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

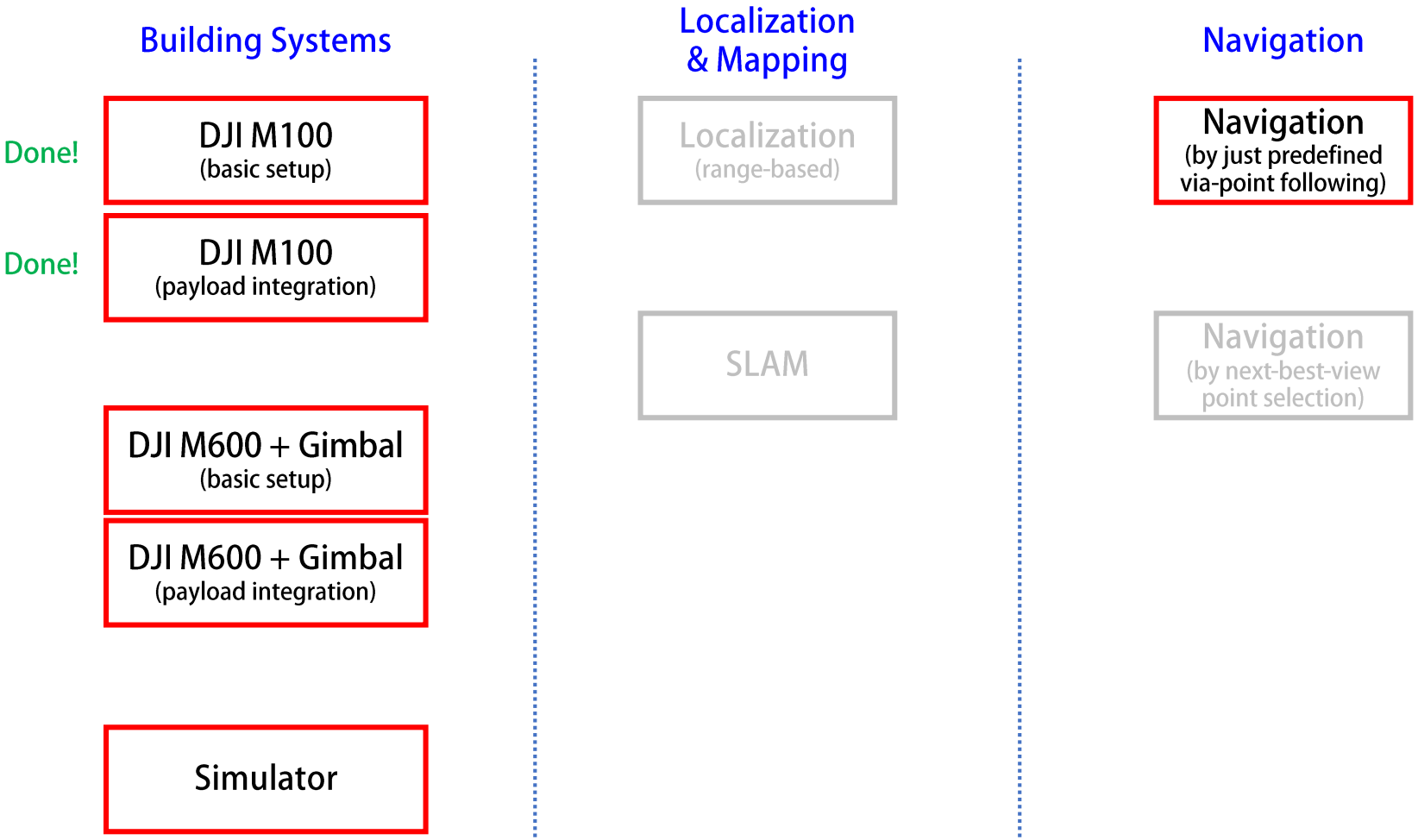
- Software
  - Matlab
  - C++
  - Ubuntu
  - ROS
- Theory (for backend: state estimation from sensor measurement)
  - EKF
  - MSCKF
  - Smoothing
- Sensor
  - GPS
  - IMU
  - Camera
  - LiDAR

