# CUPUS Crowdsensing App
User Manual

1. Download and install the application (Figure 1a)

2. Turn on GPS (and Bluetooth when communicating with air quality monitoring sensor)

3. Open the app, there are 3 main activities (Figure 1b, marked red):

- left default activity with map for defining new subscriptions,
- middle activity for connecting with sensor, and
- right activity with application settings

4. Click on the settings activity (Figure 1c), first there are Server IP and Server Port (they already have default values), then Publisher connection and Subscriber connection (Publisher connection should be turned on when publishing data, similar Subscriber connection should be turned on for receiving the data of interest – Figure 1d. Note that if later on you see „Timed out" message instead of „Connected" on this screen, you should first turn off, and then again turn on the slider, and application will automatically transmit all messages that have not been sent to the server side.), and finally Aggregation period for communication with sensor (has default value of 20 and should not be changed).

5. Click on the middle activity, first there are internal sensors available on the mobile phone (Figure 2a), such as, noise, location, light, etc. (you can click on each of them and see their current measurements - Figure 2b), below internal sensors there are external sensors (this list is now empty since your phone is not connected with any of them), on the right there is „+" sign, when you click on it, the app will start searching for available sensors (Figure 2c) - choose one, the app will ask you to pair with sensor (Figure 2d), click yes, and the app will connect with sensor, if you click on *Fer sensor* (Figure 2e) you will be able to see its measurements (Figure 2f). Below you can find more information on how to use *Fer sensor.*

6. Click on the left activity which shows map pointing on your current location - Figure 3a (if you have GPS turned on), and at the bottom (on the right) there is „+" sign (for defining new subscriptions) - click on it and put your finger on the map (at the location you are interested in) and hold your finger on that point until there is a pink circle which defines the subscription area (Figure 3b), when the circle is big enough to cover the area of your interest (e.g., some neighborhood in the city), press check sign, and pick parameters of your interest - Figure 3c (e.g., temperature and CO - you can pick multiple parameters at the same time) and your subscription is defined - now you will start receiving notifications with measurements for your subscription area if anyone is measuring (including you) - notification is displayed as a red marker on the map (Figure 3d), if you click on it you'll see the parameter and its measured value. Above the „+" sign, there is a „list" sign, click on it and you can see all subscriptions you have made (Figure 3e). For each subscription there are 2 options, first to highlight the subscription area on the map (e.g., if you forgot where did you define your subscription), and to unsubscribe – when you unsubscribe, you will not receive any new notifications.

7. The application has a log.txt file where you can see all measurements. The file is located in the Downloads folder of your mobile phone. Note that on some phones, such as, Motorola Moto G4+, you can not you cannot directly access the log file in Downloads but you need to go through phone's

