# Meeting Materials for QDrone Project Regular Internal Meeting

# Regular Internal Meeting for QDrone Project

Jan 7 2019 4PM at PSE 312

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# 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

#### **Building Systems**

Done!

DJI M100 (basic setup)

Done!

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)

## Task 1: Localization

#### ☐ Following Predefined Via-Points

#### **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)

**In-progress** 

SLAM

#### **Navigation**

Navigation (by just predefined via-point following)

#### 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)

# Task 3: Navigation

#### ☐ Building a Map by Next-Best-View Point Selection

#### **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)

# 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

**Zahra** (primarily semantic SLAM)

**Kunwoo** (primarily UAV localization)

UWB-Inertial Odometry (UIO)

- EKF-based UIO and/or DOP
- MSCKF-based UIO and/or DOP

Localization with UIO + GPS switching

Conventional SLAM

- Using vision and/or LiDAR
- ORB2

Semantic SLAM

Fusion with deep

**Jungwon:** supports Kunwoo & Zahra mainly in technical issues.