Nanomonitor Web Portal Current Status

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NanoMONITOR is partly funded by the European Commission Life+ with grant agreement LIFE14 ENV/ES/000662

The Concept

The NanoMONITOR web portal has two specific objectives:

1. To store, manage and elaborate data

2. To disseminate knowledge to the scientific community, the stakeholders and the general public.

url: http://demo.msensis.com/nanomonitor

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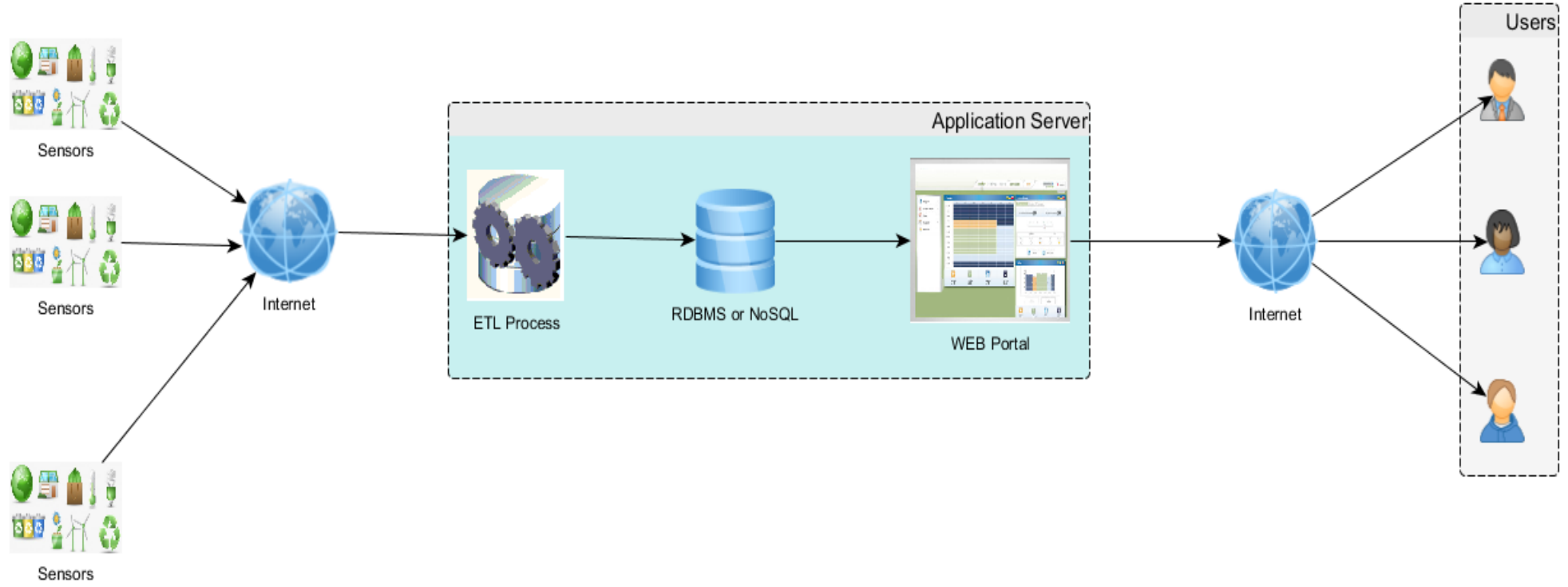
Nanomonitor Web Portal – System Architecture

A high level diagram of the solution in relation to the external entities



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Functionality of the Open Platform [1]

- Accessible over the Web and user friendly
- With pluggable computational modules
- Making use of processed data from various environmental sensors
- Not limited, scalable and expandable.