internal storage, and then you will see the log.txt file in the Downloads folder. Also, if the log file is too long, sometimes you will not be able to see all data on your phone, so you need to transfer the file on your computer.
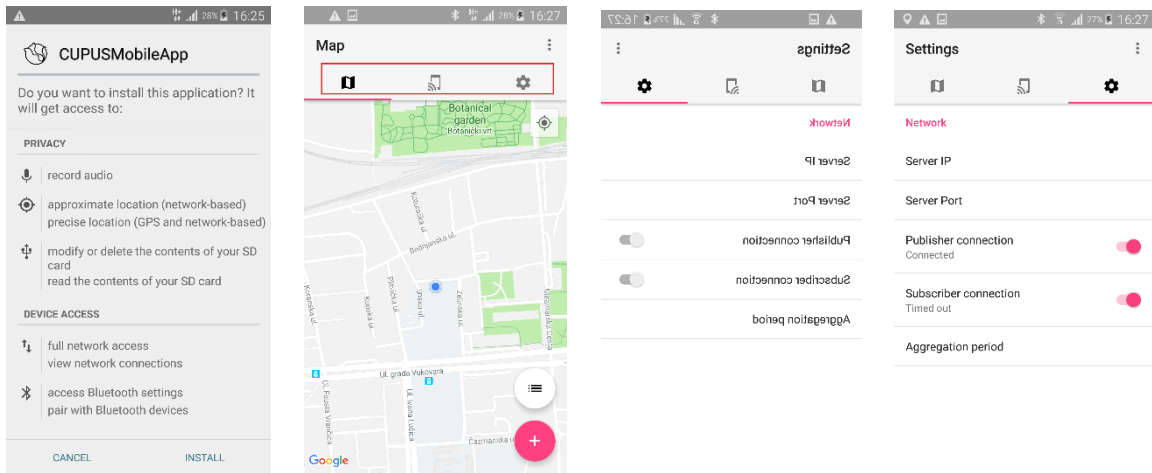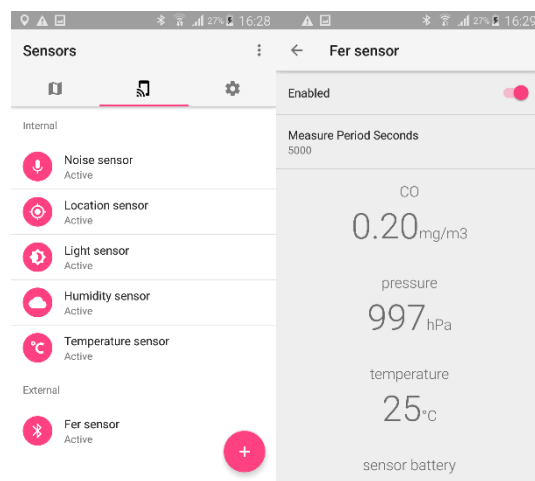

Figure 1 Installation and Settings activity
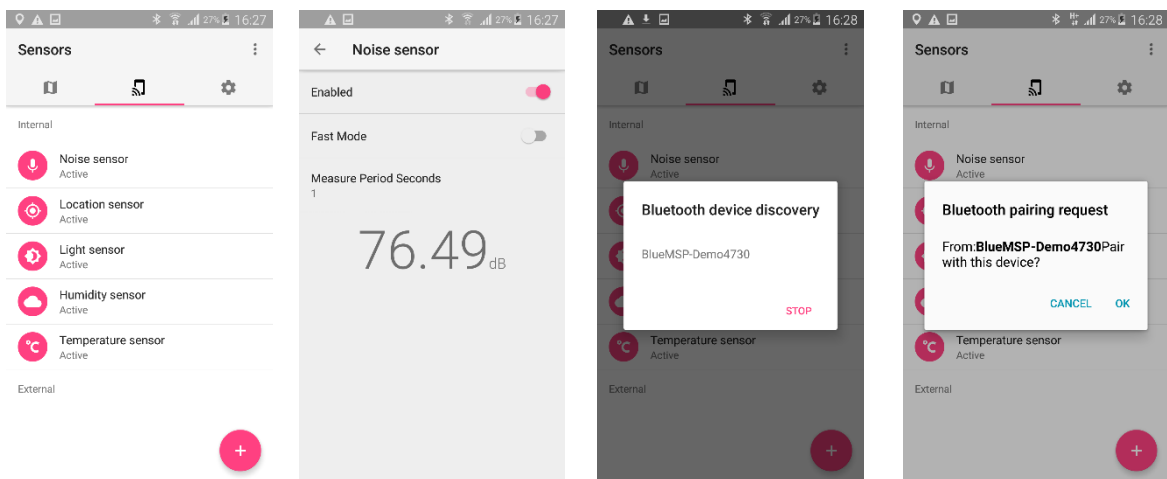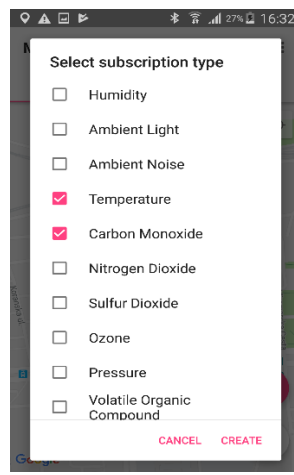
Figure 2 Sensors activity

