Generating Enhanced Augmented Reality Surveillance (G.E.A.R.S.): Test Plan

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Client: Sentry View Systems

1. Test Cases

1.1 Purpose

In the following test cases we will denote the key functionalities of our project and our expected flow for testing the requirements. Our main goal is to accomplish an interface between the mmWave sensors and the augmented reality device, for that reason our testing will focus on ensuring that the information detected by the mmWave sensors will be properly depicted on the augmented reality 3D model.

<table>
<tr><td colspan="2"><TC0001> <Use the Texas Instrument mmWave sensor to track an object.>

Description:
This test case simulates the process that the mmWave sensor will take to detect objects.

Goals:
Successfully detect an object moving through the sensor’s field of view.
Test Data:
An object that is actively moving through the sensor’s field of view.
Test Tools:
Code Composer Studio
Uniflash
TI mmWave Sensor
Test Startup Procedure:
Connect the mmWave to the tester’s computer and start the Code Composer Studio and Uniflash programs.
Test Closedown Procedure:
Disconnect the mmWave sensor and closedown Code Composer Studio and Uniflash programs.</td></tr>
<tr><td colspan="2">1. Test Case – Flow Testing</td></tr>
<tr><td>Preconditions:
1. Test environment contains no other moving objects
2. mmWave sensor is mounted and running in the room the object will walk through.

Test Steps:

1. Launch the People Counter visualizer application from the Texas Instrument’s mmWave SDK.
2. One person will enter through the sensor’s FOV.
3. Based on the visualizer object creation, our system will instantiate an object.</td><td>Expected Results:

1. Successful launch of the data visualizer.
2. The data visualizer will represent the person as a dense cloud of points.
3. An object will be instantiated in our system and it’s our system will begin tracking it’s information.</td></tr>
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<**TC0002**> <Display a 3D model in AR through the Magic Leap One device.>

Description:
This case will test the Magic Leap One's ability to display a pre-generated model developed in Unity's IDE.

Goals:
Successfully display a 3D model in AR.
Test Data:
A pre-generated 3D model.
Test Tools:
Unity IDE
Magic Leap One
Test Startup Procedure:
Tester will load a Unity scene containing a 3D model. Connect the Magic Leap One device to the tester's computer.
Test Closedown Procedure:
Close the current scene and exit the Unity IDE. Disconnect the Magic Leap One device from the computer.

2. Test Case – Flow Testing

Preconditions: 1. Test environment will contain a pre-generated 3D model. Test Steps: 1. Start up the Magic Leap One device and run the G.E.A.R.S. application. 2. Select the "Demo" option using the Magic Leap One's Mission Control device.	Expected Results: 1. G.E.A.R.S. application launches successfully, displays the menu in the AR system. 2. The 3D model of we have designed will be shown in AR.

<**TC0003**> <Use the Magic Leap One's Mission Control device to select an object within the 3D model and display additional data relevant to the object.>

Description:
This case will test the selectability of an object within the 3D model. Selected objects should have their heart rate, breathing rate, velocity, and most recent path displayed to the user.

Goals:
Successfully select an object and display a box containing the object's heart rate and breathing rate. The object's most recent path will be displayed as a line trailing behind the object.

Test Data:
A 3D model containing one object. The heart rate, breathing rate, and most recent path of the object will be loaded in from a set of pseudo data.

Test Tools:
Unity IDE

Test Startup Procedure:
Tester will load a Unity scene containing a 3D model and an object within it.

Test Closedown Procedure:
Close the current scene and exit the Unity IDE

3. Test Case – Flow Testing

Preconditions:
1. Test environment will contain an object instantiated using data from the TI mmWave People Counter application.
2. Test environment will contain a pre-generated 3D model.

Test Steps:

1. Using the Mission Control device, move the cursor over the object in the 3D model.
2. Using the Mission Control device, "select" the object.

Expected Results:

1. Outline the object to show that the cursor is currently over it.
2. A trail that highlights the object's path over the last couple seconds will appear on the 3D model. A box will appear above the 3D model that displays information about the selected object.
    a. Box Information: Velocity, Breathing Rate, Heart Rate

<**TC0004**> <Display an object moving through a 3D model in AR>

Description:
This case will test the system's ability to instantiate an object and track its movement through a 3D model.

Goals:
Successfully track and object's movement through the model..
Test Data:
A 3D model containing one object. The object's movement will be pre-loaded, not based on active sensor data.
Test Tools:
Unity IDE
Magic Leap One
Test Startup Procedure:
Tester will load a Unity scene containing a 3D model.
Test Closedown Procedure:
Close the current scene and exit the Unity IDE

4. Test Case – Flow Testing

Preconditions:
1. Test environment will contain data from the TI mmWave People Counter application.
2. Test environment will contain a pre-generated 3D model.

Test Steps:

1. Start up the Magic Leap One device and run the G.E.A.R.S. application.
2. Select the "Demo" option using the Magic Leap One's Mission Control device.
3. Connect the mmWave sensor to a computer and start the People Counter application
4. One person will enter through the sensor's FOV.
5. The Magic Leap One device receives the data from the People Counter application.
6. The object will move through the mmWave sensor's FOV.

Expected Results:

1. G.E.A.R.S. application launches successfully, displays the menu in the AR system.
2. The 3D model of we have designed will be shown in AR.
3. People Counter application starts up successfully and starts receiving sensor data
4. The People Counter application will track the object and send its current position to the Magic Leap One device
5. The Magic Leap One device instantiates the object in the 3D model.
6. The object's movement will be tracked accordingly and updated in the 3D model.