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Functionality of the Open Platform [2]

- Internet access with password for scientists, and/or authorised users
- Auto-storing function to avoid loss of data
- Availability of versions for PCs, tablets and mobile devices
- Use of alerts when improving the software features
- Data downloadable in excel sheets
- Ensure cooperation with main browsers

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Functionality of the Open Platform [3]

NanoMONITOR Web Portal - Functionalities

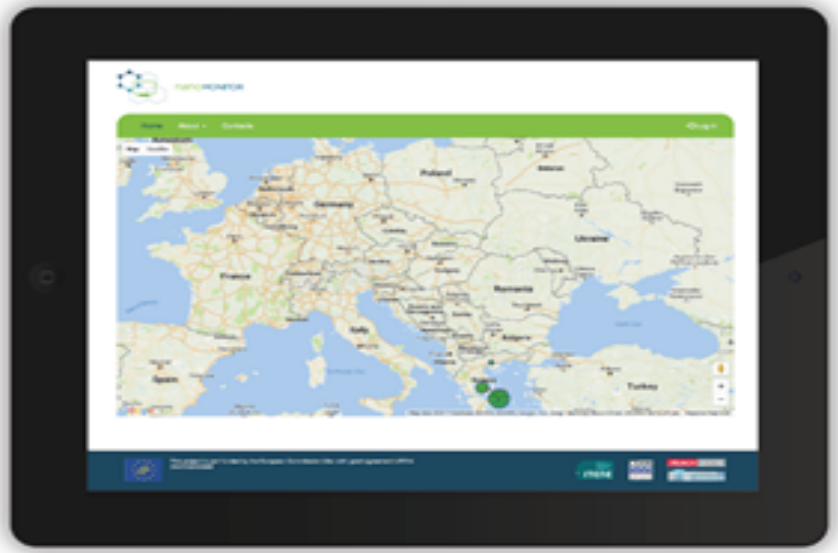
Multiple exporting data formats

Real-time multiparametric graphical information

Easy data management options, including data storage, comparative analysis and modelling

High resolution maps

Access from smartphones and tablets



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Data sources

- There are two methods to receive sensor data.
- Both methods push data TO the data repository server.

Method 1: Real time (MAIN)

- JSON data are pushed from each sensor to the server for processing

Method 2: Off-line mode

- CSV data are pushed to the server by an operator (an authenticated user).

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User types

General Public

No registration, access to general data, no access to statistical elaboration.

Stakeholders

Access to all data and to the statistical tools.

Data providers / Partners / Scientists

Access to all data and to the statistical tools.

Administrator

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Where we are…

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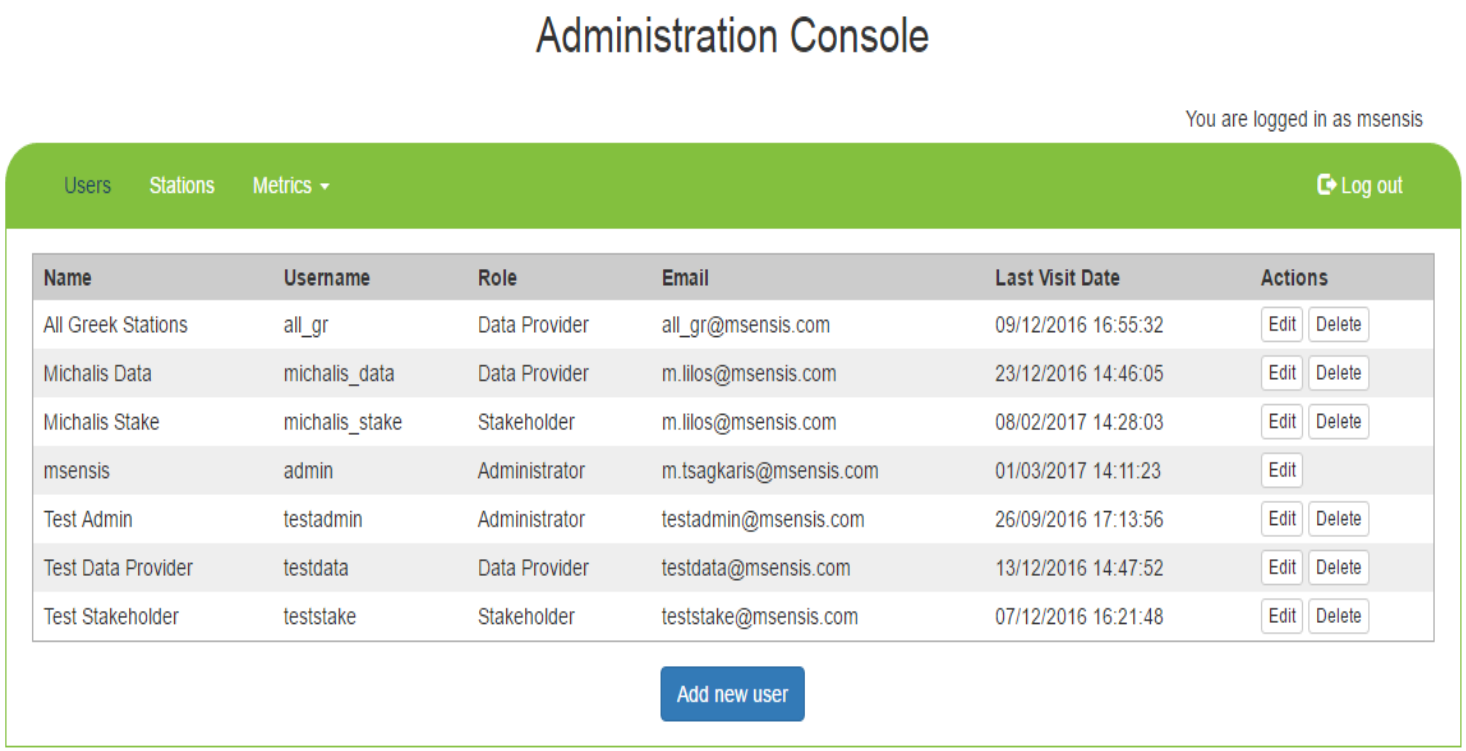