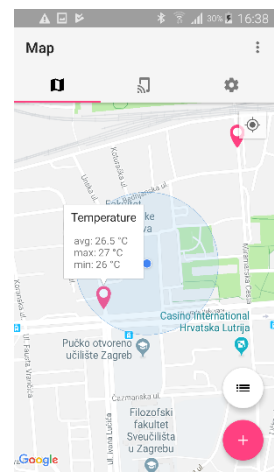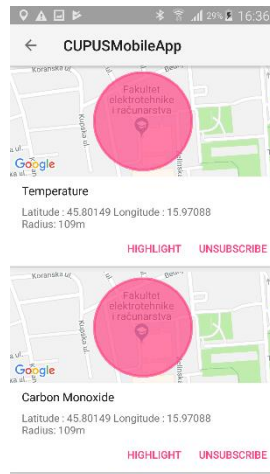a)   b)   c)   d)

e)

Figure 3 Subscriptions activity

FER Sensor

Figure 4 shows the design of the FER Air Quality Sensor mechanical enclosure. Each sensor node measures temperature, humidity, atmospheric pressure, and sub-ppm level concentrations of carbon monoxide (CO) and nitrogen dioxide (NO_2). Mechanical enclosure is designed for sensor to be carried either attached to clothes by a belt clip, as shown in Figure 4, by carabiner hook, or to a bicycle using a standardized ¼" camera mount screw, as shown in Figure 5. Enclosure is not waterproof.
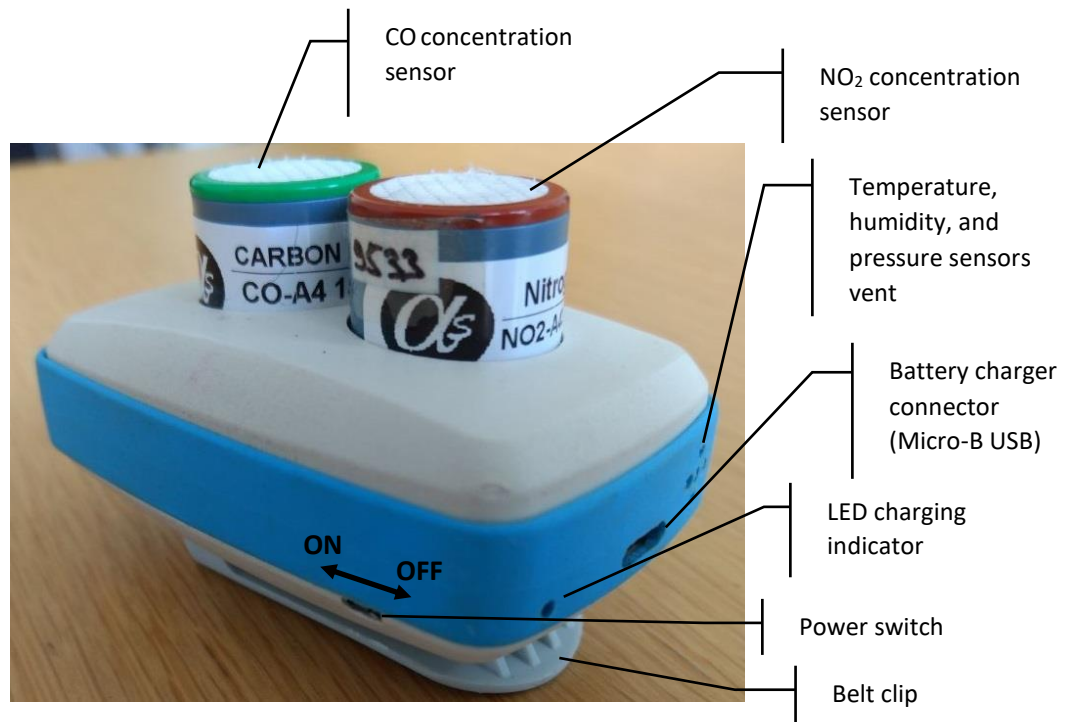

Figure 4 Mechanical design of the sensor enclosure

Figure 5 Bicycle mount

DunavNET Sensor

To be defined.