



# SUITS

[www.suits-project.eu](http://www.suits-project.eu)

## ***Traffic Data Collection Tools & Analysis***

***Crowdsourcing, MyPolisLive.net & the Kalamaria Pilot***

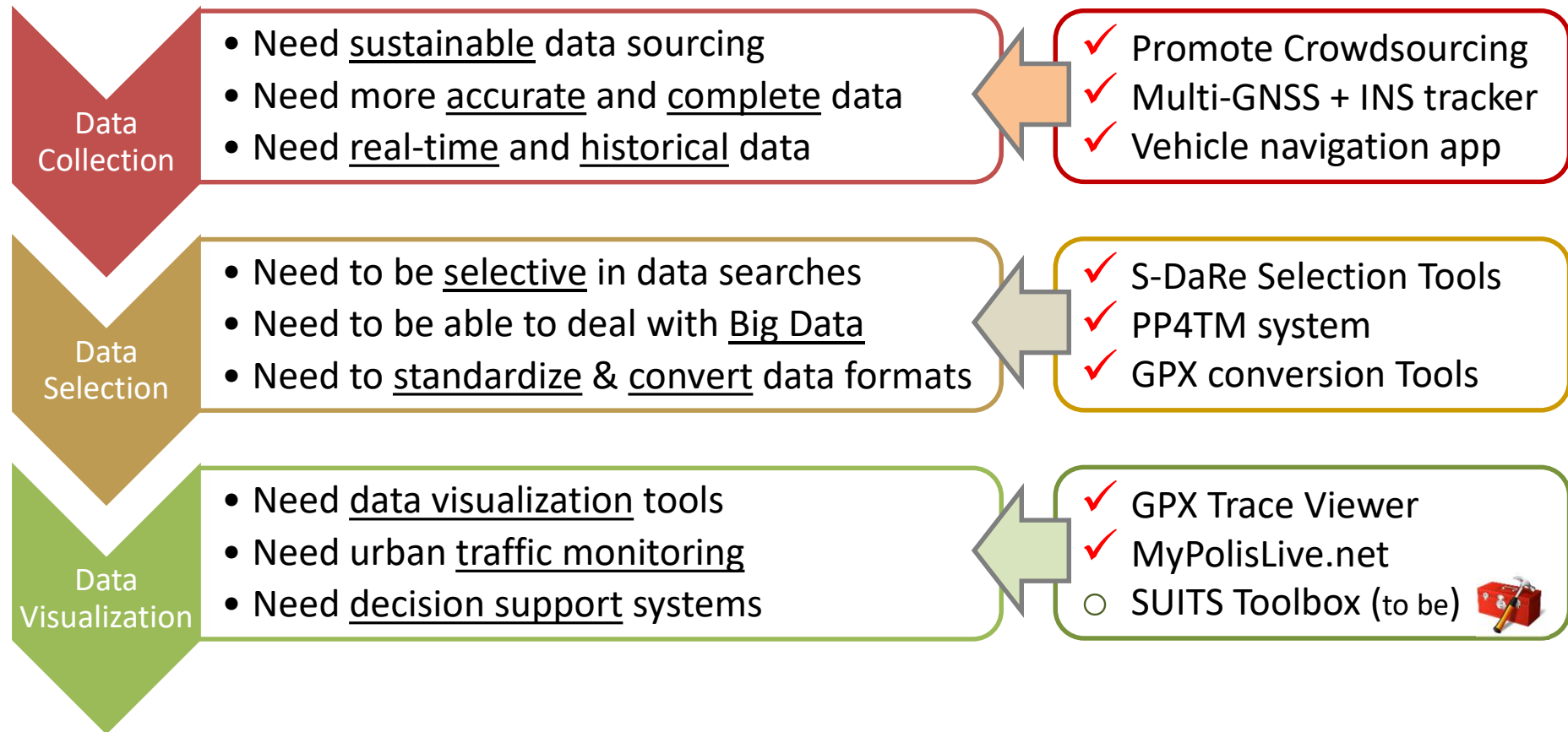


### SUITS Data Webinar

5/5/2020

**Dr. Fotis K. Liotopoulos, (SBOING)**

# The VISION: Supporting L.A. SUMP's with Data

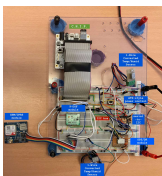


Crowdsourcing using conventional GPS trackers & IoT telecom services



Pilot Demo In Kalamaria

Advanced, multi-GNSS + INS tracker **prototype** for urban vehicle tracking



SBUTRACKER

Collaborative, crowdsourced navigation system adapted for in-vehicle multimedia consoles



CarNav Car Edition

**MyPolisLive.net**

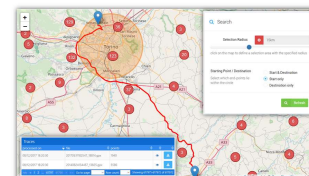
A platform for real-time vehicle tracking and traffic monitoring for urban traffic management



MyPolis LIVE

**DaRe.SUITS-project.eu/tools**

- ☐ GPX format (converter)
- ☐ GPX file anonymization / pseudonymization
- ☐ Insertion of GPX file metadata into a Geospatial DB
- ☐ Geo-selection of GPX trace datasets



S-DaRe Tools (by **sbong**)



Scalable, data homogenization funnel and fast query processing engine over big transport data



The PP4TM System

## 1<sup>st</sup> PART: Tools for Historical Mobility Data

|                        |                                                                                                            |
|------------------------|------------------------------------------------------------------------------------------------------------|
| Get user contributions | <ul style="list-style-type: none"> <li>• GPX files, OSM, etc.</li> <li>• Other formats (SBOING)</li> </ul> |
| Convert to GPX format  | <ul style="list-style-type: none"> <li>• Handle Big Data</li> <li>• GDPR compliant</li> </ul>              |
| Select GPX files       | <ul style="list-style-type: none"> <li>• Organize (database)</li> <li>• Visualize, Download</li> </ul>     |



## RESEARCH

### Traffic models

e.g. POLITO results  
(Dr. Miriam Pirra)

## 2<sup>nd</sup> PART: Tools for Real-time Mobility Data

|                      |                                                                                                                                                                                                   |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Crowdsourcing        | <ul style="list-style-type: none"> <li>• Citizen / Logistics mobility</li> <li>• Kalamaria Pilot</li> </ul>                                                                                       |
| MyPolisLive.net      |  <ul style="list-style-type: none"> <li>• Real-time traffic info</li> <li>• Historical traffic info</li> </ul> |
| Open Data Repository | <ul style="list-style-type: none"> <li>• Get / Use Open data</li> <li>• Contribute Open data</li> </ul>                                                                                           |

### Tools available from: (soon)

- SUITS Toolbox  
<https://www.suits-project.eu/tools>
- CIVITAS Toolbox  
<https://civitas.eu/tool-inventory>

Contact: [info@sboing.net](mailto:info@sboing.net)

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## PART 1: Tools for Historical Mobility Data



# GPX-trace Tools

(\*) **GPX:** GPS eXchange data format (XML)



