MOBILE MAPPING CAR

Acceptance Test

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Content

1 Introduction

1.1 Purpose

The goal of this document is to define the acceptance test for the Mobile Mapping Car.

1.2 Definitions

The “User’s smartphone” refers to the smartphone where the application is running.
The “Car” refers to the microcontroller, the car and the sensor platform.
The “Car’s smartphone” refers to the smartphone placed on the car to serve as camera

1.3 Scope

This acceptance test checks the requirements specified in the Requirement Specification.

2 Test specification

The test specification specifies which devices are tested and in what conditions the tests are performed.

2.1 Devices under test

The following devices are part of the Mobile Mapping Car system:

Devices	Operating System	Hardware
Microcontroller	N/A	Arduino Mega 2560
Ultrasonic sensors	N/A	HC-SR04
User’s smartphone	Android OS	smartphone
Car’s smartphone	Android OS	smartphone

***Figure 1*: List of tested devices**

2.2 Test setup

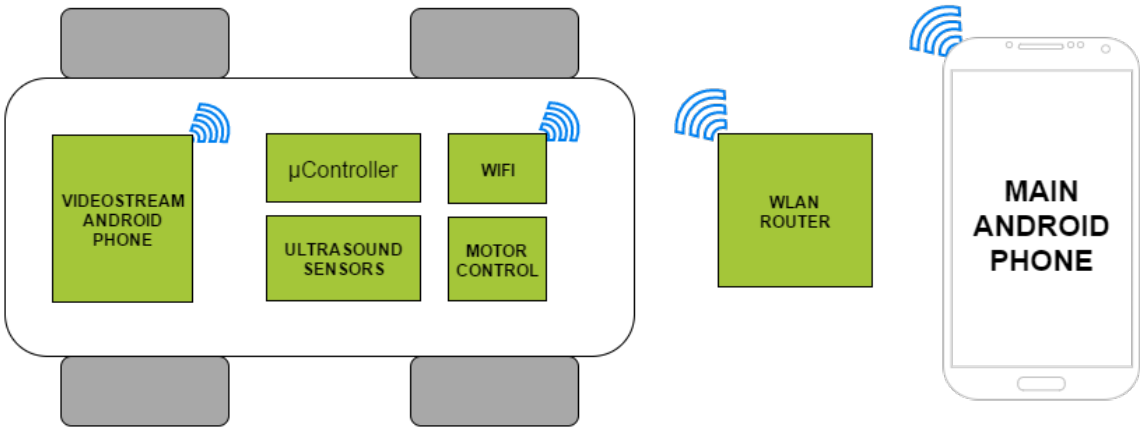

Figure 2: Test setup

In figure 1 is shown the setup for the test. We will proceed through all the tests with this setup. The system consists of the user's smartphone (Main android phone), the car's smartphone (Video stream Android phone) and the car itself divided into the microcontroller, the WIFI shield, the motor control and the ultrasonic sensors.

It is assumed that the application is installed on the user's smartphone.

Essential for the connection is a WLAN router. The two Smartphones and the microcontroller must be connected to the same network and should be reachable from each other. Then the application on the main Smartphone has to be started at the beginning.

2.3 Test environment

The tests can be effected anywhere as long as a wireless hotspot is available. Both the user and the car must be within the WLAN boundaries (Usually a maximum of 32 meters wide).

3 Test procedure

3.1 Test of functional requirements

3.1.1 Test Use case 1.1: Input connection data

Description: The purpose of this test is to input the necessary connections information in the user's smartphone**.**

Prerequisites: The user's smartphone is powered.

Test:

Step	Procedure	Expected results	
1	Pushes the "connect button" on the "start screen".	The "connect screen" is displayed.	OK
2	Enters the IP and the port of the car's microcontroller then enters the IP and the port of the car's smartphone and pushes the "connect button".	The check boxes corresponding to the connection with the microcontroller and the smartphone are checked.	OK

Figure 3: Use case 1.1 – scenario

3.1.2 Test Use case 1.2: Connect to microcontroller

Description: The purpose of this test is to connect the user's smartphone with the car and the car's smartphone.

