

Meeting Materials for QDrone Project Regular Internal Meeting



Regular Internal Meeting for QDrone Project

Jan 7 2019
4PM at PSE 312

Participant: Jungwon Kang, Zahra Arjmandi, Kunwoo Park

Prerequisites for Pursuing Project

☐ Software

- Matlab
- C++
- Ubuntu
- ROS

☐ Theory (for backend: state estimation from sensor measurement)

- EKF
- MSCKF
- Smoothing

☐ Sensor

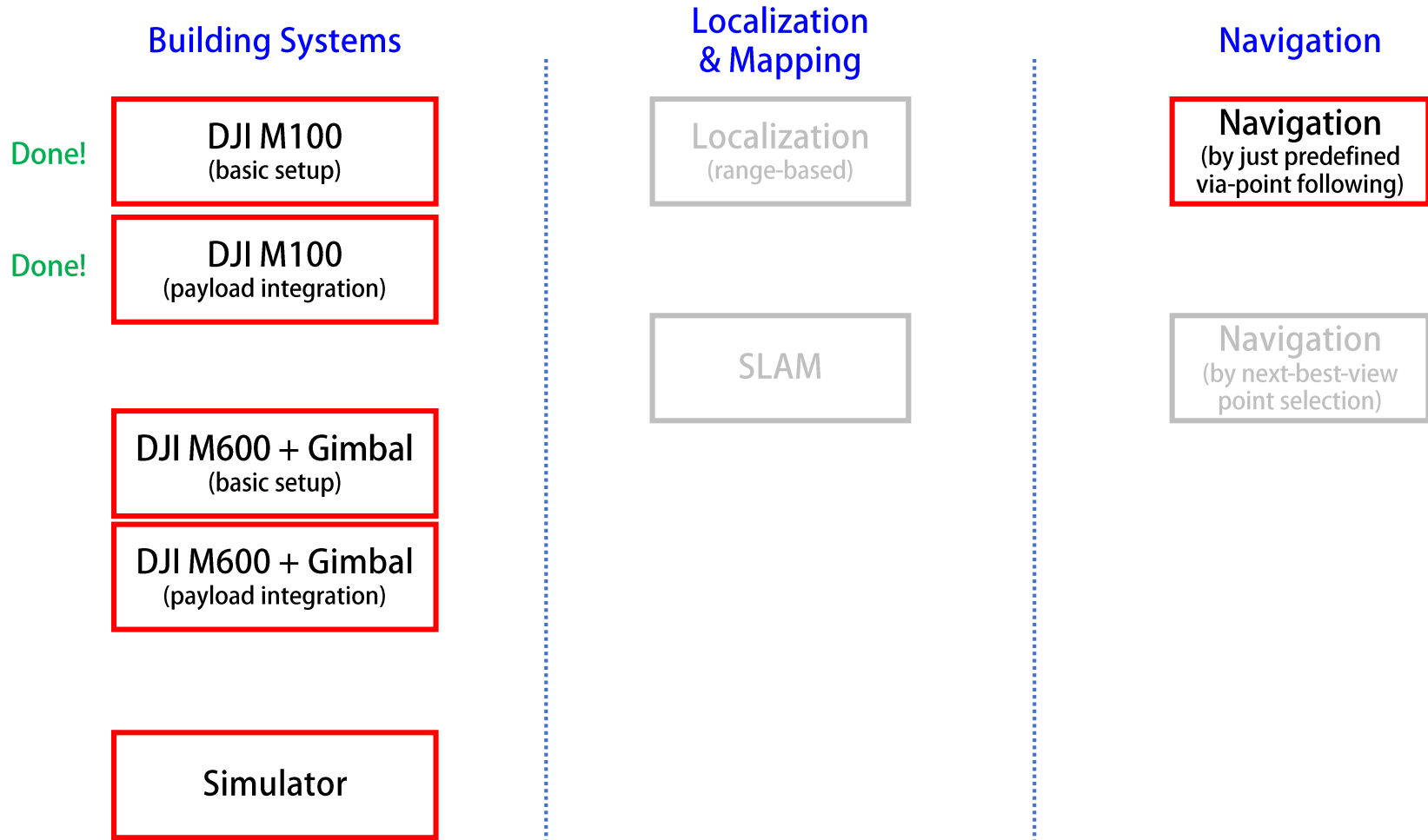
- GPS
- IMU
- Camera
- LiDAR

Tasks

- ☐ Task 0: Building Systems
- ☐ Task 1: Localization
- ☐ Task 2: SLAM
- ☐ Task 3: Navigation