10 min

# GPX Data Processing Tools (by )



<https://dare.suits-project.eu/tools/>

1. SBOING trace files → GPX format (converter)



2. GPX file anonymization / pseudonymization



3. Insertion of GPX file metadata into a Geospatial Database



Demo

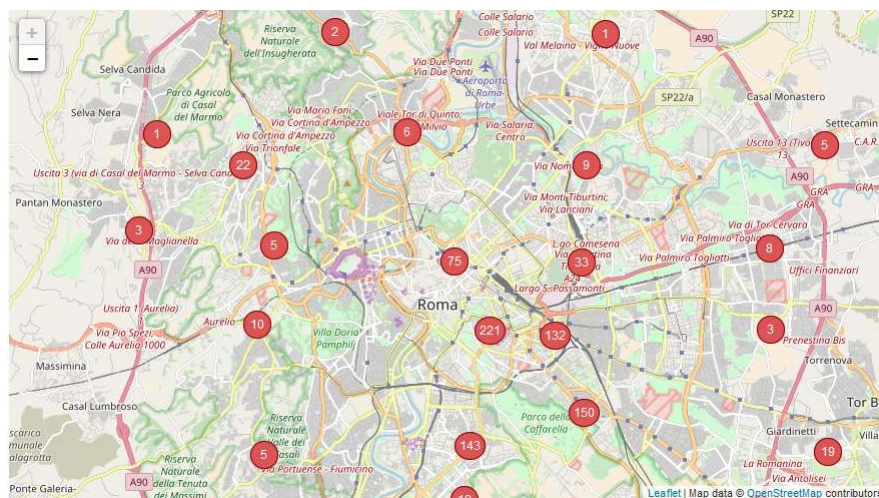
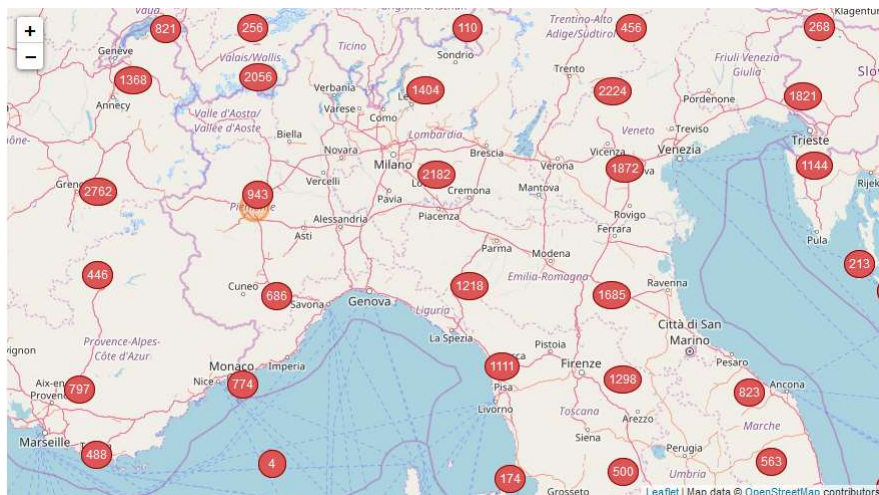
4. **Geo-selection of GPX trace datasets (select, view, export)**





# Geo-Selection of GPX traces

## Selecting & Downloading GPX Traces



Navigation bar: dare.suits-project.eu/tools/traces/

Left sidebar: Home, Traces, Administrative, Users

### TRACES

show clusters of traces for the visible map area

Selection Radius: 12km

Download Selected Traces

Select a circular area on the map above and press the Download button.

Download Selected Traces: 178 traces

Download button

Traces processed on:

| processed on        | points |
|---------------------|--------|
| 09/12/2017 17:22:04 | 19292  |
| 08/12/2017 23:56:23 | 9809   |
| 09/12/2017 19:13:52 | 8834   |
| 09/12/2017 21:09:46 | 8182   |
| 09/12/2017 19:13:46 | 6594   |
| 08/12/2017 23:56:24 | 5682   |
| 09/12/2017 19:13:53 | 4507   |
| 09/12/2017 22:48:09 | 4486   |
| 09/12/2017 17:21:57 | 3568   |
| 09/12/2017 17:21:57 | 3390   |

Showing 1-10 of 178

Download Selected Traces dialog box:

Επιλέξετε να ανοίξετε:

traces\_20171212\_012822.zip

που είναι: WinZip File (3,5 MB)

από: http://dare.suits-project.eu

Τι να κάνετε ο Firefox με αυτό το αρχείο:

☐ Ανοίξτε με WinZip (προστέλλεται)

☒ Αποθήκευση αρχείου

☐ Να γίνεται αυτόματα σφύριγμα και κτύπος για αρχεία αυτού του είδους.

OK Ακύρωση



# Geo-Selection of GPX traces

## Selecting & Viewing GPX Traces

**Search**

Selection Radius: 15km

click on the map to define a selection area with the specified radius

Starting Point / Destination

Select which end-points lie within the circle

☐ Start & Destination  
☒ Start only  
☐ Destination only

**Refresh**

| Traces              |                          |        |
|---------------------|--------------------------|--------|
| processed on        | file                     | points |
| 08/12/2017 18:20:30 | 20170531182547_18814.gpx | 1940   |
| 08/12/2017 18:20:30 | 20140824134457_13825.gpx | 5586   |

Showing 617971-617972 of 617972

# MyPolisLive.net & The Kalamaria Pilot

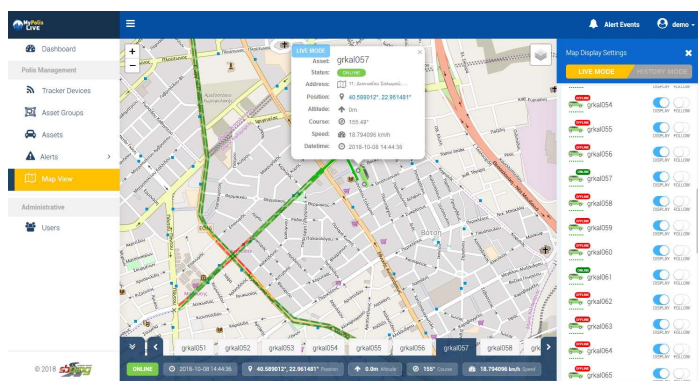
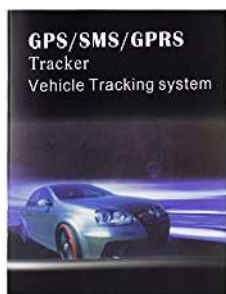


25 min



# Urban Mobility Tracking Pilot in Kalamaria (Greece)

Oct. 2018 – Jan. 2019



## ❖ 50 vehicles with commercial GPS trackers

- Selected a commercial GPS tracker: TK103B

## ❖ Cost per vehicle

- **Tracker:** 40 €, **IoT SIM:** 3,5 €/mo. (100 MB/mo.), **Installation:** 15 €

## ❖ Pilot Management

- Participating users have been invited by public invitation, (first-come-first-served), [[www.sboing.net/Kalamaria-pilot](http://www.sboing.net/Kalamaria-pilot)]
- Special invitation with preference to TAXI companies
- Included are also 8 trucks from MAKIOS Logistics
- Incentivization: Participants would keep the tracker, if they contributed traffic data in the area of Kalamaria for 4 months.
- They picked up the tracker after signing a consent form (GDPR)
- Coordinated with the City of Kalamaria and Vodafone.