- Interface declarations
- Interface management
- Securing the Management Interfaces
- Initial/Quick/Detailed Configuration
- Declare server identities
- Outbound Connections
- Data sources management
- Load various modules
- Alarms
- Basic reports
- System user management (role based)

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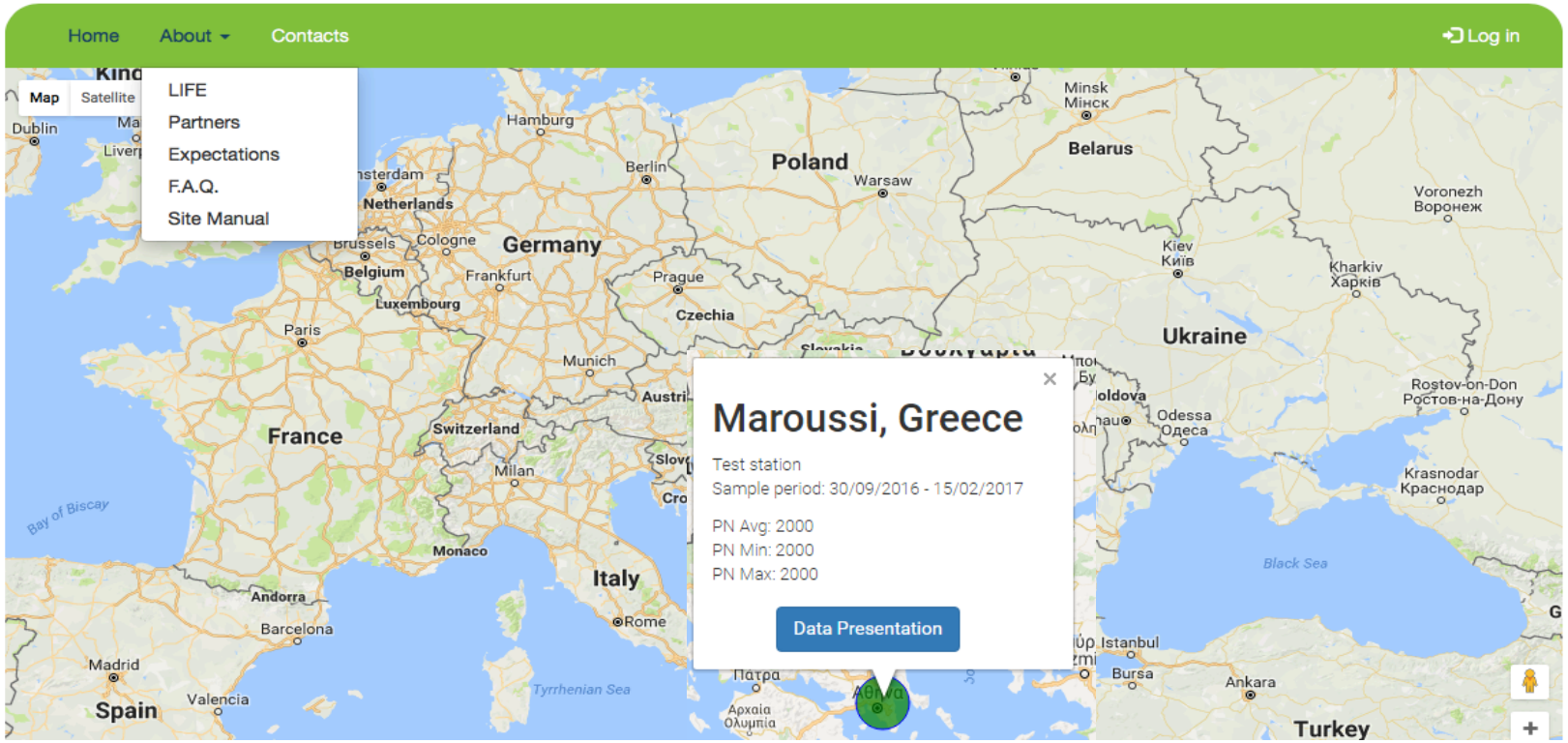
Public access