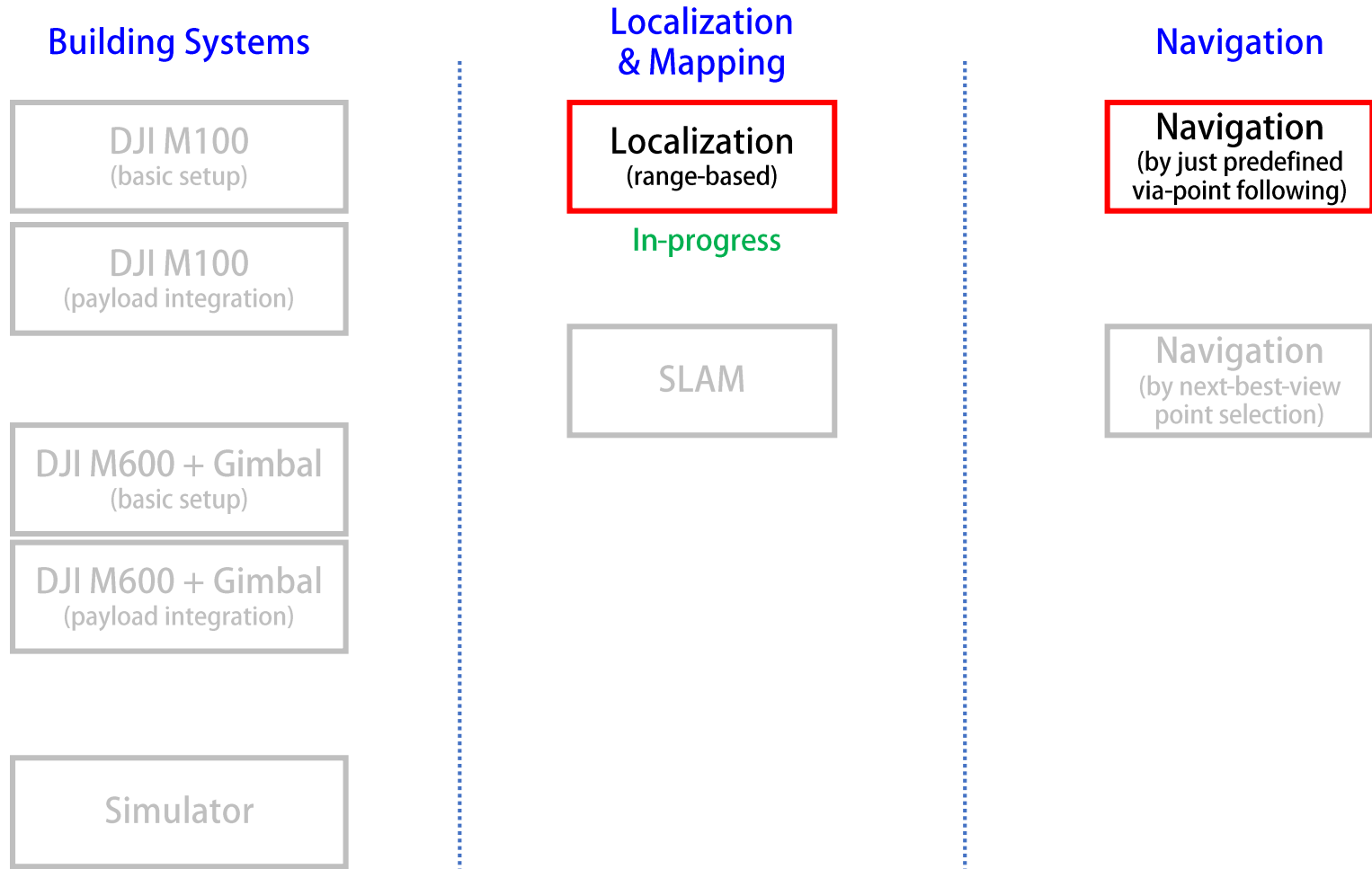
Task 0: Building Systems

❑ Building Complete Systems



Task 1: Localization

❑ Following Predefined Via-Points



Task 2: SLAM

❑ Building a Map

Building Systems

DJI M100
(basic setup)

DJI M100
(payload integration)

DJI M600 + Gimbal
(basic setup)

DJI M600 + Gimbal
(payload integration)

Simulator

Localization & Mapping

Localization
(range-based)