## ❖ Traffic monitoring platform: **MyPolisLive.net**

- Road coloring, vehicle routes, data pseudonymization



# UltiCarNavi:

## Android app for crowdsourced traffic data collection



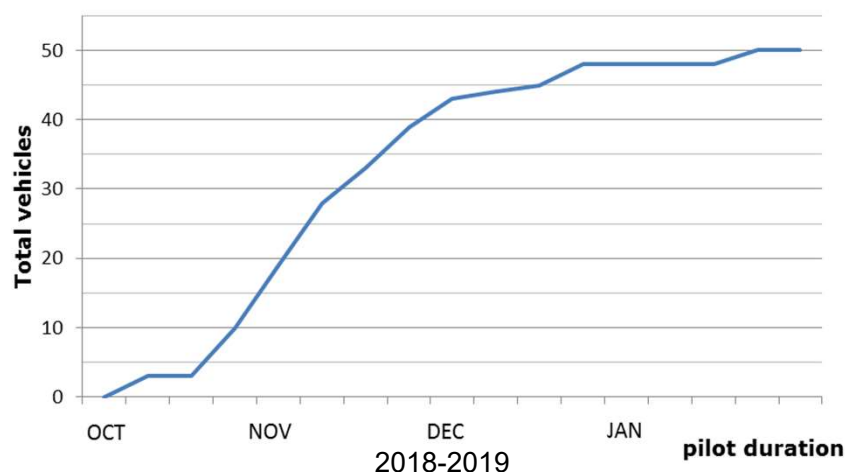
**UltiCarNavi:**  
A GPS navigation app  
for Android multimedia  
consoles, by **sboing**

Offline navigation and  
traffic data collection  
(vehicle tracking)

<https://sboing.net/en/page/ultinavi>

# The Kalamaria pilot project: an Overview

## Vehicles participation

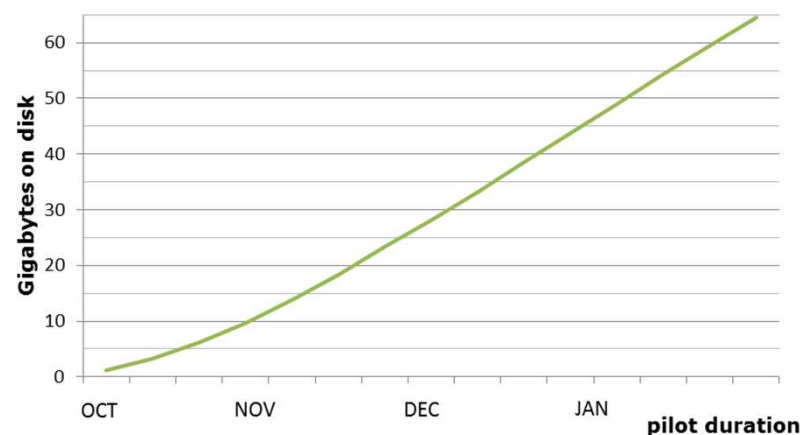


Capacity to manage 100s or even 1000s of vehicles.



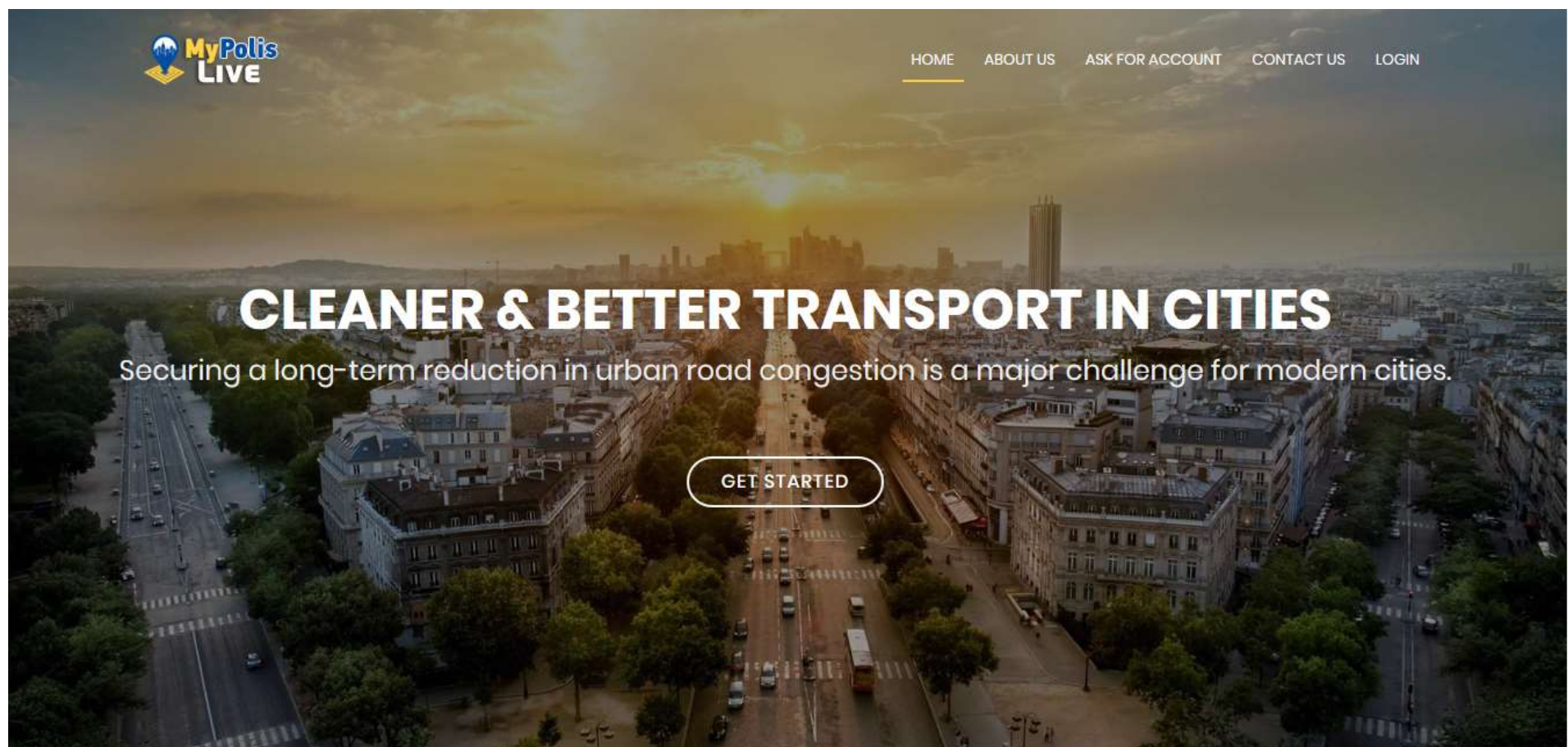
- Development of a system capable of managing TBytes of traffic data.
- Exploitation of cloud resources / infrastructure
- Emphasis on data security and privacy (GDPR).
- The size of the dataset is:
  - For speeds  $\geq 3\text{km/h}$ : 623.875 rows (GDPR compatible dataset)
  - For speeds  $> 0$ : 1.652.081 rows
  - For speeds  $\geq 0$ : 22.889.499 rows

