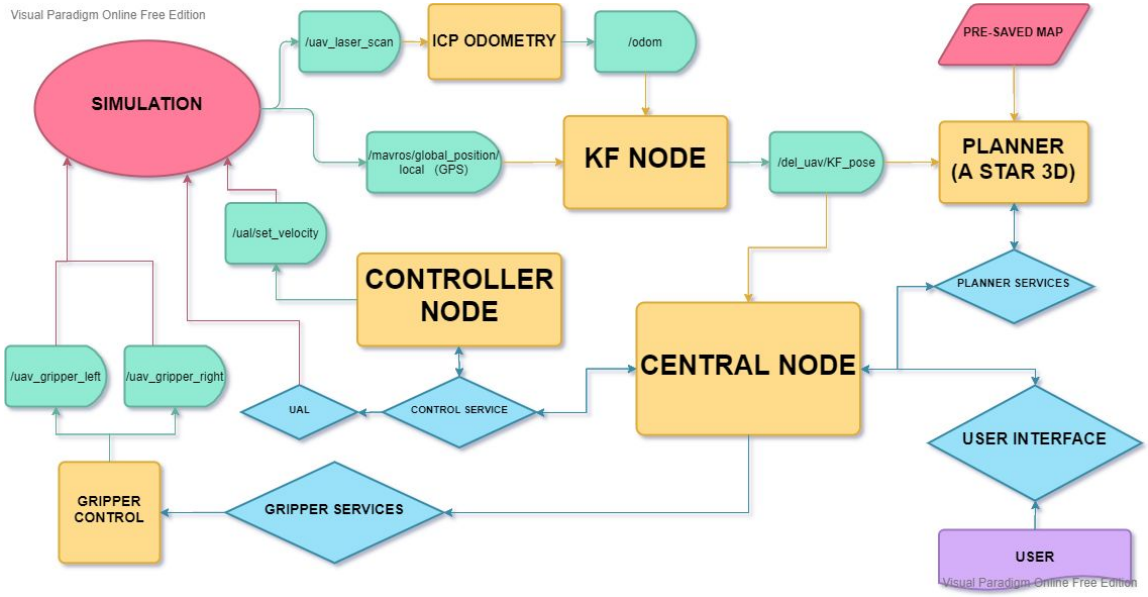
Planificación:

- Se pretende usar A*
- Buscamos obtener planificación en 3D, mediante octree



Tareas realizadas

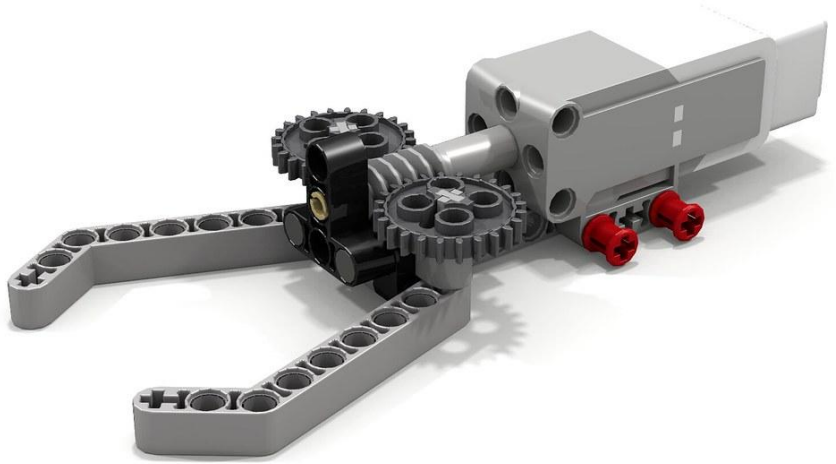
Sistema final



Tareas realizadas

Implementación del gripper

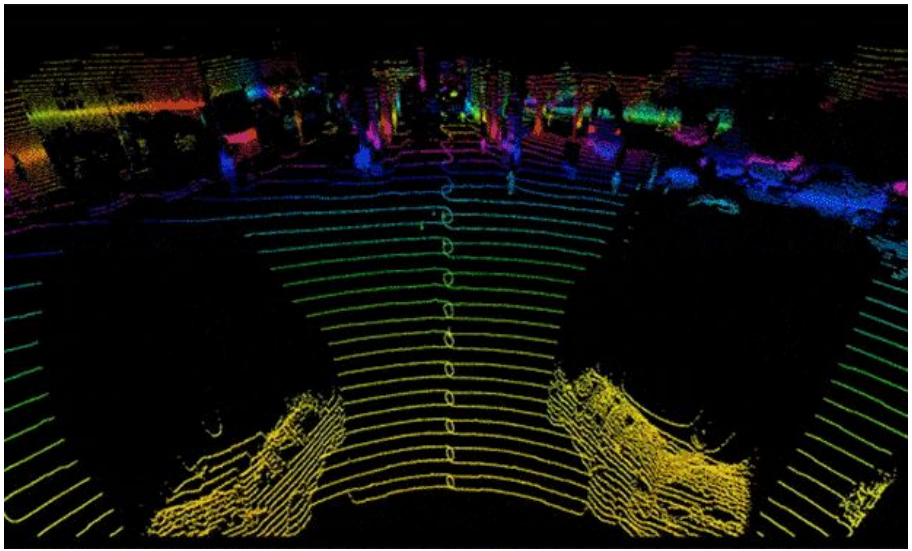
- Programación URDF
- Nodo para controlar desde ROS



Tareas Realizadas

Implementación de los sensores

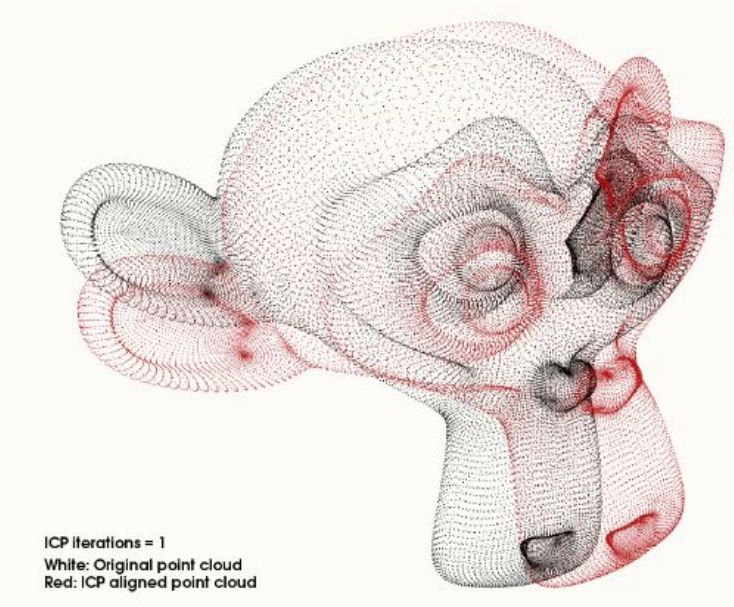
- Usamos URDF y plugin de Gazebo



Tareas Realizadas

Localización

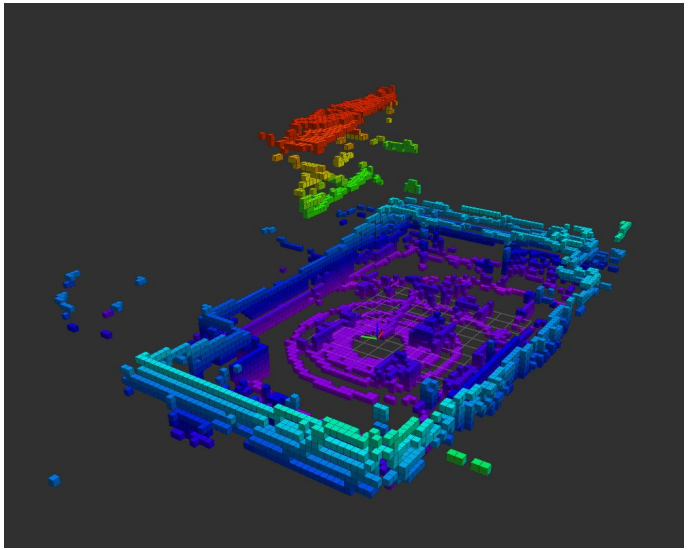
- Usamos rtabmap para el ICP
- Actualizamos con las medidas con GPS
- Integramos todo con filtro de Kalman