Tasks

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

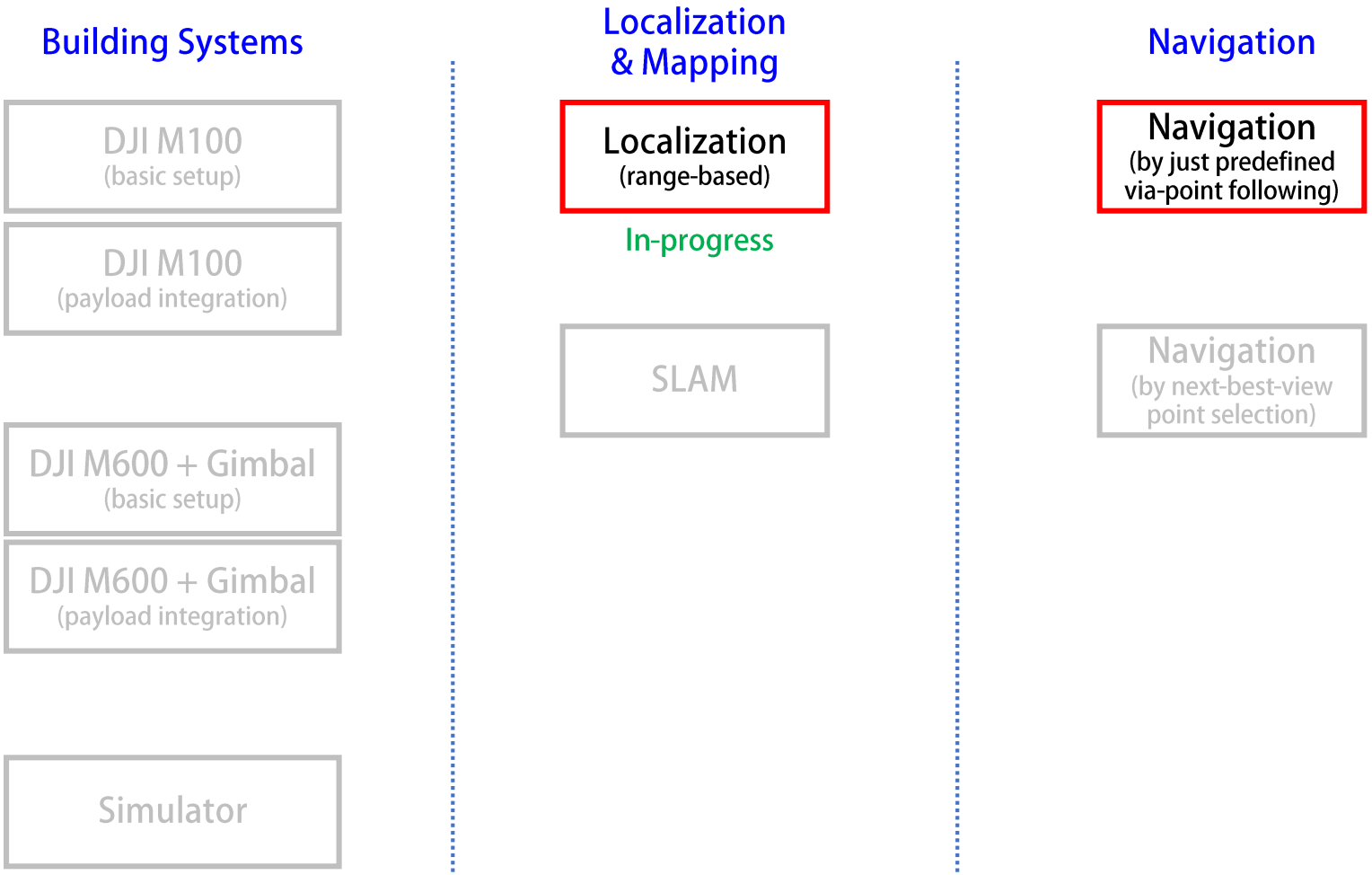
Task 0: Building Systems