## Database growth



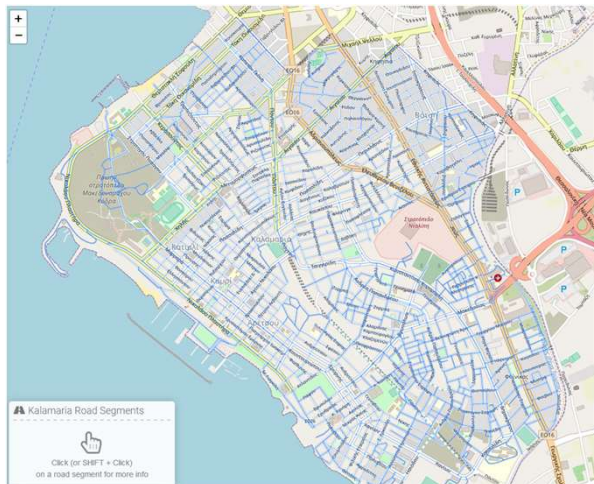
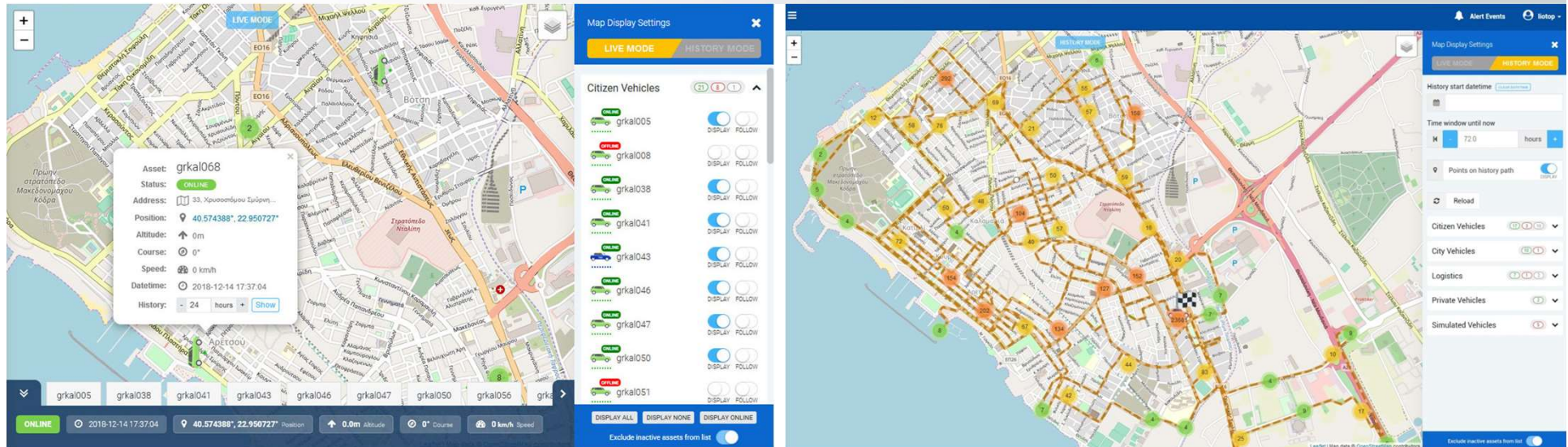
**MyPolisLive.net:**

## A Platform for Urban Mobility Monitoring



# MyPolisLive.net:

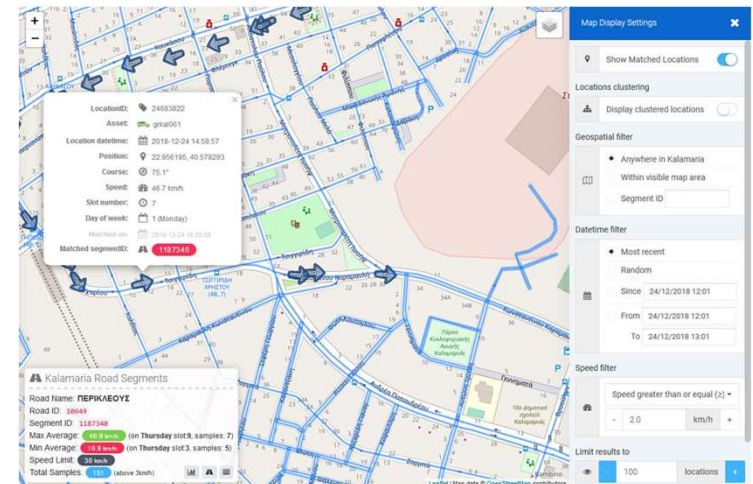
## Real-time & Historical Visualization of Urban Mobility



Automatic generation of the  
entire City's Road Network

Management of multiple Cities  
and their resources

**Free** for all Cities

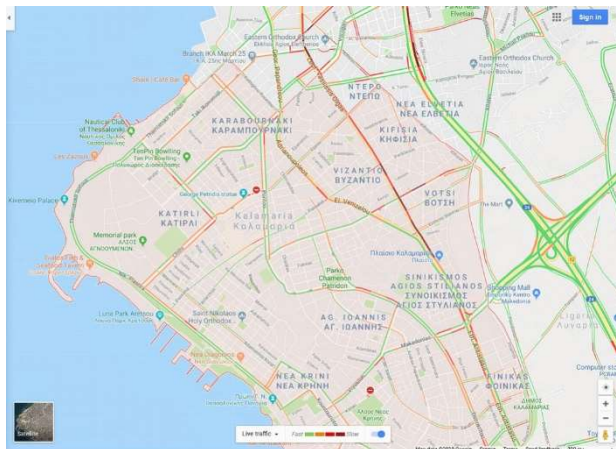


# MyPolisLive.net: Real-time Traffic monitoring & Comparisons

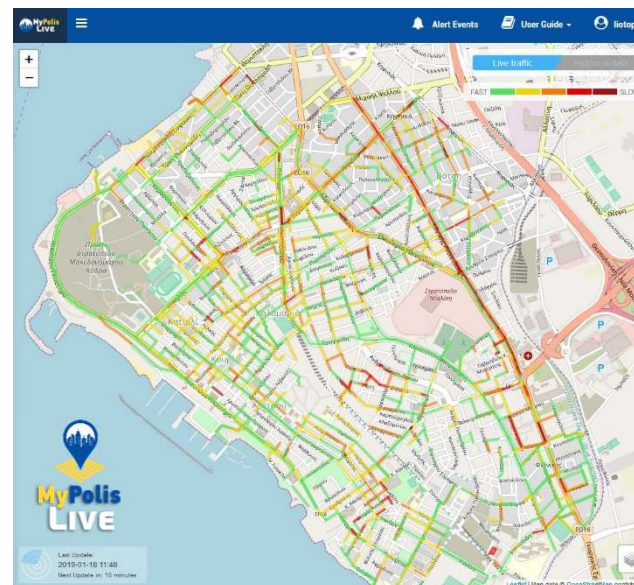


## MyPolisLive.net (SBOING)

### Google Traffic



<https://www.google.gr/maps/@40.5794659,22.9533678,15z/data=!5m1!1e1>



[https://mypolislive.net/admin/fleet/map\\_traffic/kalamaria](https://mypolislive.net/admin/fleet/map_traffic/kalamaria)