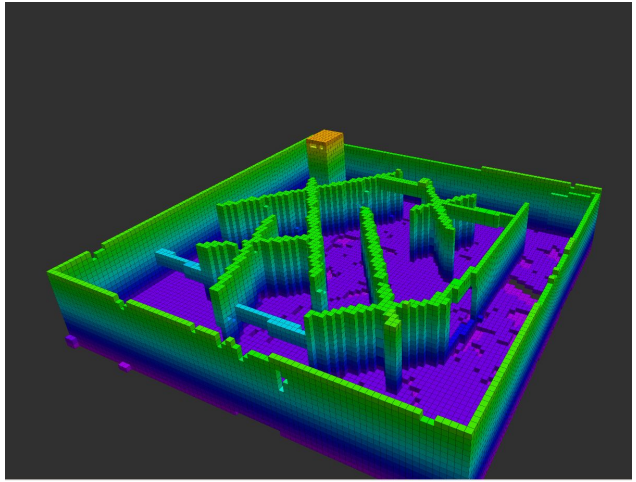


Tareas Realizadas

Mapeo

- Usamos ROS_quadrotor_simulator y Octomap
- Se obtiene un octree

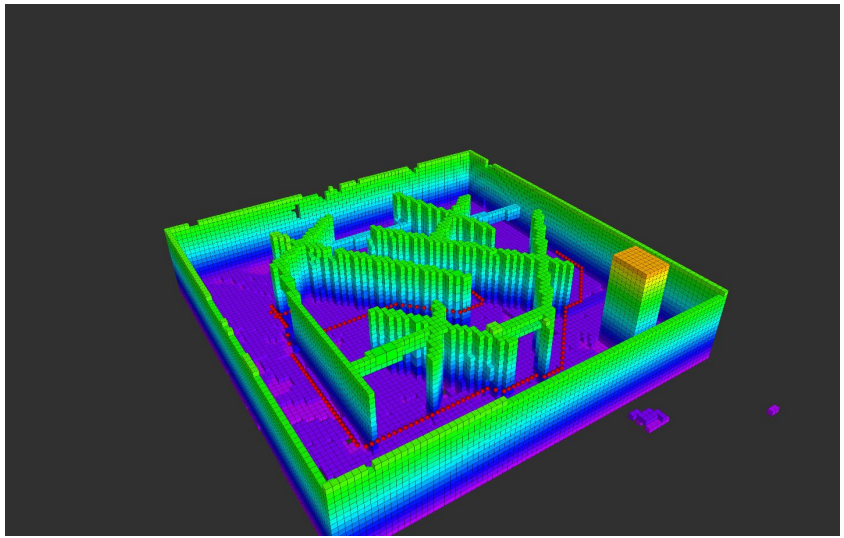


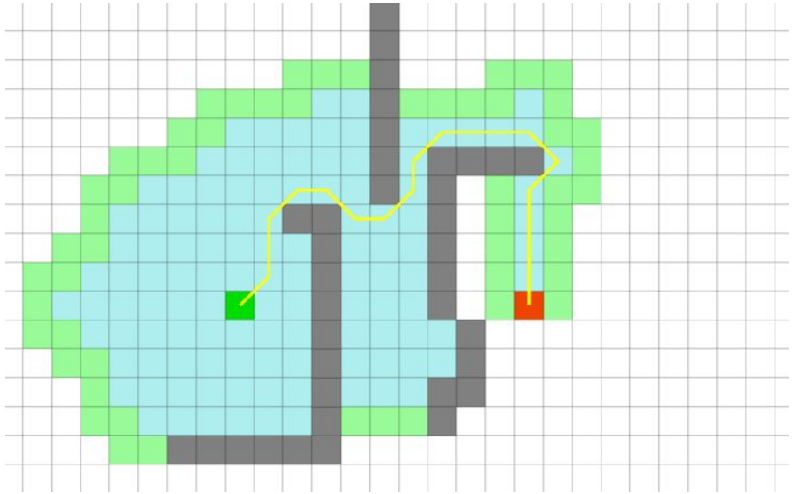


Tareas Realizadas

Planificación

- Utilizamos un algoritmo A* para recorrer un voxelgrid (100x100x7) generado con 3 mapas 2D

