ClairCity: Citizen-led air pollution reduction in cities

D4.11 Fully functional App – First City

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Document Details

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Description	This is a brief description of the ANTS system (ClairCity App) which is fully functional by now and has been launched in Bristol (First City). The main delivery is the launch of ANTS, and the availability for users.

Version History

Version	Updated By	Date	Changes / Comments
V1.0	Mirjam Fredriksen	April	First version
V2.0	Svein Knudsen	April	

Contributions and Acknowledgements

The authors would like to thank the following people for their important contributions used in the preparation of this final document.

Quality Assurance	Svein Knudsen (NILU)
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Executive Summary

ANTS is a system identifying how travelling impacts efficiency and wellbeing.
It consists of:

1. GreenAnt – a smartphone application collecting information about travel patterns using GPS and motion sensors on the phone
2. ANTS - a web tool for analysing and presenting data, from investigated zones.

To use the system you need to register zones on the web tool named ANTS, where you want to collect data about how people travel. Users can assign themselves to the zone by downloading the GreenAnt smartphone app. When the user is within the zone, route and transportation data will be collected and later stored on the server.

The ANTS system is now available for use in cities. The ANTS is a webtool and an APP app and details for where to find the different parts is shown below.

ANTS

Web tool

http://ants.nilu.no/

GreenAnt - Play store

Android app

https://play.google.com/store/apps/details?id=no.nilu.GreenANT

GreenAnt - App store

iOS app

https://itunes.apple.com/us/app/green-ant/id1248256138?mt=8

ANTS – anonymous travel system

Ants is a system identifying how travelling impacts efficiency and wellbeing.
It consists of:

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ANTS

Web tool

http://ants.nilu.no/

GreenAnt - Play store

Android app

https://play.google.com/store/apps/details?id=no.nilu.GreenANT

Compatible devices: Android 6.0 (Marshmallow) and newer

GreenAnt - App store

iOS app

https://itunes.apple.com/us/app/green-ant/id1248256138?mt=8

Compatible devices: Requires iOS 11.2 or later. Compatible with iPhone 5s, iPhone 6, iPhone 6 Plus, iPhone 6s, iPhone 6s Plus, iPhone SE, iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, iPhone X, iPad Air, iPad Air Wi-Fi + Cellular, iPad mini 2, iPad mini 2 Wi-Fi + Cellular, iPad Air 2, iPad Air 2 Wi-Fi + Cellular, iPad mini 3, iPad mini 3 Wi-Fi + Cellular, iPad mini 4, iPad mini 4 Wi-Fi + Cellular, 12.9-inch iPad Pro, 12.9-inch iPad Pro Wi-Fi + Cellular, 9.7-inch iPad Pro, 9.7-inch iPad Pro Wi-Fi + Cellular, iPad (5th generation), iPad Wi-Fi + Cellular (5th generation), 12.9-inch iPad Pro (2nd generation), 12.9-inch iPad Pro Wi-Fi + Cellular (2nd generation), 10.5-inch iPad Pro, 10.5-inch iPad Pro Wi-Fi + Cellular, and iPod touch.

• Why use the ANTS system?

The ANTs system document what people do and not what they say they do when exposed societal changes!
Information can be gained at
  - citizen level and
  - as a group of users
ANTs give information on:
  - Carbon footprint, Air Quality and health
    - Citizen level to inform and empower the citizen. Emissions, exposure and health index. What is my contribution how is my health impacted. What can I do to reduce effects and contribution.
    - Group level to evaluate the effect of societal changes. How do I compare to my friends and other groups using the system. What can we do as a group?
    - What happened when changes have been done. Closing a tunnel, changed the traffic pattern etc.
    - Relates to relevant statistics to reflect the impact of actions and activities.
Evaluate the impact of policies and changes made by comparison to before and after changes have been made. ANTs can be used as a testbed for policies and give guidance to policy and decision making.
ANTs will empower the users to evaluate the results of decisions and to use this in marketing the actions and the current policies.