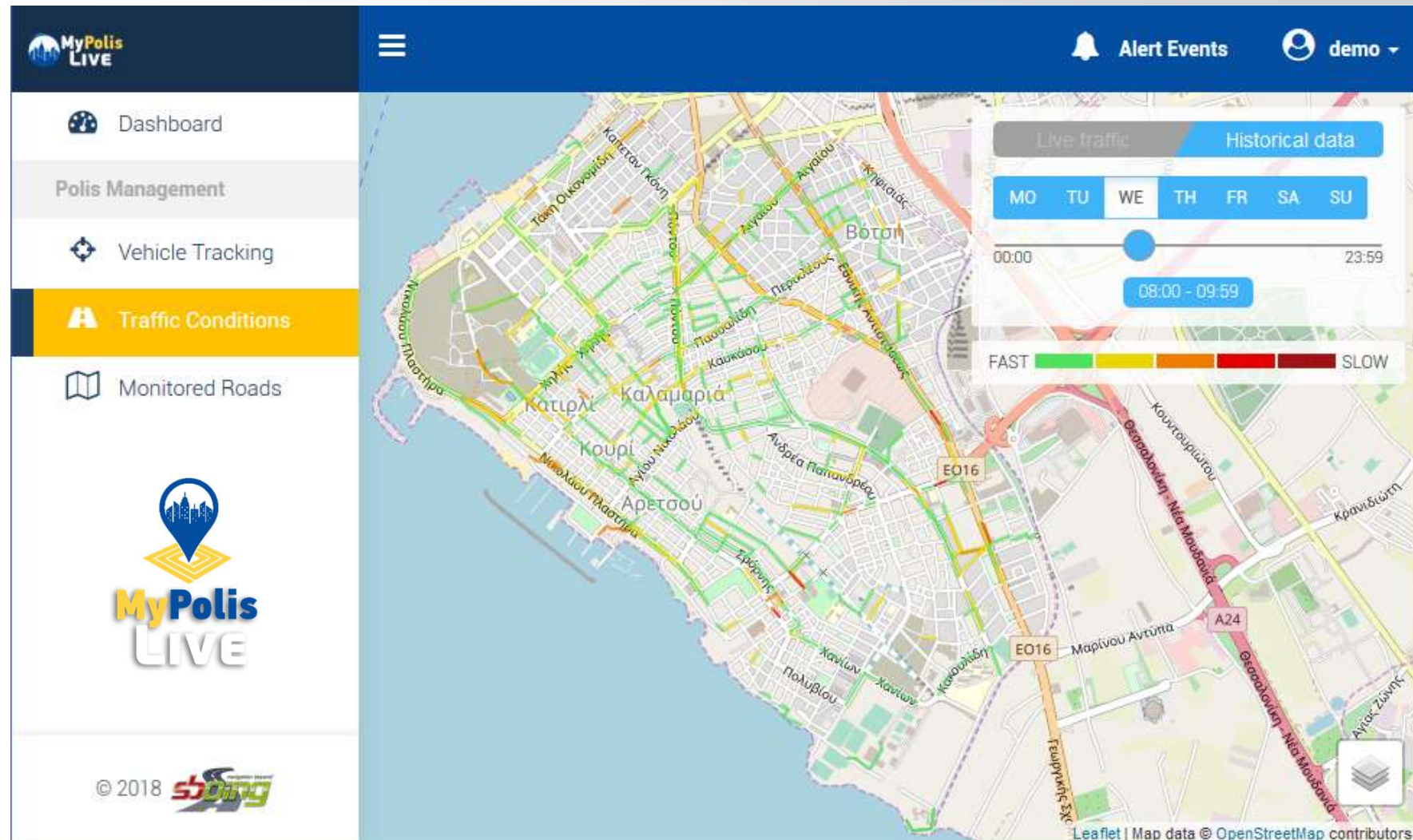
**18/1/2019 11:45 am**

### TrafficThess (CERTH/HIT)

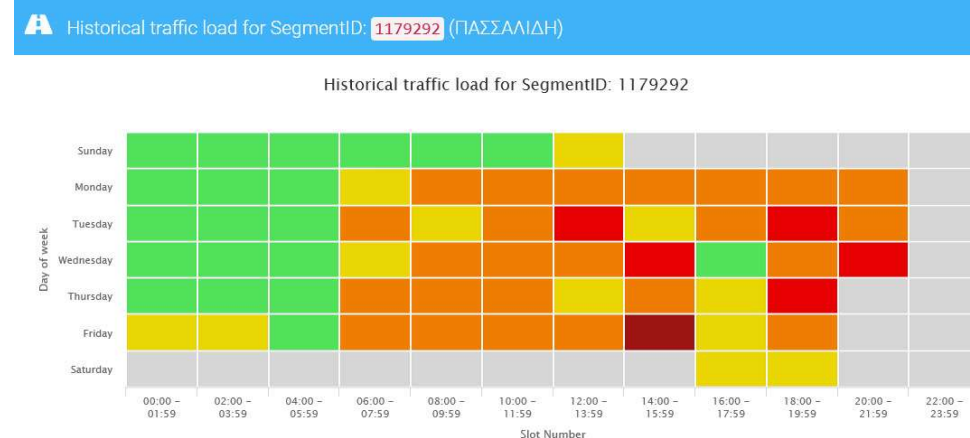
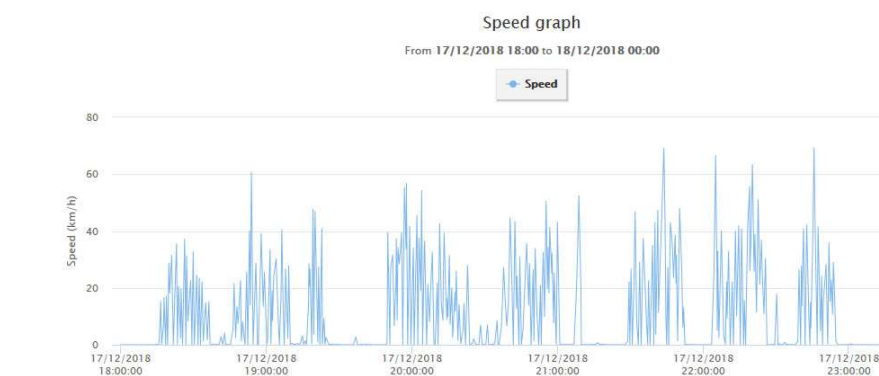
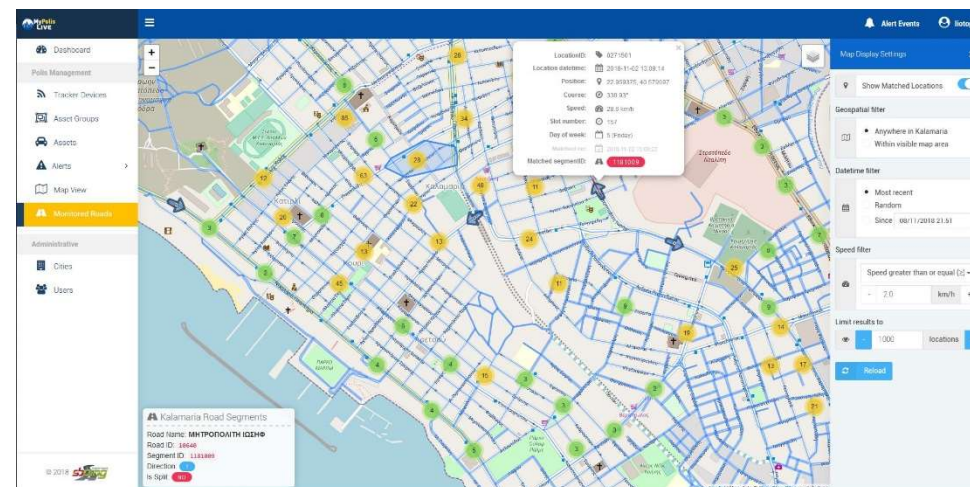