❑ Building Complete Systems



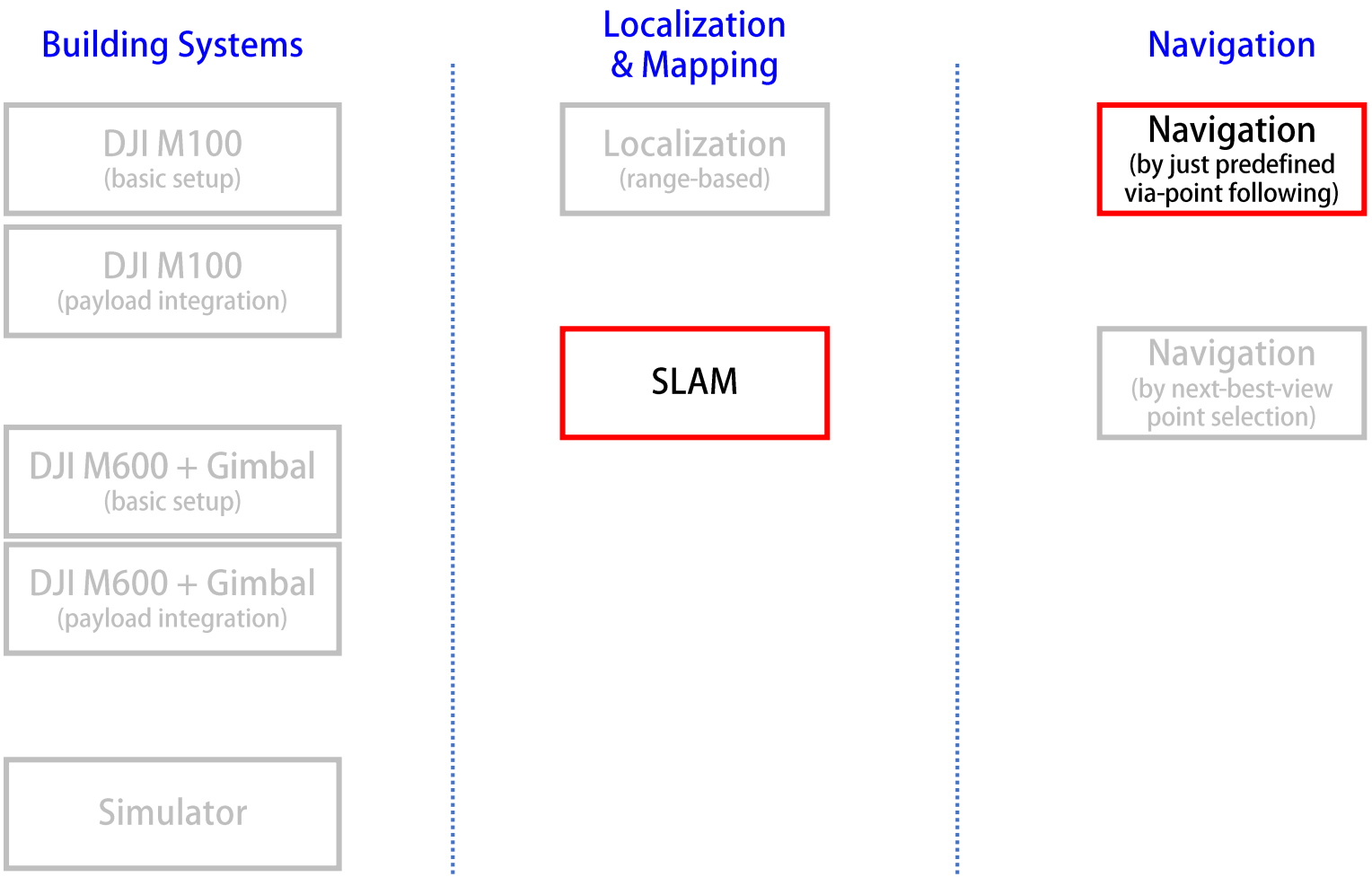
Task 1: Localization

❑ Following Predefined Via-Points



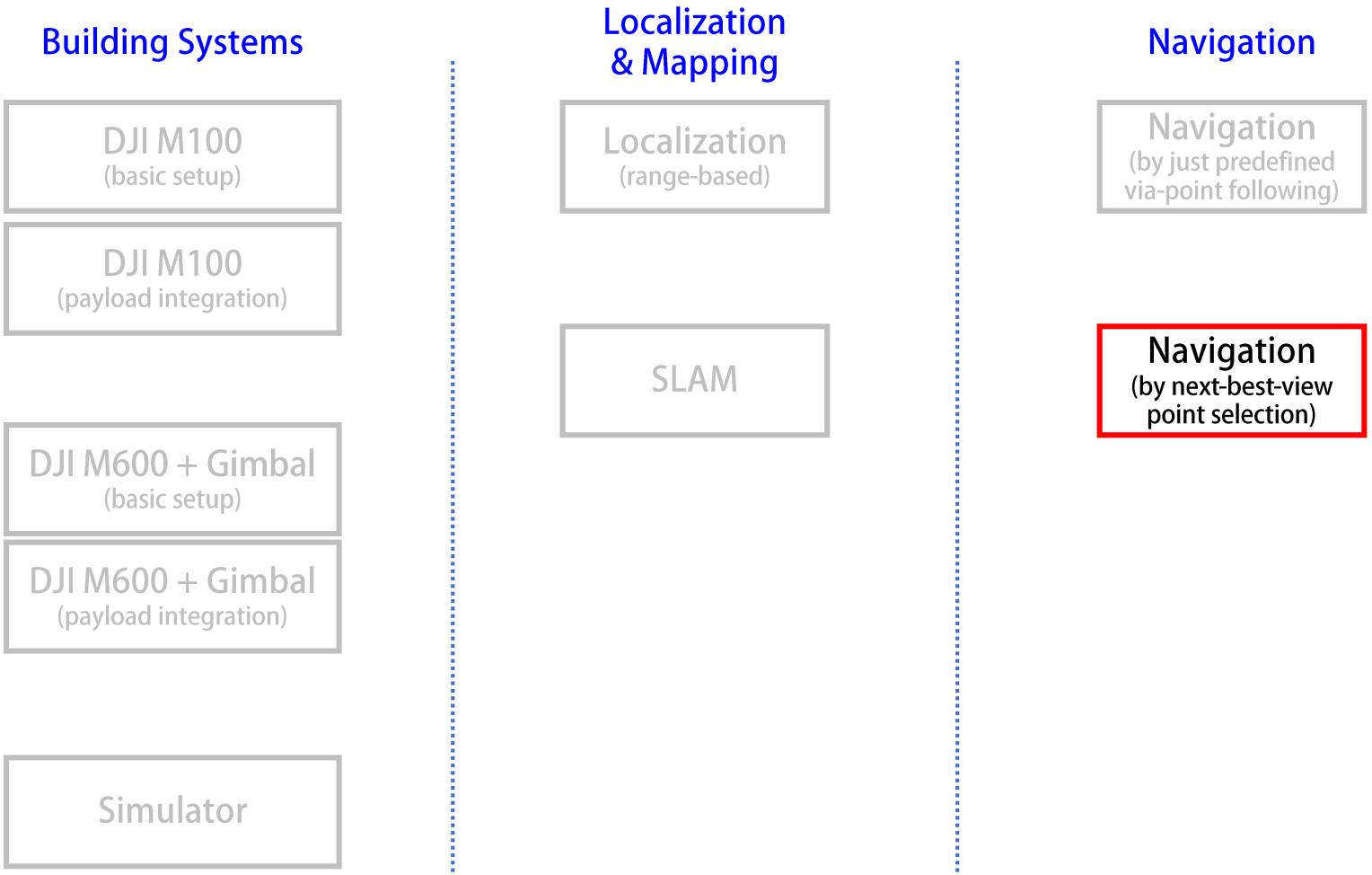
