1. SYSTEM TEST PLAN

The tests for our POC device are performed on individual aspects of our design, and then on the whole device as a field test. Each test plan consists of an input condition and an expected result. Meeting of the expected result in response to the given input will approve the system's functionality.

1.1. CEHW Testing

Depth Camera + Accelerometer Unit Test

- Testing the device working

Input:

Power is plugged in with sufficient charge (>9V), and USB cable is properly connected.

Expected Result:

Using visualisation software, it is possible to look at the data stream.
Incoming data stream can be shown in its raw format.
Acceleration data can be displayed.

Microprocessor Unit Test

- Testing the device working and connections established

Input:

Power and USB cables are connected, and some UI commands are inputted via the serial connection

Expected Result

UI responds to the inputted commands

1.2. Obstacle Detection and UI Mapping

Ground Detection Testing

- Testing the ground working

Input:

With device turned on, position it such that the ground is within FOV. Start a visualisation software.

Expected Result:

Ground is detected and displayed in the visualisation software.

Obstacle Detection Testing (Proximity)

- Testing the detection working

Input:

With device turned on, bring one or more objects in the FOV

Expected Result:

Vibration goes off when closer than the threshold, according to the UI protocol, including different kinds of vibrations.

Obstacle Detection Testing (SW level)

- Testing the detection working on the SW level

Input:

With device turned on, bring one or more objects in the FOV. Visualisation software is prepared.

Expected Result:

Detections of objects are indicated in the visualisation software. Detections correctly correspond to the obstacles.

UI Mapping Testing

- Testing the correct mapping to UI

Input:

With device on, bring objects to specific locations of FOV

Expected Result:

Correctly corresponding motors go off.

1.3. PSU Testing

Battery Life Testing

- Testing the battery life of device

Input:

Turn on device and equip it.

Keep the device working such that the power drainage is realistic

Expected Result:

Device will be functional for minimum of 30 minutes from full charge

Power Supply Unit Unit Testing

- Testing the capability and stability of PSU

Input:

Bring obstacles in all FOV, causing all motors to fire.

Expected Result:

All motors fire for reasonable amount of time (~5 seconds)

1.4. Field Testing

Field Testing of Device

- Testing correct functionality of device in realistic setting

Input:

With the device equipped and blind folded, navigate indoors.

Encounter various types of obstacles, including pits, high obstacles, and low obstacles

Expected Result:

Successful navigation with nominal collisions