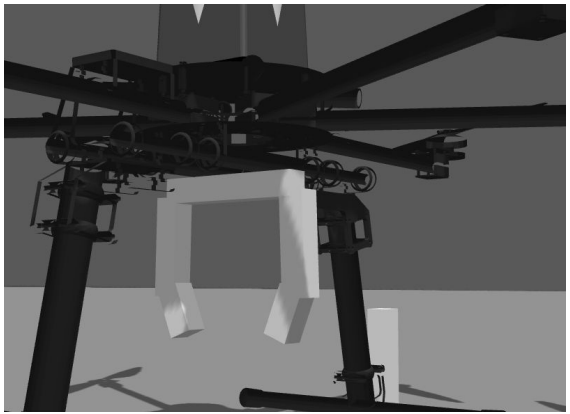




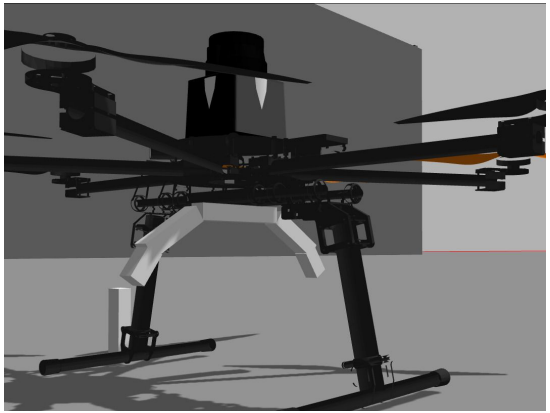
Experimentos

Experimento de la garra

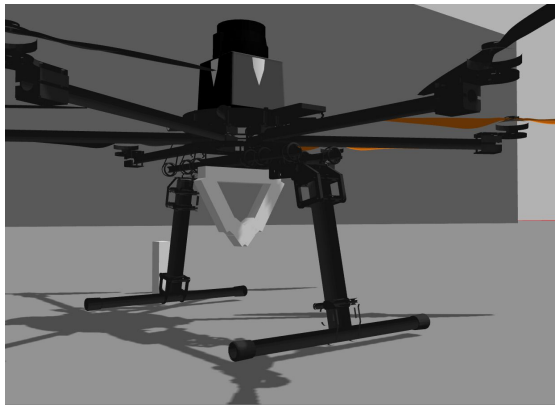
Garra relajada



Garra abierta

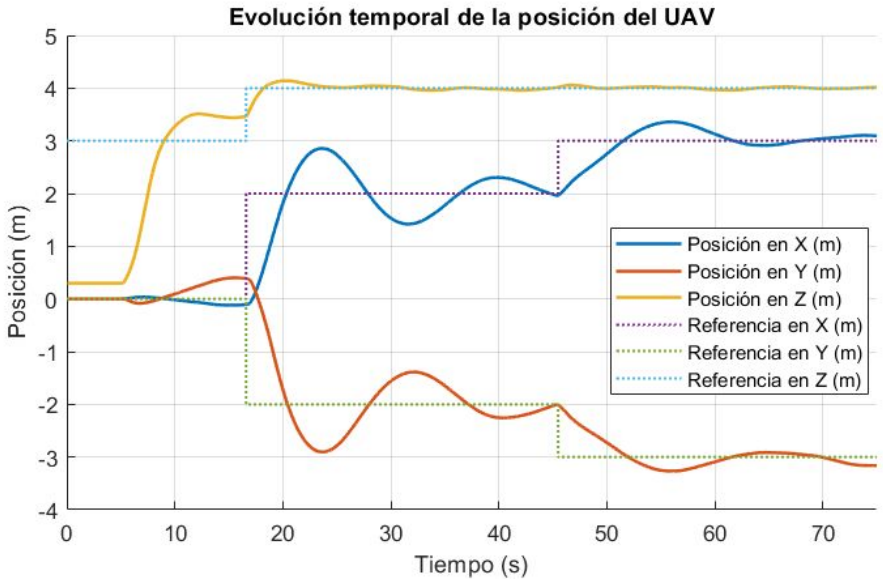


Garra cerrada



Experimentos

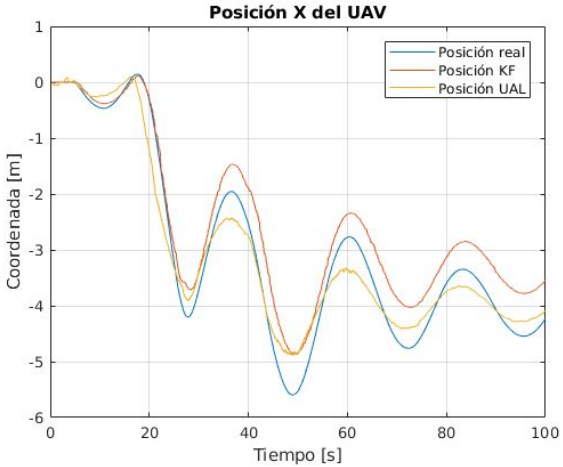
Experimento del control

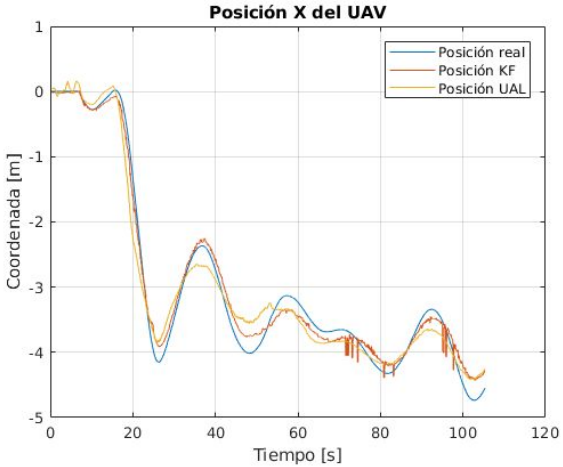


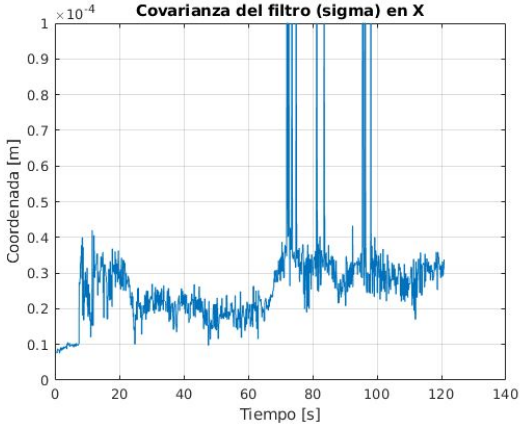
Experimentos

Experimento de localización

Punto calculado por “rtabmap_ros”







