Test Plan

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Our test plan includes a few tests ranging from localization to drone control. We will test Wifi and optical localization against known points in space over time. Drone control will be tested using standard control commands sent to the drone with an observer tracking the outcome of the drone's actions. A neural network is also used to identify the drones points in space and cut through the noise of the sensors (wifi and optical). The neural network test will be comparing the outcome of the neural network against known points in space.

Test Case Descriptions

WF1.1	**Wifi Localization Test 1**
WF1.2	This test will identify the amount of noise found in the wifi localization data
WF1.3	Collect wifi localization data at known points in space over time, compare that data against the known points in space
WF1.4	Inputs: Wifi localization data captured by a raspberry pi, known points in space
WF1.5	Expectations: noise in the wifi localization data, as wifi localization using RSSI in an analog measure.
WF1.6	Normal
WF1.7	Blackbox
WF1.8	Performance
WF1.9	Unit

WF2.1 **Wifi Localization Test 2**

WF2.2 This test will identify the best Kalman filter configuration for the noise found in the wifi localization data

WF2.3 Collect wifi localization data at known points in space over time, compare that data (with a kalman filter) against the known points in space

WF2.4 Inputs: Wifi localization data captured by a raspberry pi (with a kalman filter), known points in space

WF2.5 Expectations: minimized noise in the wifi localization data, the kalman filter should improve the accuracy and precision of the data.

WF2.6 Normal

WF2.7 Blackbox

WF2.8 Performance

WF2.9 Unit

WF3.1 **Wifi Localization Test 3**

WF3.2 This test will be an experiment into using an artificial neural network (ANN) identifying if a well trained network can be used as a filter for the wifi localization noise

WF3.3 Collect wifi localization data at known points in space over time, compare that data (with a trained ANN filter) against the known points in space

WF3.4 Inputs: Wifi localization data captured by a raspberry pi (with a trained ANN filter), known points in space

WF3.5 Expectations: minimized noise in the wifi localization data, the trained ANN filter should improve the accuracy and precision of the data.

WF3.6 Normal

WF3.7 Blackbox

WF3.8 Performance

WF3.9 Unit

DC1.1 **Drone Control Test 1**

DC1.2 This test will identify functioning drone control through the drone’s SDK.

DC1.3 Write code using drone’s SDK that will attempt to control the drone through its SDK.

DC1.4 Inputs: SDK code, different commands through SDK.

DC1.5 Expectations: Drone can be controlled as expected through documented SDK functionality.

DC1.6 Normal

DC1.7 Blackbox

DC1.8 Functional

DC1.9 Integration

OL1.1 **Optical Localization Test 1**

OL1.2 This test will identify the accuracy of our Optical Localization system

OL1.3 Using our optical localization tools we will compare perceived localized points through optical localization against known points in space.

OL1.4 Inputs: Optical localization data, known points in space

OL1.5 Expectations: Optical localization data is usable for actual localization

OL1.6 Normal

OL1.7 Whitebox

OL1.8 Performance

OL1.9 Unit

OL2.1 **Optical Localization Test 2**

OL2.2 This test will identify the precision of our Optical Localization system

OL2.3 Using our optical localization tools we will compare perceived localized points through optical localization against known points in space.

OL2.4 Inputs: Optical localization data, known points in space

OL2.5 Expectations: Optical localization data being close enough to the known points in space that the data is usable. This test will give us insight into understanding what kind of filter we will need.

OL2.6 Normal

OL2.7 Whitebox

OL2.8 Performance

OL2.9 Unit

OL3.1 **Optical Localization Test 3**

OL3.2 This test will determine the best Kalman filter configuration.

OL3.3 Using our optical localization tools we will compare Kalman filtered localized points through optical localization against known points in space.

OL3.4 Inputs: Optical localization data, Kalman filter configuration, known points in space

OL3.5 Expectations: Kalman filter shows better results than that of the raw data

OL3.6 Normal

OL3.7 Blackbox

OL3.8 Performance

OL3.9 Unit

Test Case Matrix

ID	Normal / Abnormal	Blackbox / Whitebox	Functional / Performance	Unit / Integration
WF1	Normal	Blackbox	Performance	Unit
WF2	Normal	Blackbox	Performance	Unit
WF3	Normal	Blackbox	Performance	Unit
DC1	Normal	Blackbox	Functional	Unit
OL1	Normal	Whitebox	Performance	Unit
OL2	Normal	Whitebox	Performance	Unit
OL3	Normal	Blackbox	Performance	Unit