Task 2: SLAM

❑ Building a Map



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

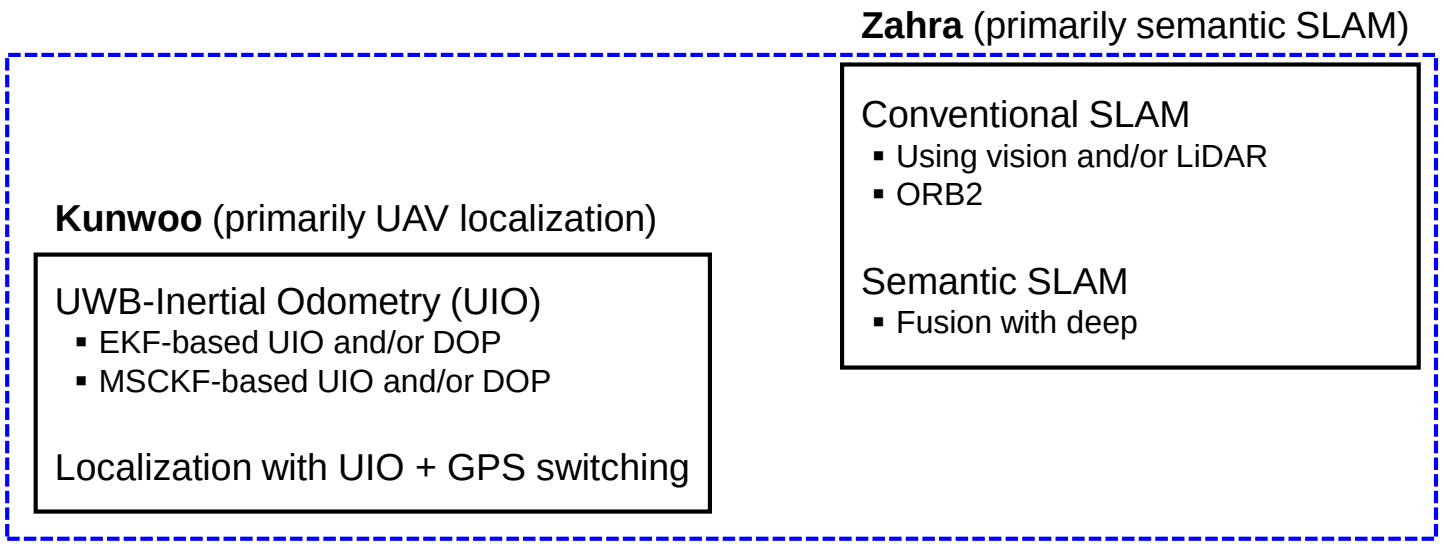
- Zahra
  - Understanding Kunwoo's EKF-based UWB localization code (including EKF)

- 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.