The ANTS system is designed to empower te citizen to actively get aware of the personal contributions to air quality amd Carbon footprint, and if and indicate how this effects peraonal and citizen's health. The tool will also be able to analyse the contribution from groups of people, such as industries, service providers and public authorities. The tool give a possibility to actually quantify the changes in citizen behaviour caused by decisions made. This will support the actual decision/change and a possibility to quantify the effect of the change in activity.
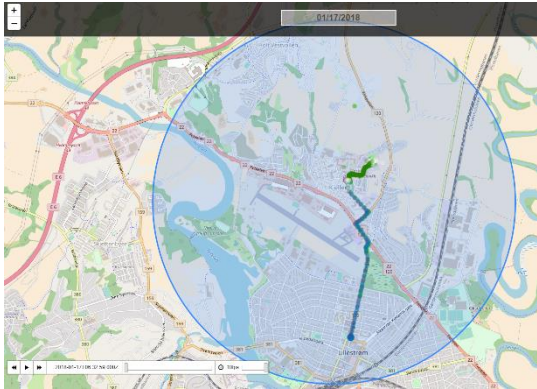
• How it works, users view
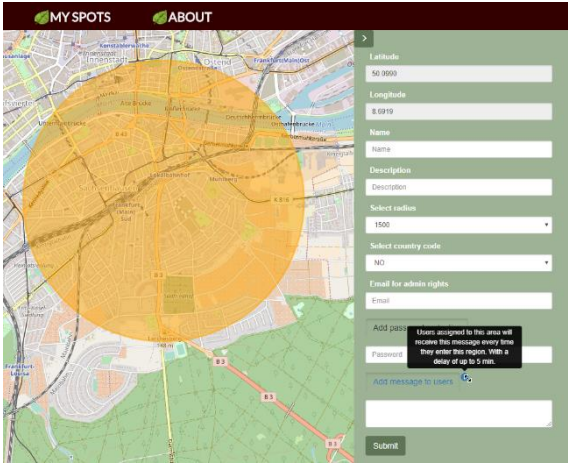
Register an area on a map where you want to ask people to collect data by using the web page and click on the map. Give the zone a name, description and an email for administration rights. This zone can be password protected to secure the data collected or made as a public and open spot. It is also possible to add a message that will be displayed on the GreenAnt app when a user enters this zone. To get information about air quality exposure and emissions you need to select the country code for the zone.

To collect data the user downloads the app and creates a nickname. The nickname will never be shown with the collected data if the user do not choose otherwise. After registration, the user selects the zones where the app is allowed to collect data about routes and activity. As default, the data is only uploaded with a 6-hour delay. This delay timing can be increased and decreased in the app. For privacy concerns, we recommend at least 6 hours.
Data collected can be visualized on the web, providing a password if the zone is protected.
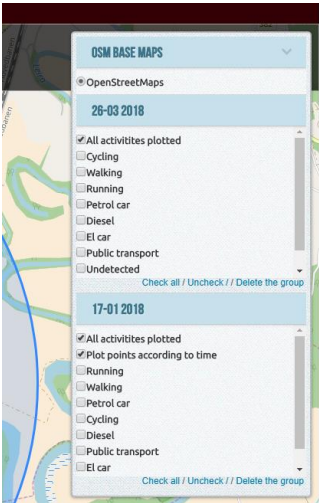

The data will be visualized as a collected group of data for a selected day. Different data layers can be added to the map to separate between the different activities, walking, cycling etc. It is also possible to compare different days by using the calendar.
You can also visualize the data by using a player that will animate the movements during the selected day.

There will also be different statistics available and comparison of days.
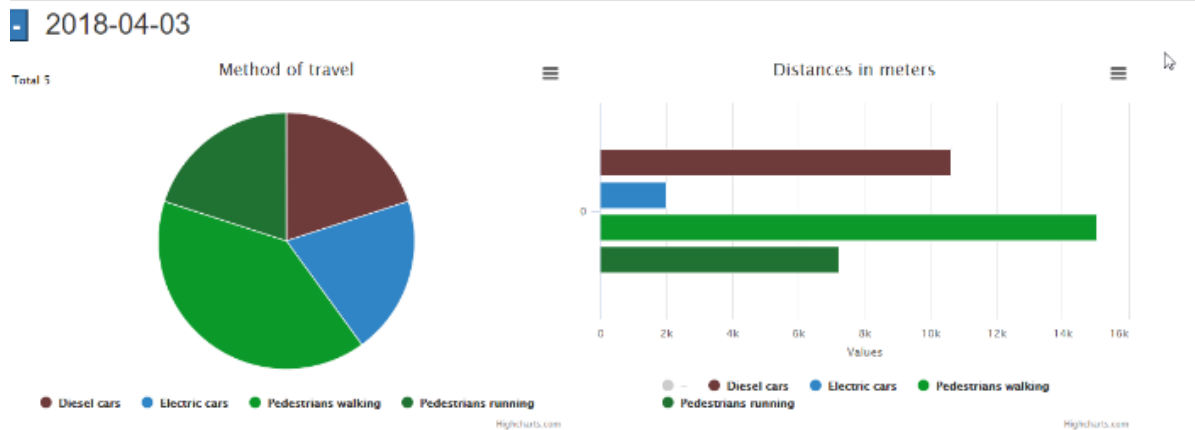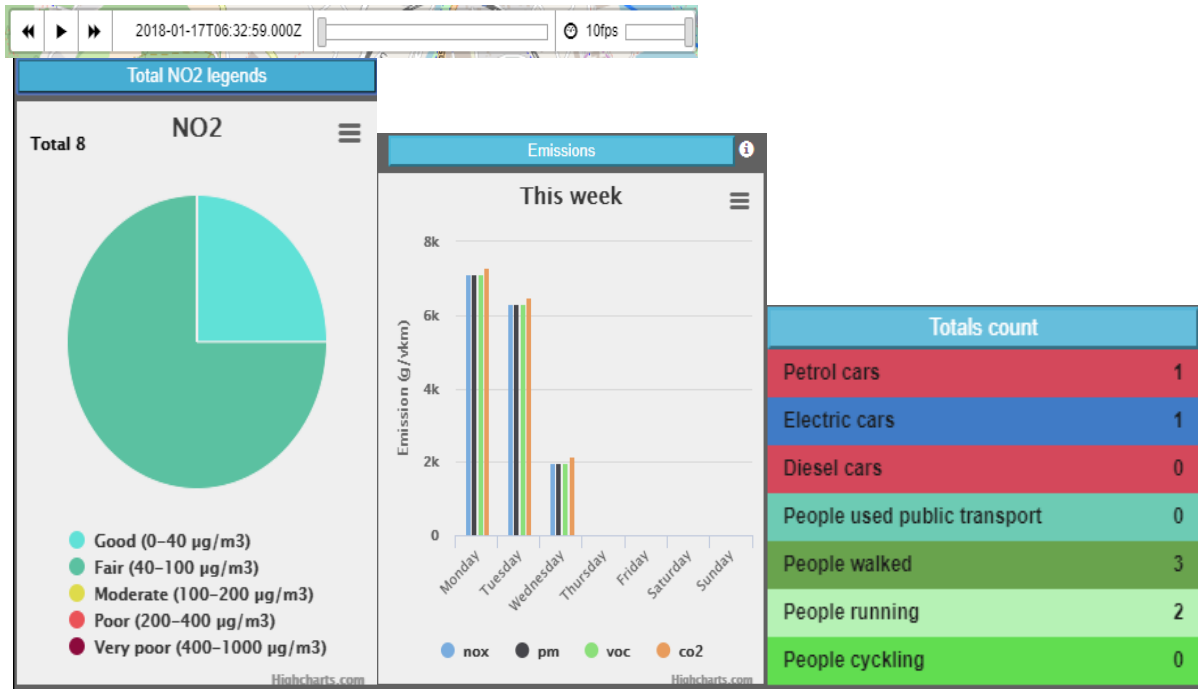
• How it works, developers view