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NanoMONITOR- 2nd Stakeholders' Day

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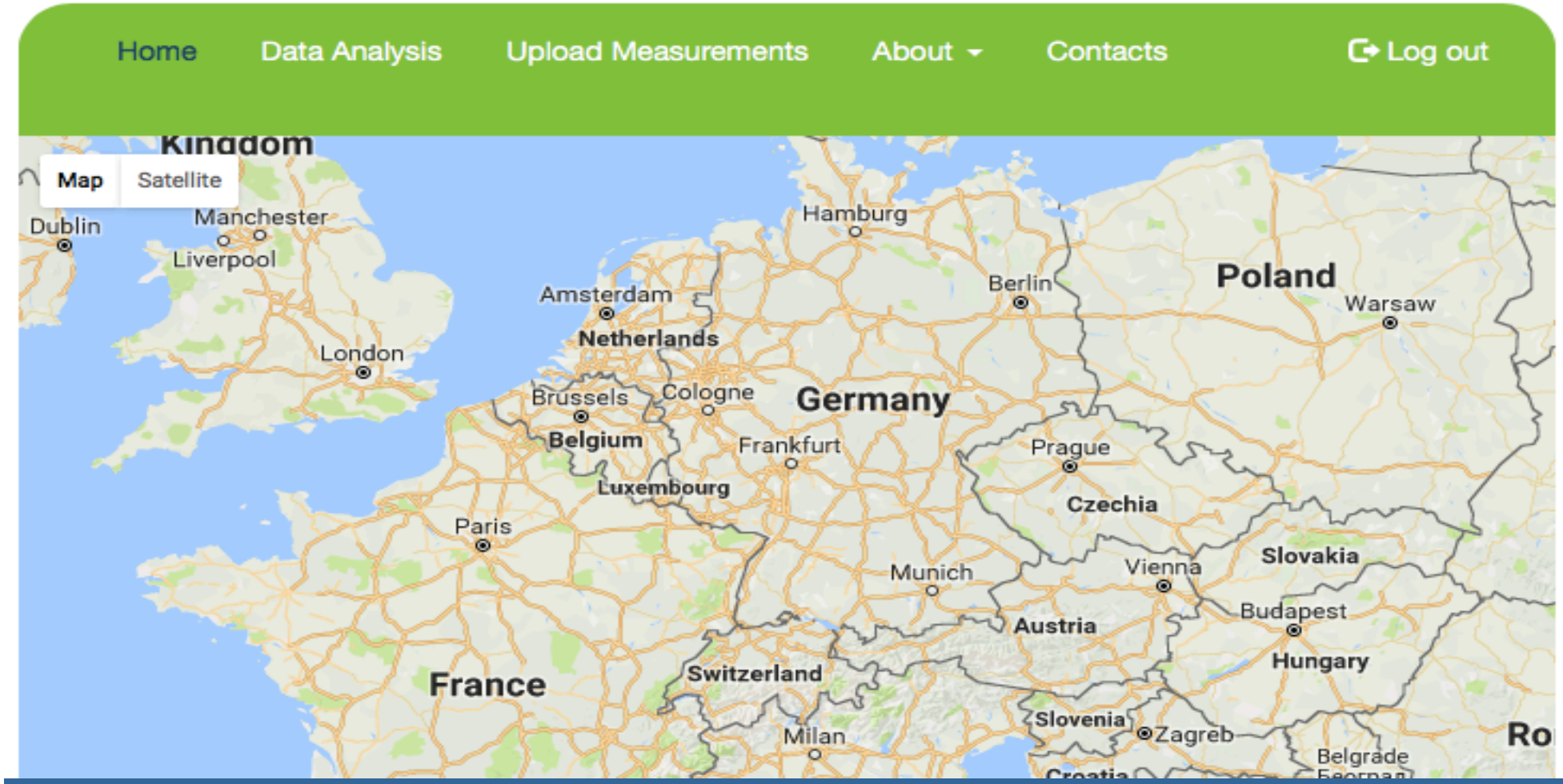
Where we are…