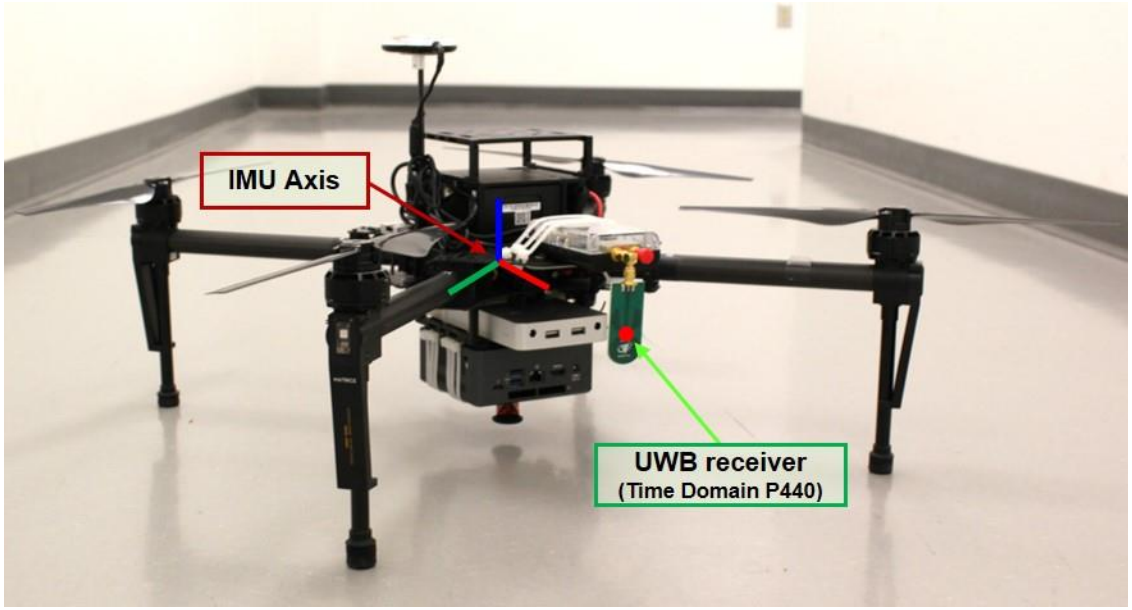
IMU Calibration Problem

Jan 24 2019

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

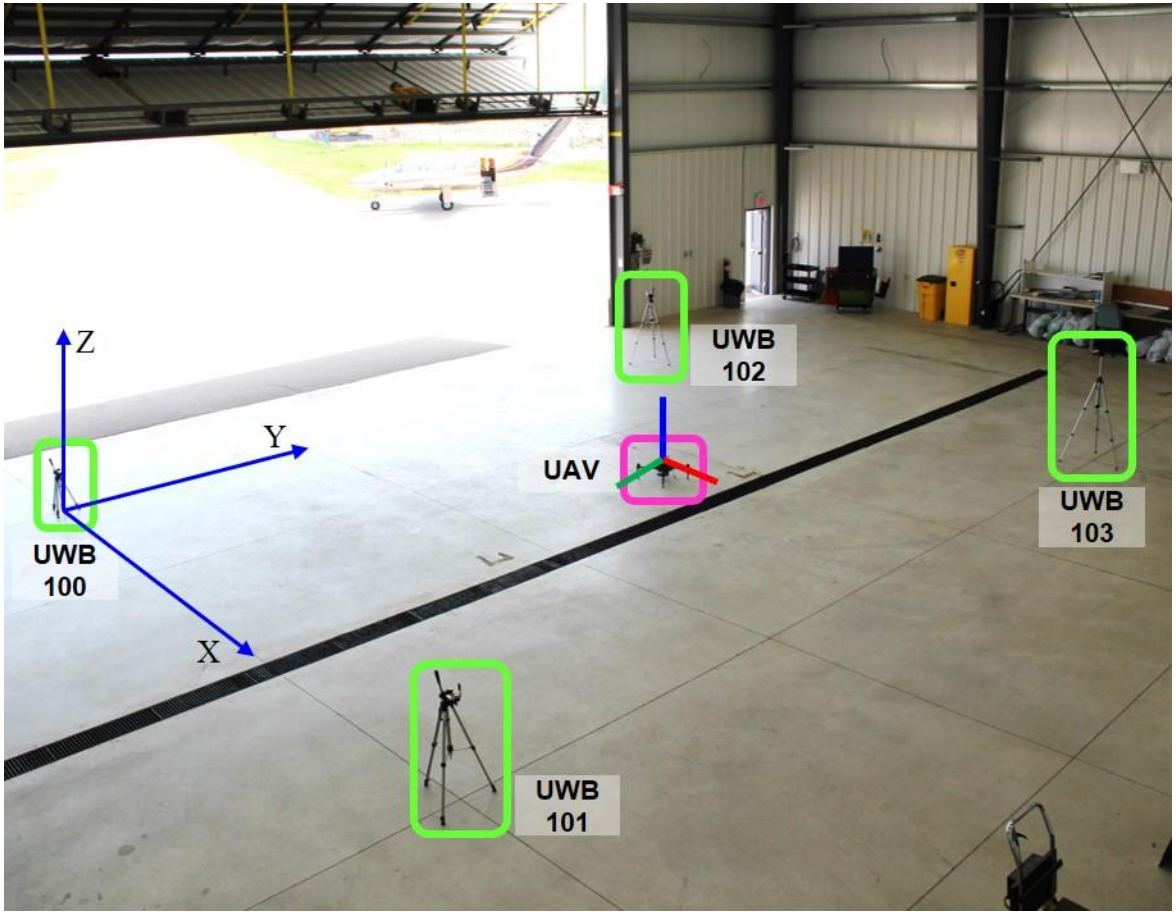
Problem 1

- Where is the UWB receiver wrt IMU axis?