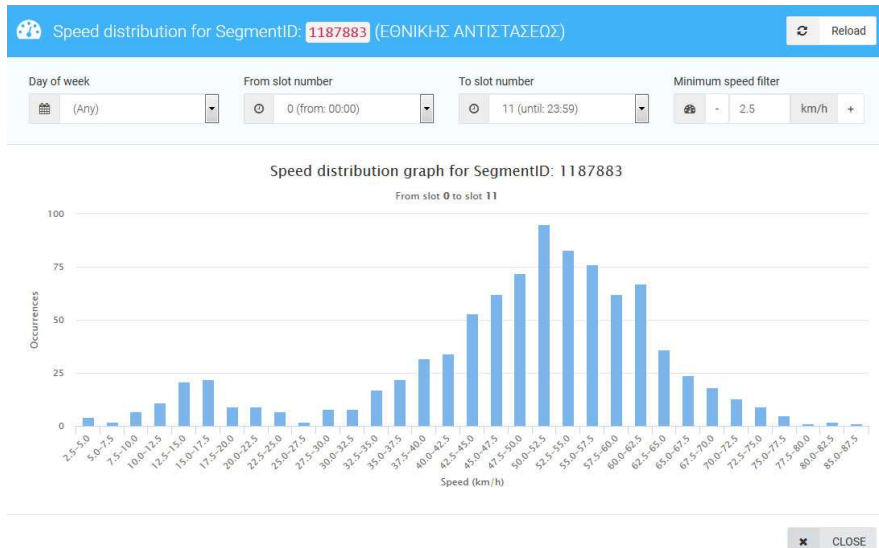


<https://www.trafficthess.imet.gr>

# MyPolisLive.net: Historical Traffic Data about the City Network



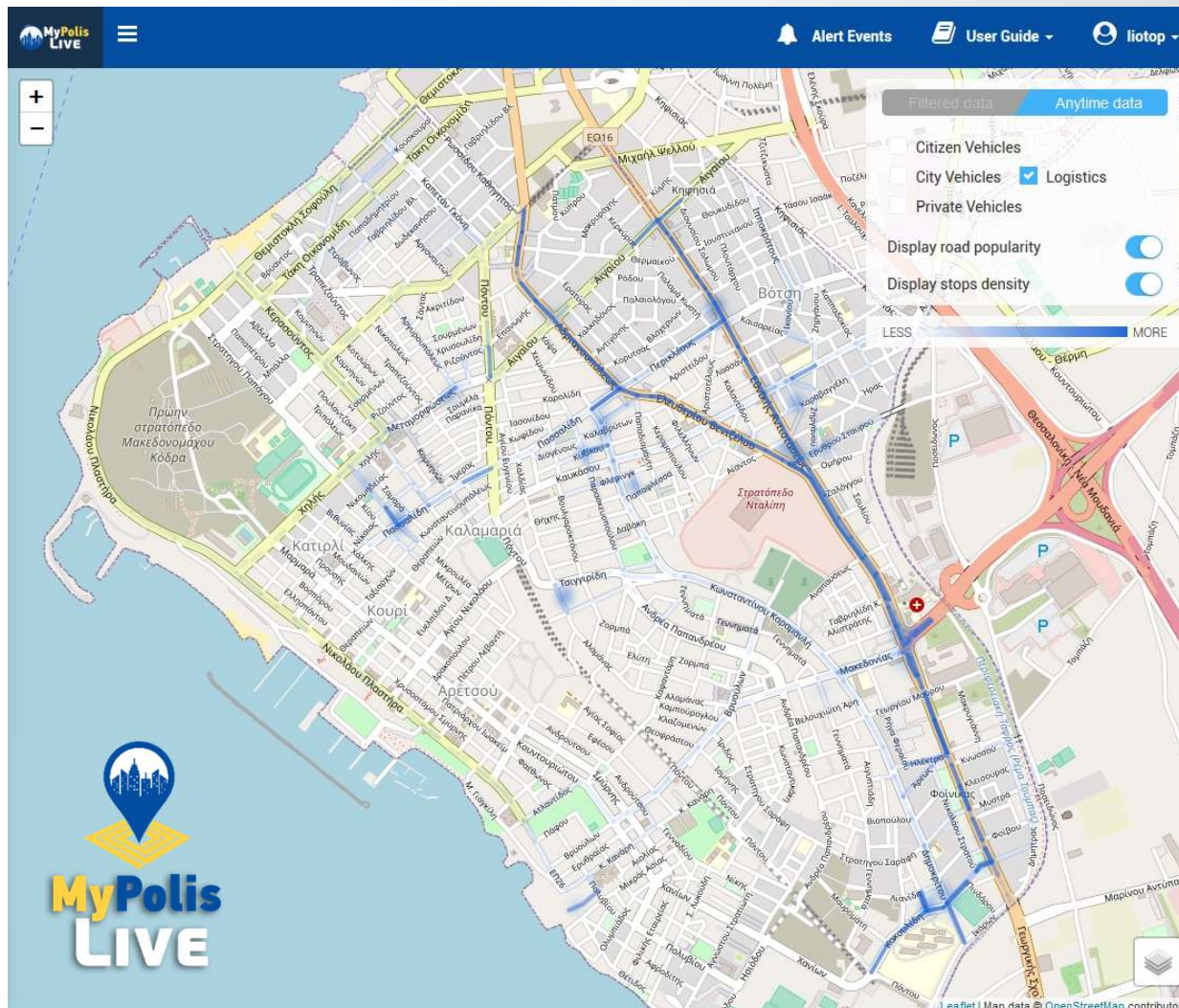
# MyPolisLive.net: Various Statistics per Road-Segment