Prerequisites:

- The car's smartphone is powered.
- The car is powered
- Data connection have been entered.

Test:

Step	Procedure	Expected results	
1	Pushes the "start recording" on the "start screen".	The "LiveVideoScreen" is displayed.	**OK**

Figure 4: Use case 1.2 - scenario

3.1.3 Test Use case 2: Stream video

Description: The purpose of this test is to stream a video from the car's smartphone to the user's smartphone.

Prerequisites:

- The car's smartphone is powered.
- The car's Smartphone and the user's Smartphone are connected.

Test:

Step	Procedure	Expected results	
1	The car's smartphone captures a video and send it the user's smartphone.	The video is displayed on the user's smartphone screen.	OK

Figure 5: Use case 2 - scenario

3.1.4 Test Use case 3: Navigate the car

Description: The purpose of this test is to navigate the car, making it move in the four directions available.

Prerequisites:

- The car is powered.
- The car and the user's Smartphone are connected.

Test:

Step	Procedure	Expected results	
1	The user's smartphone provide an interface allowing the user to move the car forward / backward and left/right.	The interface is displayed on the user's smartphone screen.	OK
2	Press any of the directional button	The car moves in the chosen direction	OK
3	Release the directional button	The car stops moving	OK

Figure 6: Use case 3 - scenario

3.1.5 Test Use case 4: Record room

Description: The purpose of this test is to collect data from a room then draw and save a map of the room.

Prerequisites:

- The car is powered.
- The car and the user's Smartphone are connected.

Test:

Step	Procedure	Expected results	
1	The user's smartphone provide an interface allowing the user to start recording.	The interface is displayed on the user's smartphone screen.	OK
2	Press the rec button	The car start the scan	OK
3	Wait until the scan finished	The platform with the sensor turn by 10°, then repeat until it has done a complete revolution.	OK
4	The user's smartphone draw a map with the data	A new map is shown in the map list	OK

Figure 7: Use case 4 – scenario

3.1.6 Test Use case 5: Manage recorded maps

Description: The purpose of this test is to access to a map in the list of saved map in the user's smartphone and display it in full screen.

Prerequisites: At least one map must be saved.

Test:

Step	Procedure	Expected results	
1	Push "map" button	The maps list is displayed on the left. The preview of the map at the beginning of the list is displayed on the right.	OK
2	Select a map from the list	The selected map preview appears	OK
3	Press the preview of the map	The selected map is displayed in full screen.	OK

Figure 8: Use case 5 - scenario

3.1.7 Test Use case 6: Delete map

Description: The purpose of this test is to access to a map in the list of saved map in the user's smartphone and delete it.

Prerequisites: At least one map must be saved.

Test:

Step	Procedure	Expected results	
1	Push "map" button	The maps list is displayed on the left. The preview of the map at the beginning of the list is displayed on the right.	**OK**
2	Select a map from the list	The selected map preview appears	**OK**
3	Press the map in the list for a few seconds	A popup appears, asking confirmation for deleting the map.	**OK**
4	Press "yes" in the popup	The popup vanish and the map is deleted	**OK**

Figure 9: Use case 6 - scenario

3.1.8 Test for small objects detection

Description: The purpose of this test is to assure that the ultrasonic sensors can detect small objects as table or chair legs.

Prerequisites:

- The car is powered
- The main smartphone and the car are connected

Test:

Step	Procedure	Expected results	
1	Steer the car and align it with, what is considered, a small object.	The steering is just as usual.	**OK**
2	Start recording	The car starts recording and sending data	**OK**
3	Check the resulting map	There should be a dot where the co-called small objet would be.	**OK**

Figure 10: Small objects detection - scenario