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- Toolbar: Buttons are always visible on all pages
- Dropdown menu approach for further information
- Login/Logout for authorized users

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Input data file

According to the available specs every 10 secs a new record will be created from each sensor, thus, for every time instance t_i, the following values will be available in the DB.

- Station ID
- Date, Time
- Temperature (ambient) T
- Pressure
- Wind Speed, Wind Direction
- PN (number of particles) and Concentration C_A
- Diameter $\overline{d}$ (the monitoring station measures, for every time instance, the average diameter of the particles detected.)
- PM, PM10, PM2.5, O_3, CO, SO_2, NO_X

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Input data sample file

Station ID	Location	Latitude	Longitude	Comment	Date	time	T ambient	Pressure	PN	Diameter	PM	Wind Speed	Wind Direction	PM10	PM2.5	O3	CO	SO2	NOx
Integer	Text	dd:mm:ss.ss s	dd:mm:ss.ss s	Text	dd/mm/aa	hh:mm:ss	deg C	bars	p/cc integer	nm integer	mg/m3	m/s	deg	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
	1 Valencia	38:57:33.804 N	95:15:55.739 W	Municipality station, urban	15/02/2017	14:28:31	20.54	1.026	1089	100	0.026734	13.5	45	0.026734	0.026734	0.046	4.267	0.022	0.057
	1 Valencia	38:57:33.804 N	95:15:55.739 W	Municipality station, urban	15/02/2017	15:28:31	21.04	1.026	1085	95	0.026734	13.4	60	0.027883562	0.027883562	0.047978	4.450481	0.022946	0.059451
	1 Valencia	38:57:33.804 N	95:15:55.739 W	Municipality station, urban	15/02/2017	16:28:31	19.45	1.026	1080	123	0.026734	12.3	33	0.029082555	0.029082555	0.050041054	4.641851683	0.023932678	0.062007393
	1 Valencia	38:57:33.804 N	95:15:55.739 W	Municipality station, urban	15/02/2017	17:28:31	18.54	1.026	1076	86	0.026734	11.6	120	0.030333105	0.030333105	0.052192819	4.841451305	0.024961783	0.064673711
	1 Valencia	38:57:33.804 N	95:15:55.739 W	Municipality station, urban	15/02/2017	18:28:31	18.22	1.026	1072	78	0.026734	11.7	75	0.031637429	0.031637429	0.054437111	5.049633711	0.026035141	0.067454682
	1 Valencia	38:57:33.804 N	95:15:55.739 W	Municipality station, urban	15/02/2017	19:28:31	17.78	1.026	1067	97	0.026734	11.9	180	0.032997838	0.032997838	0.056777906	5.266767961	0.027154651	0.070355232