Problem 2

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

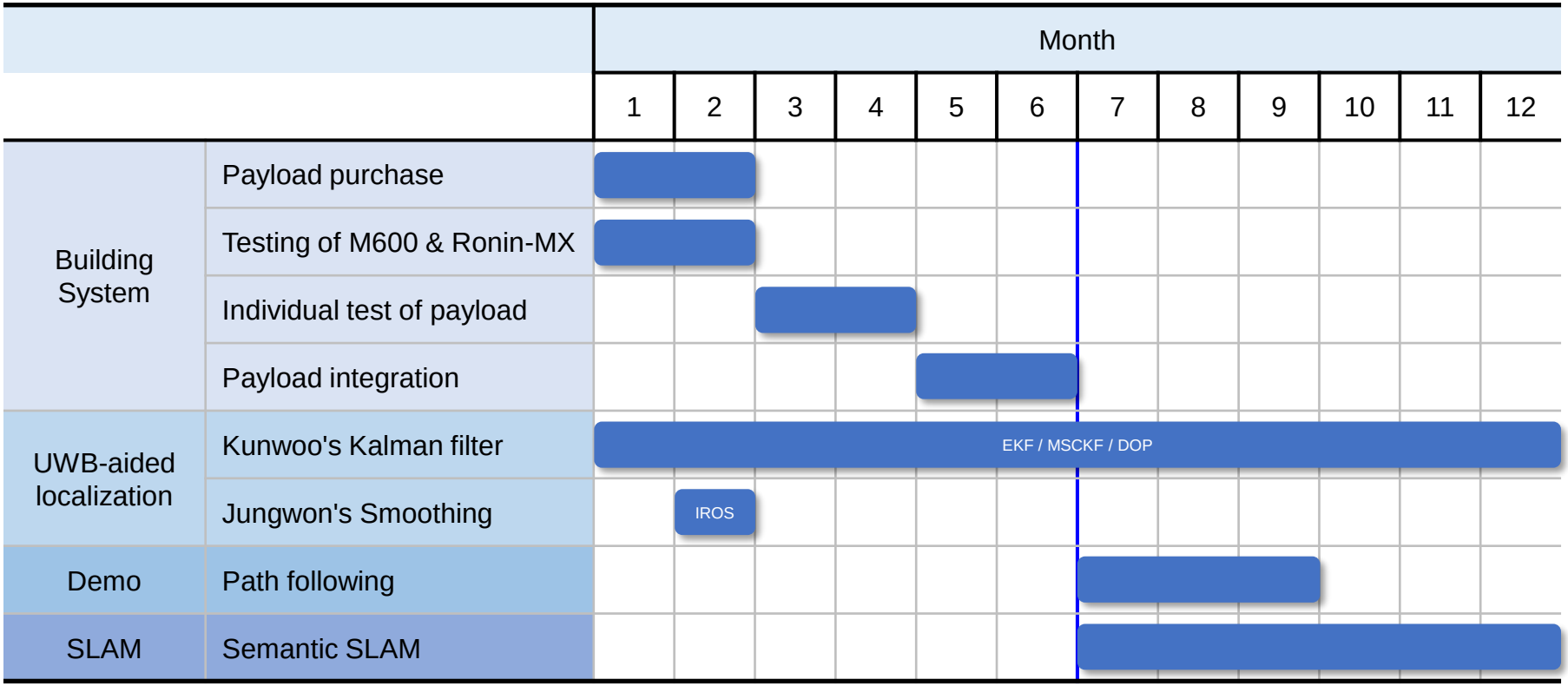


Plan for Year 2019

Feb 5 2019

Participant: Jungwon Kang, Zahra Arjmandi, Kunwoo Park

Plan for Year 2019



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

Current Progress & To do next

Mar 10 2019

Jungwon Kang

Current Progress & To Do Next

Subject	Detailed Task	Current Progress	To Do Next
System building	Payload purchase	▪ Received Velodyne Puck Lite & Hi-Res	▪ Receiving the rest of ordered items (All items are listed at the bottom of page.) ▪ Need to buy a cabinet with lockers ▪ Making a list of items
	Testing M600 & Ronin-MX	▪ Tested Ronin-MX ▪ Not tested M600 due to a broken battery ▪ The broken battery (TB48S) was delivered to the OmniView tech.	▪ Need to order extra TB48S batteries. (Need $2000 for six TB48S)
	Test of each payload	None	
	Payload integration	None	
Dataset release	UWB-IMU dataset generation & release	None	▪ Need to do experiments ▪ Need to release the dataset to the public ▪ Need to submit a paper about the dataset
Localization solution	UWB multilateration-based localization	▪ Implemented an initial version of multilateration in C++	▪ Need to implement LM non-linear optimization in C++
	UWB-EKF-based localization	▪ Implemented in MATLAB (by Kunwoo)	▪ Need to implement in C++ ▪ Need to write a thesis draft by Kunwoo
	UWB-Smoothing-based localization	▪ Implemented in MATLAB (by Jungwon) ▪ Submitted IROS paper	▪ Need to implement in C++
Navigation solution	Coverage path planning	▪ Implemented in MATLAB (by Zahra)	
	Implementing in real systems	None	▪ Need to implement in M100 & M600

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