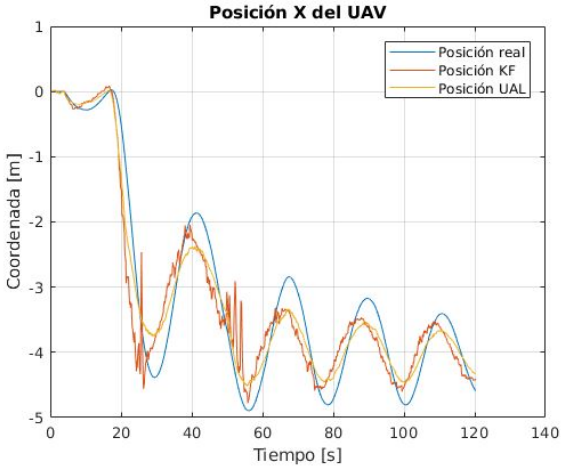
Cov. GPS = 10^{-2}

Cov. GPS = 10^{-4}

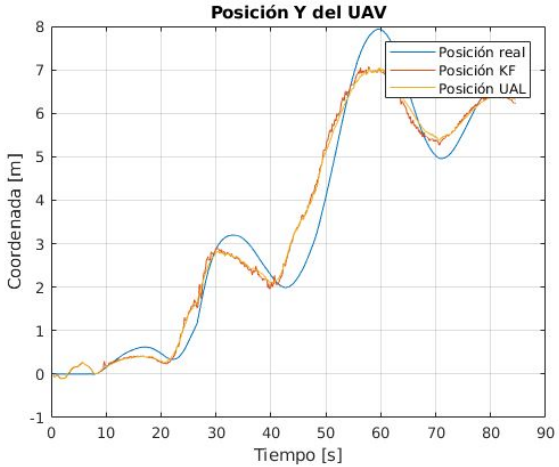
Experimentos

Experimento de localización

Punto calculado usando T*punto_ant (T proporcionada por rtabmap_ros)



Cov. GPS = 10^{-3}



Cov. GPS = 10^{-4}

Experimentos

Experimento de la planificación

Trayectoria	Resolución 0.3	Resolución 0.5
(0,0,0) a (-16,-1-6)	295.64s	39.83s
(-16,-1,6) a (16,-1,3)	2916.39s	96.01s
(17,17,1) a (-3,-3,5)	3222.14s	117.68s

Experimentos

Implementación del sistema completo

Video