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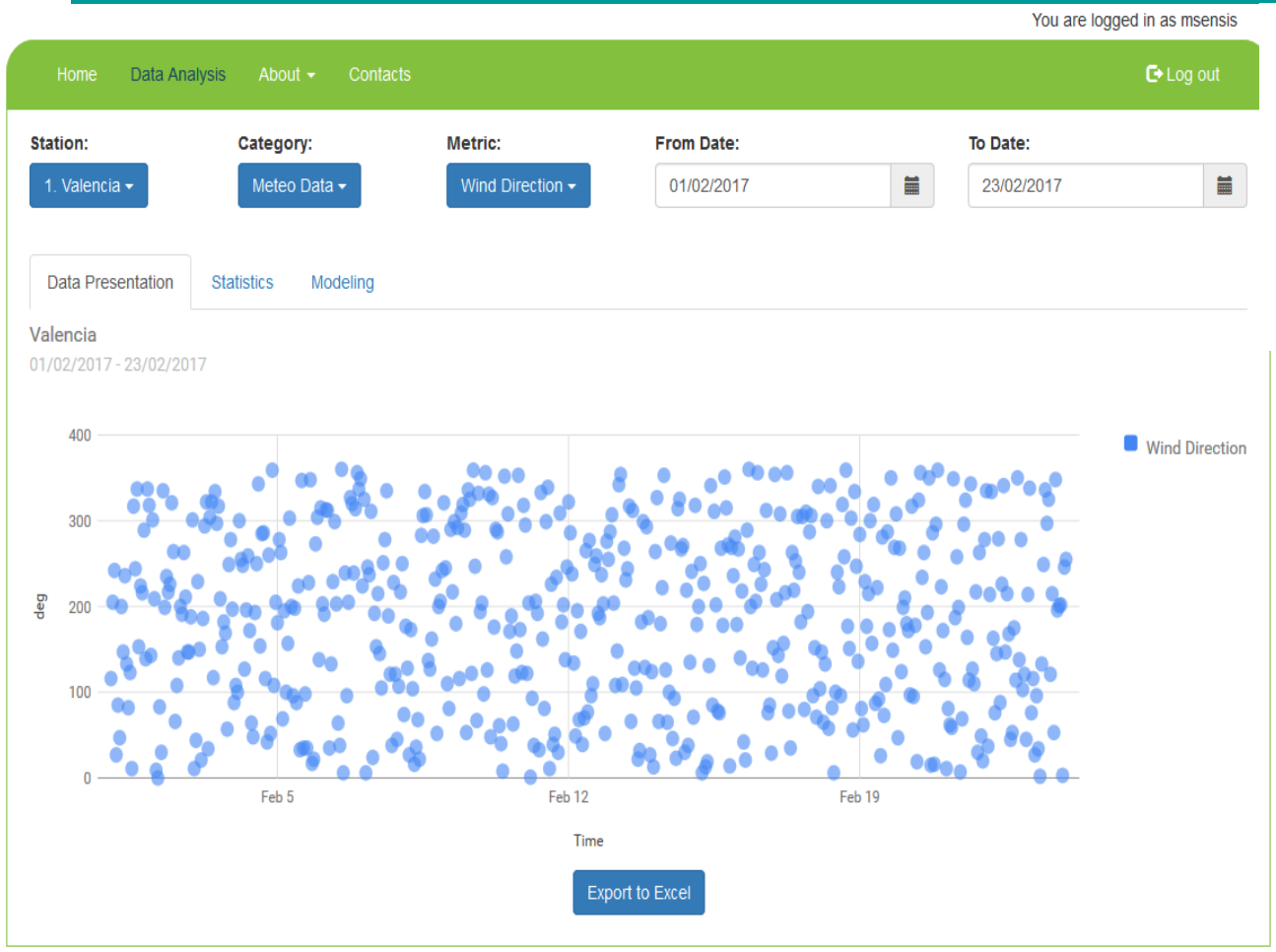
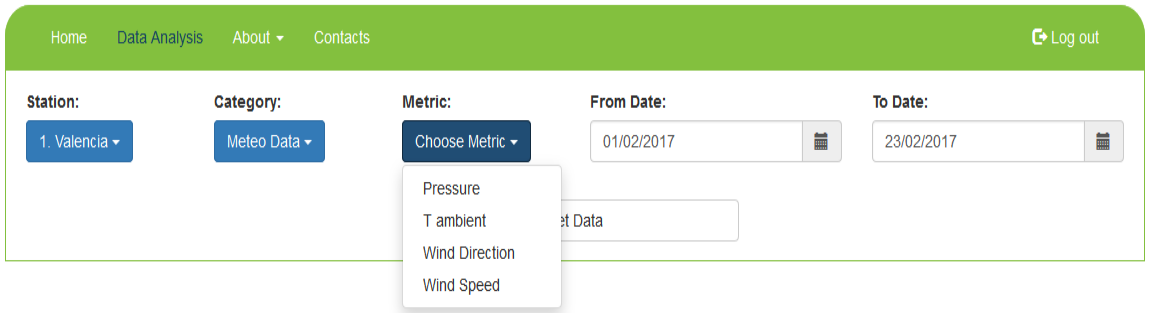
Data Presentation