SLAM

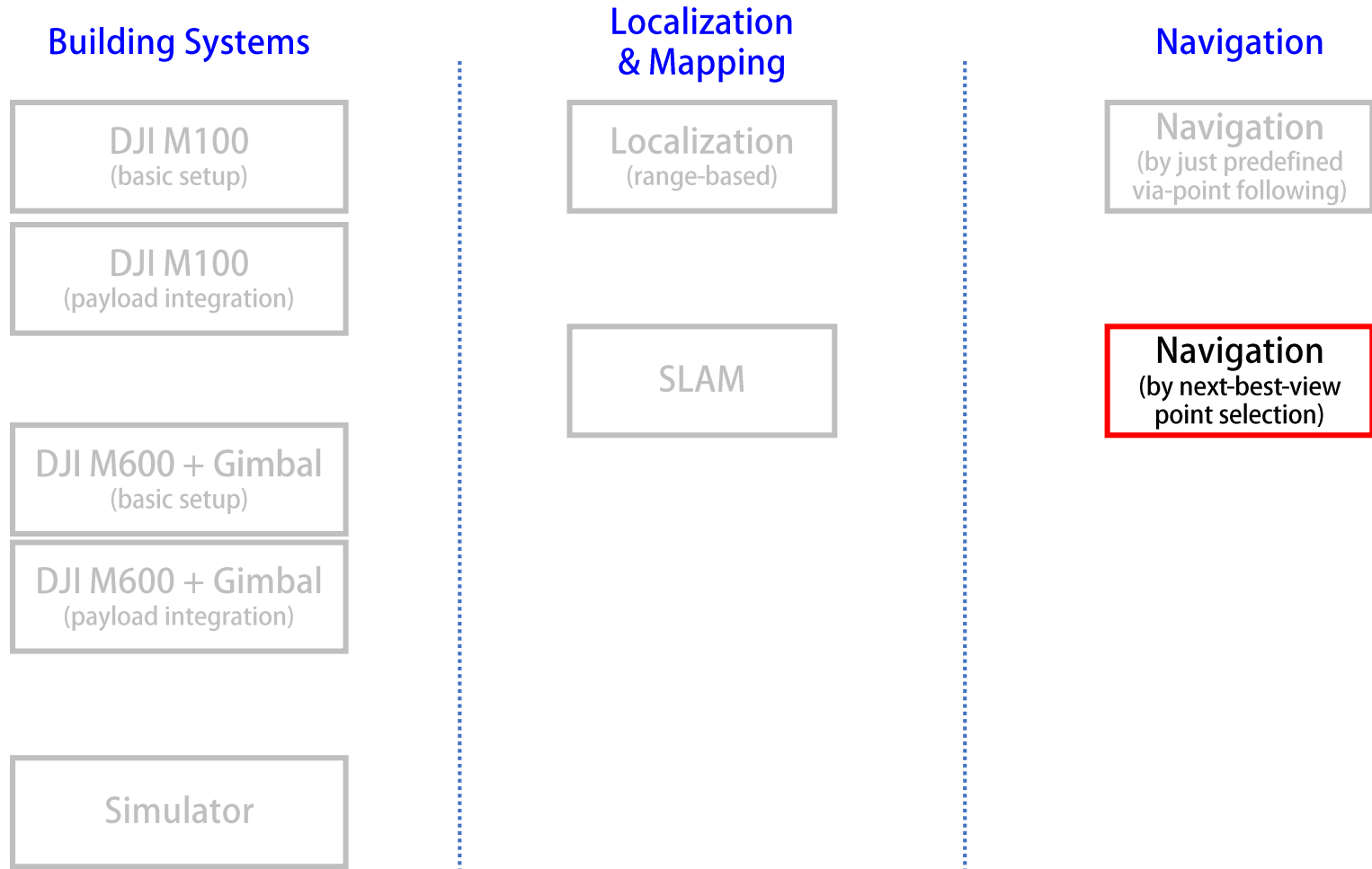
Navigation

Navigation
(by just predefined
via-point following)

Navigation
(by next-best-view
point selection)

Task 3: Navigation

❑ Building a Map by Next-Best-View Point Selection



Meeting Results: What to do

❑ Common

- Basic setup for 'DJI M600 + Gimbal' (primarily by Zahra & Kunwoo)
- Booking a PSE 4th floor room equipped with motion capture systems

❑ Zahra

- Understanding Kunwoo's EKF-based UWB localization code (including EKF)