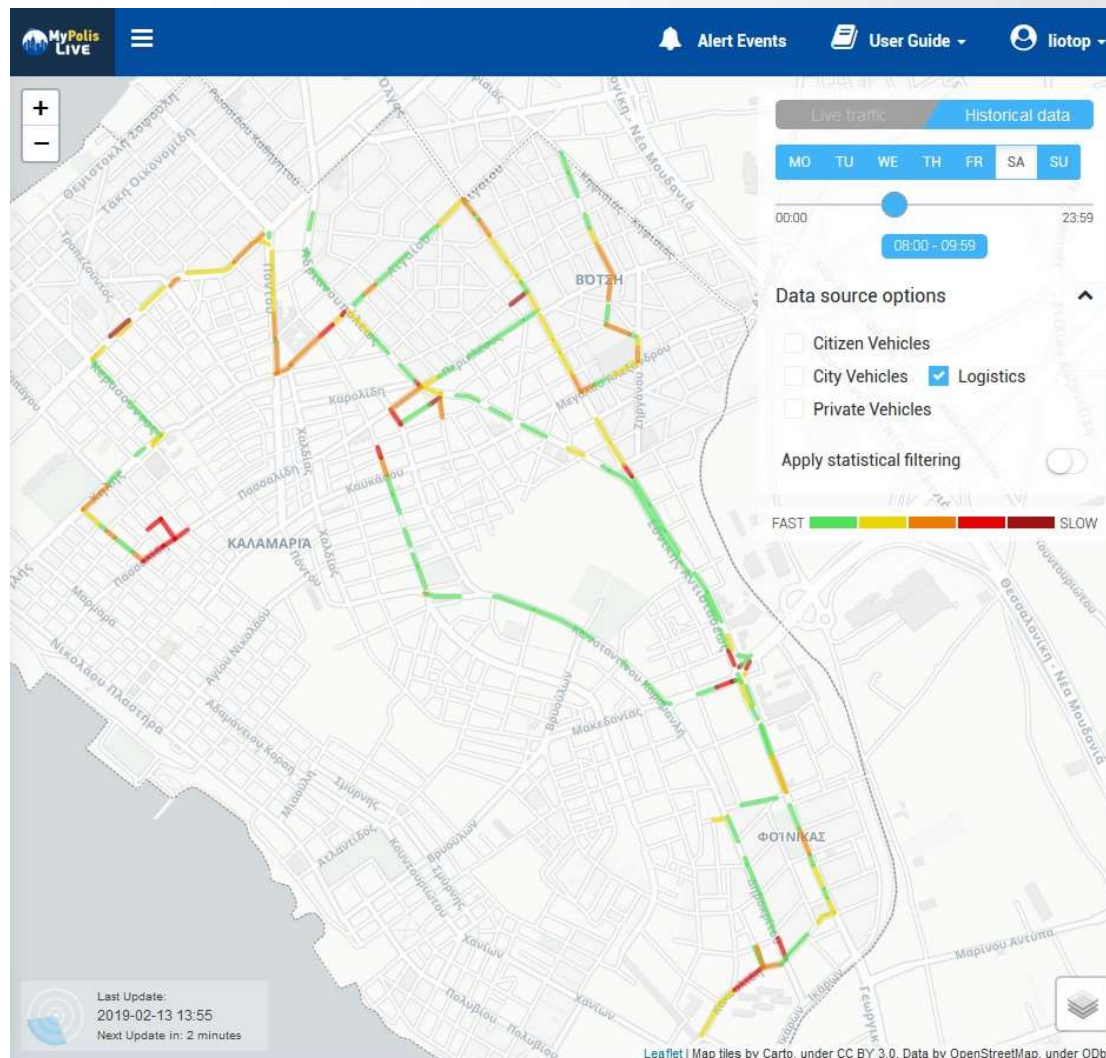
# MyPolisLive.net: Freight traffic profiling in Urban environments

## City & Logistics

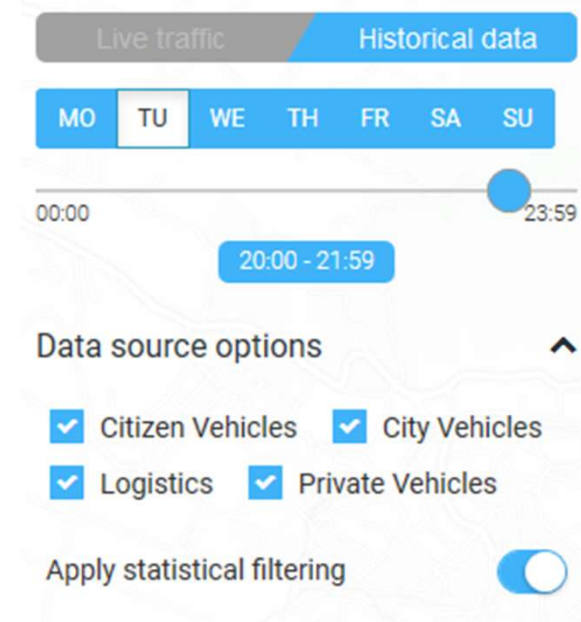
- ✓ Freight traffic profiling by visualizing the most frequent delivery points (stops) and the most popular routes (taken by freight).
- ✓ Direct correlation of freight traffic with the rest of the city traffic (i.e., citizen mobility).
- ✓ Impact evaluation of the temporary or permanent mobility measures related to freight, e.g. route changes, delivery timeframes, loading zones, etc.
- ✓ Reduction of the number of freight trucks delivering within congested areas.
- ✓ Reduction of driven distances and travelling time.
- ✓ Improvement of urban accessibility, quality of living and economic growth of the affected areas, by optimizing the speed of distribution of goods.
- ✓ Reduction of pollutant emissions and energy consumption.



# MyPolisLive.net: Segregated, historical traffic data for Freight



Traffic segregation and study of the impact and contributions to the total urban traffic load of each individual group (citizens, logistics, taxis, busses, etc.), separately, in space and in time.