- Data selection
  - Station
  - Type of Information (Category, metric)
  - Time frame
- Data presentation:
  - Graph
  - Table
- Export data in CSV (according to role)

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Analytical Tools

For the needs of NanoMONITOR Web Platform, analytical tools offer customized and adapted reports. An indicative list includes among others:

- **Data Analysis**
- **Simulation tool**
- **Exposure Risk (PECs calculation)**

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Data Analysis [1]

- ✓ Trends
- ✓ Max values (*MAX*)
- ✓ Min values (*MIN*)
- ✓ Average value ($\overline{AVG}$)
- ✓ Percentile (*P*)
- ✓ Variance (*VAR*)
- ✓ Standard deviation (*s*)
- ✓ Correlation (*r*)
- ✓ Covariance (*COV*)
- ✓ Forecast (*F*)

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Data Analysis [2]

You are logged in as msensis

Home | Data Analysis | Upload Measurements | About | Contacts | Log out

Station: 1. Valencia | **Category:** Nano Data | **Metric:** PN | **From Date:** 07/07/2017 | **To Date:** 21/07/2017

Data Presentation | Statistics | Modeling | Risk

Station ID	Location	Period	Metric	Unit	Statistic	Value
1	Valencia	07/07/2017 - 21/07/2017	PN	p/cc	Min	0.68000
1	Valencia	07/07/2017 - 21/07/2017	PN	p/cc	Max	0.93000
1	Valencia	07/07/2017 - 21/07/2017	PN	p/cc	Average	0.84000
1	Valencia	07/07/2017 - 21/07/2017	PN	p/cc	Variance	0.00884
1	Valencia	07/07/2017 - 21/07/2017	PN	p/cc	Standard deviation	0.09404

Export to Excel

- Predefined statistics are available
- Selection of parameters
- Export data in CSV