❑ Kunwoo

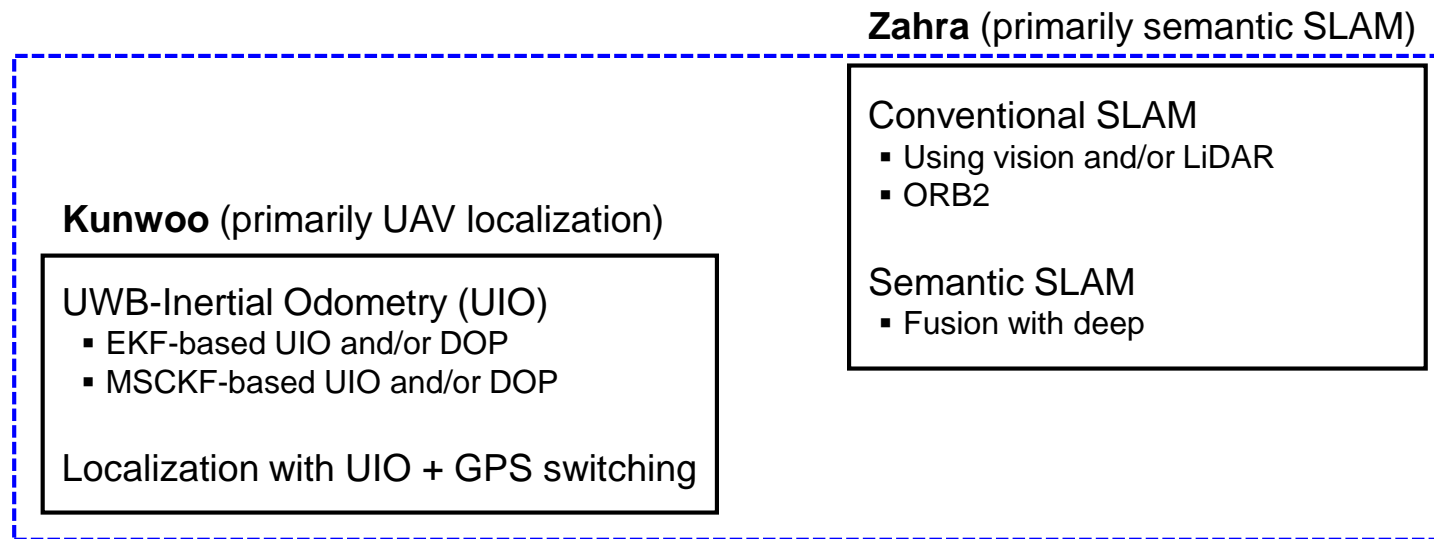
- Sending thesis and experiment plan to prof. Sohn
- Writing a paper for ISPRS Geospatial Week 2019

❑ Jungwon

- Writing a paper for IROS 2019

Future Plan

□ Jungwon's Rough Suggestion for Future Plan



Jungwon: supports Kunwoo & Zahra mainly in technical issues.