The system is built up of four different parts. The **ANTS web** for administration, analysing and visualization of collected data, is developed using Nancyfx, a web framework for .net. Leaflet, java script library for maps, has been implemented for visualizing the data on a map in different layers according to activity or transport type in addition to a calculated NO2 map. Leaflet also offers a TimeDimension plugin for playing the data according to time. The bootstrap project provides simple and quick access to front end visual components. **GreenAnt** is the name of the **smartphone applications.** The app has been developed using Xamarin from Microsoft, which provides tool for cross-platform development and code sharing among the iOS and the android version of the app.

GreenAnt requires some extra features to be able to detect transportation or activity type. In 2013 Apple started to implement a M7 coprocessor on their devices for better motion detection. GreenAnt requires this to be able to detect if the user is walking, running, driving etc. Therefore, GreenAnt works only on devices from iPhone 5 and up. For android GreenAnt make use of the google API for activity recognition and therefor requires Google Play service. GreenAnt has been tested for android version 6.0 and newer. The user is prompted to select the most used vehicle type. The built in library used for android and iOS do not distinguish between the different transportation types. The user can select between electric, petrol or diesel car or public transport. This will be used when activity vehicle is detected.

In addition to the web tool and the app, the ANTS system consists of a **web API** (application programmer interface) and a **PostGIS database** to store data as spatial objects, making it easier for spatial queries.

Both the web tool ANTS and the web API ANTS-API offers password protection for accessing data on a zone.

In addition to data collected by the GreenAnt app, the PostGIS database also contains additional data to calculate air quality exposure and estimate emissions. To calculate exposure we use background maps for each city and factors to adjust for day, week and month provided by work package 5.
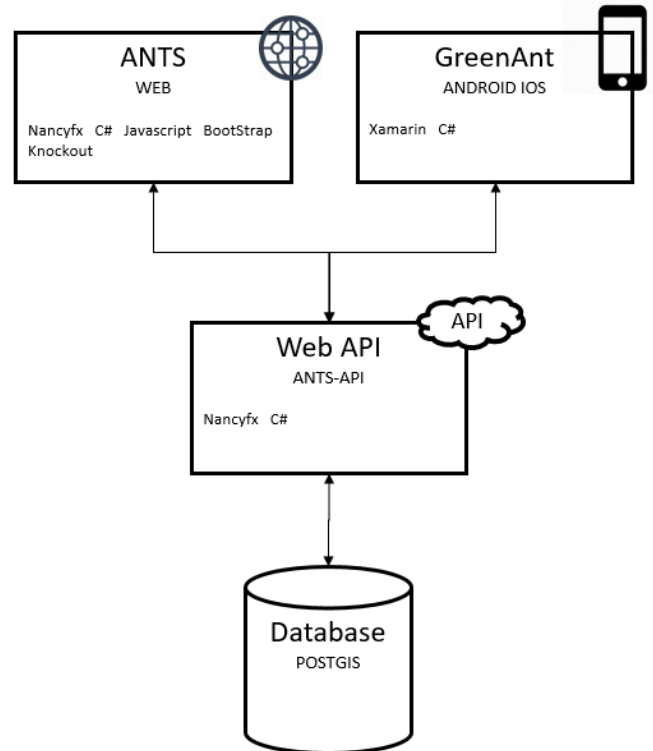
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