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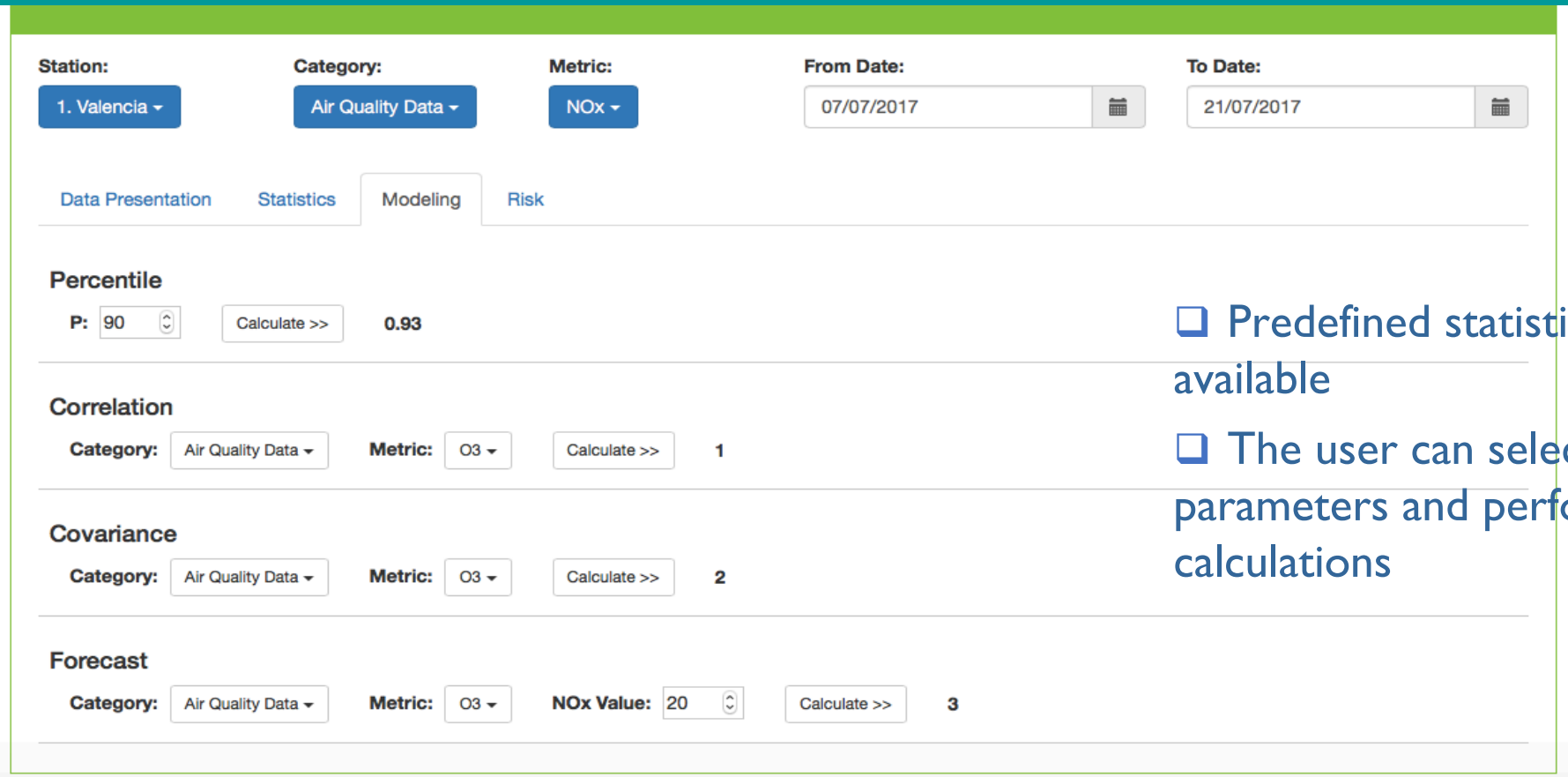
Data Analysis [3]



- Predefined statistical models are available
- The user can select the parameters and perform the calculations

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Data Analysis [4]

PECs calculation

$$\mathrm{PEC}_A = \overline{C_A} = \frac{1}{n}\sum_{i=1}^{n} C_A(t_i) \qquad (1)$$

$$\mathrm{PEC}_W = \overline{C_W} = \frac{1}{n}\sum_{i=1}^{n} C_W(t_i) \qquad (2)$$

$$\mathrm{PEC}_S = \overline{C_S} = \frac{1}{n}\sum_{i=1}^{n} C_S(t_i) \qquad (3)$$

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Still to be done …

- ❑ Completion of the PECs calculation module
- ❑ Testing
- ❑ Tool guide

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Thank you for your attention!

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