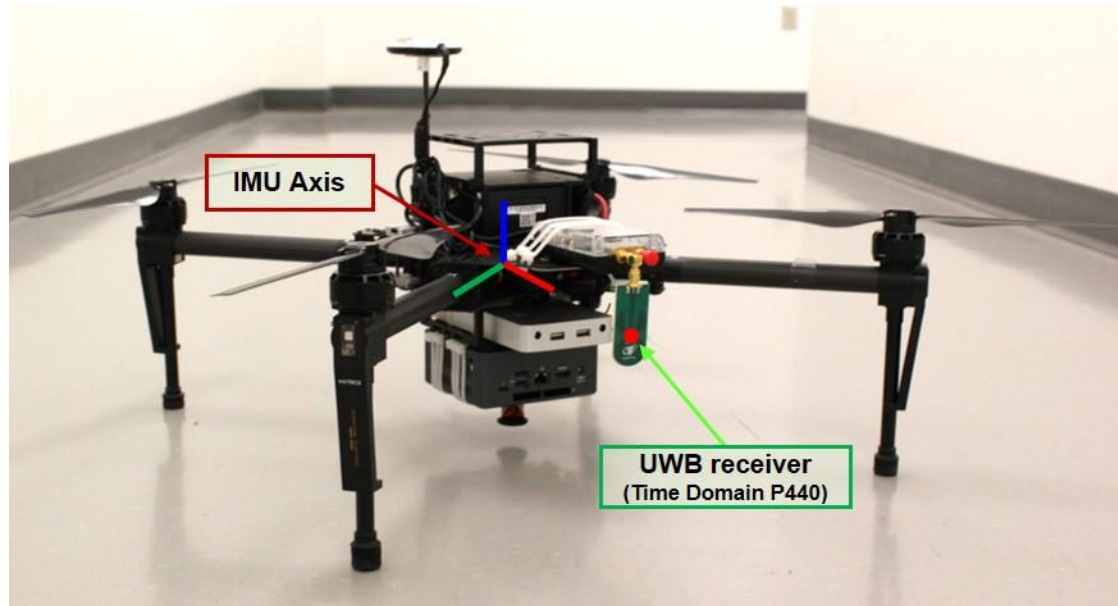
IMU Calibration Problem

Jan 24 2019

Participant: Jungwon Kang, Zahra Arjmandi, Kunwoo Park, Yujia Zhang

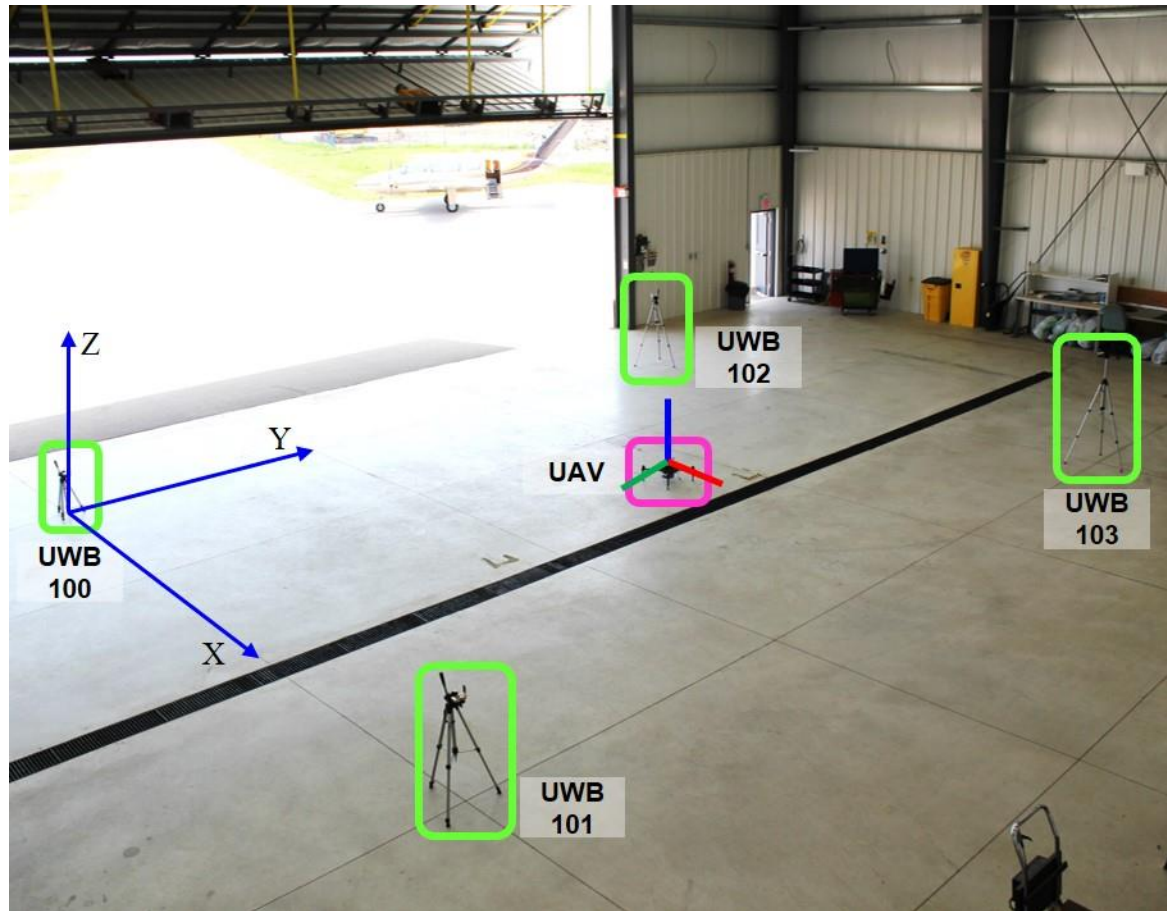
Problem 1

□ Where is the UWB receiver wrt IMU axis?



Problem 2

□ What is the initial R, T between UWB axis and IMU axis?





Plan for Year 2019

Feb 5 2019

Participant: Jungwon Kang, Zahra Arjmandi, Kunwoo Park

Plan for Year 2019

		Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Building System	Payload purchase												
	Testing of M600 & Ronin-MX												
	Individual test of payload												
	Payload integration												
UWB-aided localization	Kunwoo's Kalman filter	EKF / MSCKF / DOP											
	Jungwon's Smoothing		IROS										
Demo	Path following												
SLAM	Semantic SLAM												

Payload

- Positioning sensor: Pozyx / Spatial / DJI-RTK
- Imaging sensor: ZED stereo / FLIR Duo R / Sony A7III
- Velodyne LiDARs: Puck LITE / Puck Hi-Res / HDL-32E