## FCD Pseudonymization

... to make the floating car datasets (FCD) **GDPR-compliant** before making them open / public

| vehicleID                        | datetime       | longitude | latitude  | course | speed | segmentID | road_name         |
|----------------------------------|----------------|-----------|-----------|--------|-------|-----------|-------------------|
| a94795bdd6f5214132797fbf0dfe245a | 3/10/2018 5:17 | 22,960117 | 40,578752 | 318    | 55,3  | 1437053   | MITROPOLITI IOSIF |
| a94795bdd6f5214132797fbf0dfe245a | 3/10/2018 5:22 | 22,951863 | 40,583778 | 55     | 21,9  | 1434792   | SOUMELA           |
| 3456ef0a8f909217d6f33ff67642a233 | 3/10/2018 5:23 | 22,964021 | 40,589429 | 55     | 3,9   | 1509681   | IOUSTINIANOU      |
| a94795bdd6f5214132797fbf0dfe245a | 3/10/2018 5:25 | 22,959805 | 40,589299 | 46     | 14,6  | 1437127   | AIGAIU            |
| 3456ef0a8f909217d6f33ff67642a233 | 3/10/2018 7:06 | 22,962701 | 40,589802 | 248    | 24,1  | 1437381   | THOUKYDIDOU       |
| 3456ef0a8f909217d6f33ff67642a233 | 3/10/2018 7:07 | 22,961895 | 40,589518 | 244    | 29,7  | 1437255   | THOUKYDIDOU       |

- ✓ Filter out all (consecutive) trace data corresponding to vehicle speeds < 0,5 km/h for a duration > 2 min.
- ✓ Filter out trace data points both before and after each identified "long stop" sequence

# S-ODR: SUITS' Open Data Repository

<https://dare.suits-project.eu>



OPEN DATA REPOSITORY

SUITS DATA REPOSITORY



## SUITS Data Repository

### Open Data Repository

The SUITS Open Data Repository (S-ODR) is a global repository for urban mobility data collections (e.g. citizen mobility, freight traffic, FCD, parking, traffic lights, etc.). Anonymized or pseudonymized (only) contributions can be uploaded after registration. Data access is free, respecting license terms & conditions.



#### For Visitors

Open access to all published data collections.

[➔ Visitor Access](#)



#### For Contributors

To upload and manage data collections. Login required.

[🔒 Contributor Access](#)

### Data Repository

for the SUITS Project Partners

All partners have a access to a private cloud file storage space for collaboration. Access is available via secure file transfer protocol.

# S-ODR: SUITS Open Data Repository

## VISITOR ACCESS (open)



Text Search

traffic data

Subject

✕ Travel and transport

Data Type

✕ Experimental data

✕ Historical data

Country

✕ Greece ✕ UK

Q Refine Results

↺ Reset Filters

SUITS Open Data Repository

SUITS Home / Open Data Repository

|   | Data Collection Title                                      | Description                                                                                          | Creators                 | Country | Published  |   |
|---|------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------|---------|------------|---|
| 1 | Traffic data                                               | Traffic data collection fro IMET website                                                             | Krinos Ioannis           | Greece  | 2019-12-12 | Q |
| 2 | Coventry Air Quality                                       | Air Quality Data for Clean Air Zone                                                                  | Sunil Budhdeo            | UK      | 2019-12-12 | Q |
| 3 | Floating Car Data (FCD) from Kalamaria, Greece (2018-2019) | Floating-Car-Data (FCD) from the Kalamaria pilot, of the H2020/CIVITAS/SUITS project, City of Kalama | Dr. Fotis K. Liotopoulos | Greece  | 2019-12-11 | Q |

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<https://dare.suits-project.eu/browse>

# S-ODR: SUITS Open Data Repository

## CONTRIBUTOR ACCESS (by registration)



2020 CIVITAS SUITS

Resource Manager

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User Guide

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Users

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RESOURCE MANAGER

Before you start to deposit a new data collection, check these guidelines on how to prepare your data files and documentation:

Create a new data collection

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Text Search

FCD

Reset

Organization

(all)

Refresh

My TinnGO Data Collections

|   | Data Collection Title                                      | Description                                                                                           | Organization | Number of files | Status    | Created on          | Created by       | Last modified       |                                     |
|---|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------|-----------------|-----------|---------------------|------------------|---------------------|-------------------------------------|
| 1 | Floating Car Data (FCD) from Kalamaria, Greece (2018-2019) | Floating-Car-Data (FCD) from the Kalamaria pilot, of the H2020/CIVITAS /SUITS project, City of Kalama | (none)       | 12              | Deposited | 2019-12-10 13:15:25 | SBOING Superuser | 2019-12-11 01:20:35 | <div></div> <div></div> <div></div> |
| 2 | Floating Car Data (FCD) from Kalamaria, Greece (2018-2019) | Floating-Car-Data (FCD) from the Kalamaria pilot, of the H2020/CIVITAS /SUITS project, City of Kalama | (none)       | 0               | Saved     | 2019-12-10 16:31:08 | SBOING Superuser | 2019-12-10 16:46:14 | <div></div> <div></div> <div></div> |

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<https://dare.suits-project.eu/contribute>

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# S-ODR registered in RE3DATA



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Repository details

## SUITS Data Repository

General Institutions Terms Standards

|                                            |                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of repository                         | SUITS Data Repository                                                                                                                                                                                                                                                                                                         |
| Additional name(s)                         | SUITS DaRe<br>SUITS Open Data Repository<br>S-ODR                                                                                                                                                                                                                                                                             |
| Repository URL                             | <a href="https://dare.suits-project.eu">https://dare.suits-project.eu</a>                                                                                                                                                                                                                                                     |
| Subject(s)                                 | Computer Science, Electrical and System Engineering Systems Engineering Engineering Sciences<br>Construction Engineering and Architecture Construction Engineering and Architecture<br>Traffic and Transport Systems, Logistics<br>Urbanism, Spatial Planning, Transportation and Infrastructure Planning, Landscape Planning |
| Description                                | The Open Data Repository of the H2020/CIVITAS/SUITS Project ( <a href="http://www.suits-project.eu">www.suits-project.eu</a> ) is used to store large volumes of crowdsourced traffic data, useful for SUMP implementations by local authorities of small-medium cities.                                                      |
| Contact                                    | <a href="mailto:info@sboing.net">info@sboing.net</a>                                                                                                                                                                                                                                                                          |
| Content type(s)                            | Plain text                                                                                                                                                                                                                                                                                                                    |
| Keyword(s)                                 | urban planning traffic transport SUMP logistics                                                                                                                                                                                                                                                                               |
| Repository size                            | 3 TBytes                                                                                                                                                                                                                                                                                                                      |
| Repository type(s)                         | disciplinary                                                                                                                                                                                                                                                                                                                  |
| Mission statement for designated community | <a href="http://www.suits-project.eu/project/">http://www.suits-project.eu/project/</a>                                                                                                                                                                                                                                       |
| Research data repository language(s)       | eng                                                                                                                                                                                                                                                                                                                           |
| Data and/or service provider               | dataProvider                                                                                                                                                                                                                                                                                                                  |

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<https://www.re3data.org/repository/r3d100013057>  
or  
<http://doi.org/10.17616/R31NJMKH>

Since May 8, 2019, S-DaRe has been registered and published on **re3data** through **DataCite.org**, with **DOI: 10.17616/R31NJMKH**



Cite this re3data.org record:

re3data.org: SUITS Data Repository; editing status 2020-01-14; re3data.org - Registry of Research Data Repositories.  
<http://doi.org/10.17616/R31NJMKH> last accessed: 2020-01-15



# Thank you!

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<http://www.sboing.net>

<http://www.suits-project.eu>

<http://www.civitas.eu>



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