ENSENSIA

Environment Sensing Appliance

AIR QUALITY MONITORING STATION BY FORTH / ICE-HT

Datasheet

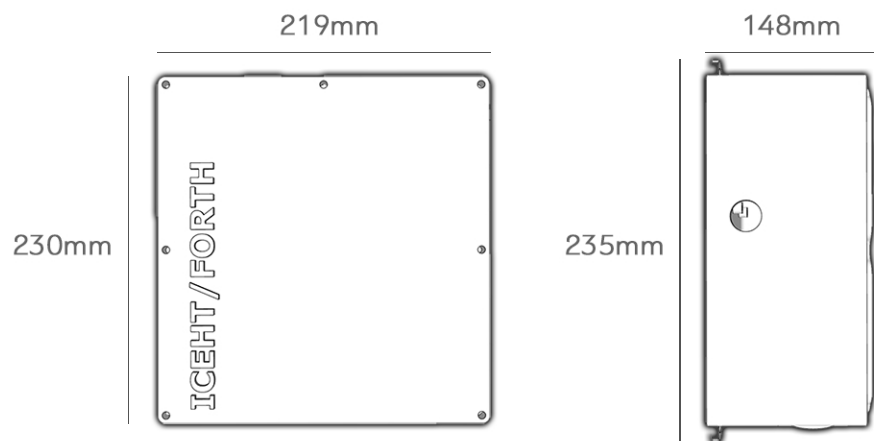# General Information

Features

Indoor & Outdoor use

Material: ASA EVO plastic with UV protection

Power button with LED indicator

GPS (optional)

CE mark

Dimensions and weight

Weight: 0.46 Kg

Power

220-240V AC 50Hz

Connectivity

2.4 GHz and 5.0 GHz IEEE 802.11ac wireless

Cellular 4G/LTE (optional)

LoRaWAN (optional)

Communication

MQTT

SSH with 2FA

Web-based platform

Sensors

CO

Sensor Technology: Electrochemical
Units: ppb / Range: 0 to 2000 ppb
Lifespan: >36 months

NO

Sensor Technology: Electrochemical
Units: ppb / Range: 0 to 200 ppb
Lifespan: >24 months

NO_2

Sensor Technology: Electrochemical
Units: ppb / Range: 0 to 200 ppb
Lifespan: >24 months

O_3

Sensor Technology: Electrochemical
Units: ppb / Range: 0 to 200 ppb
Lifespan: >24 months

SO_2

Sensor Technology: Electrochemical
Units: ppb / Range: 0 to 20 ppb
Lifespan: >36 months

CO_2

Sensor Technology: NDIR
Units: ppm / Range: 0 to 2000 ppm
Lifespan: >15 years

tVOC

Sensor Technology: Electrochemical
Units: ppb / Range: 0 to 10.000 ppb
Lifespan: >36 months

HCHO

Sensor Technology: Electrochemical
Units: ppm / Range: 0 to 5 ppm
Lifespan: >36 months

$PM_{2.5}$

Sensor Technology: Optical
Units: ug m^{-3} / Range: 0 to 500 µg m^{-3}
Lifespan: >4 years

Temperature

Units: °C / Range: -40 to 85 °C
Lifespan: >9 years

Humidity

Units: % / Range: 0 to 100 %
Lifespan: >9 years
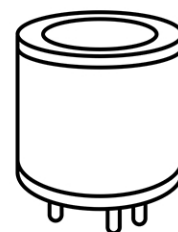
Use Notes

Operation

Do not blow air from the bottom of the device, where the sensors are placed. Exposure to direct air flow will affect the precision of the readings

The device operates in environments where the remperature ranges between 0 and 40 °C

Warm-up period is 3 hours. The NO and tVOC sensors may require more than 8 hours to provide stable responses

VOC species estimations are applicable for indoor purposes and work best in well-ventilated rooms

After installing, power-on the device by pressing the power button on the left. ENSENSIA responses with a reading after 7 minutes tops.

Data

All readings are stored in the SD card of the device. There is enough capacity for at least 5 years of persistent operation

The user can download the readings through an API or a web-based platform at http://aqmmon.iceht.forth.gr

Calibration

The sensors are factory-calibrated and adapted by FORTH/ICE-HT[1] and C-STACC[2] for use in urban areas.

The sensors' readings are corrected by FORTH/ICE-HT every 10 minutes to ensure reliability using Machine Learning methods. Regulatory instrumentation and frequent co-locations take place to persistently update the algorithms

The user can calibrate the sensors applying a linear formula to compensate for sensor drift and ageing. The formula can be easily applied at http://aqmmon.iceht.forth.gr, or by contacting FORTH/ICE-HT

Contact

For more information contact our team at ensensia@iceht.forth.gr

[1] **FORTH** INSTITUTE OF CHEMICAL ENGINEERING SCIENCES — https://www.iceht.forth.gr

[2] **C·STACC** Center for the Study of Air Quality & Climate Change — http://cstacc.iceht.forth.gr

Visualization Platform

Map

Real-time map of current measurements and operational information

Investigate the spatial distribution of the concentrations you measure

Access historical data for each location

Data Display

Gauges

Charts

Alarms

Configuration settings

Data Download

Web-based platform

API

Device Management

Parameter tuning

Electrochemical sensor parameter adjustments

Linear calibration option

ENSENSIA   AQ MEASUREMENTS ⌄   LOGIN ⌄   MEMBERS ⌄   AQ PREDICTIONS ⌄   LINKS ⌄

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DEVICE DASHBOARD

See your device on the map   Control your ENSENSIA   Report an issue   Replace a sensor   Troubleshooting   Documentation

TO VIEW THE DASHBOARD OF YOUR ENSENSIA, PLEASE CHOOSE THE ID

Devices:

-- select an option -- ⌄

Submit

Visualization Platform

IoT Air Quality Monitoring

PM$_{2.5}$ (ug m^{-3})

Good	Fair	Moderate	Poor	Very Poor
0-10	10-20	20-25	25-50	50+

Click the top-right box to toggle sensor types

CORRECTION INFO

$$PM_{2.5 \mid corrected} = PM_{2.5 \mid raw} * 0.42 + 0.26 \; (\mu g \, m^{-3})$$

ID: 2023010400

See on the map | Control your ENSENSIA | Report an issue | Rep

Label: GOLDEN_INDOOR   Latitude: 38.2971   Longitude: 21.8096

Status: **Offline**   Latest Measurement: 2023-06-23 10:21:29

Date Created: '2023-01-01 00:00:00'
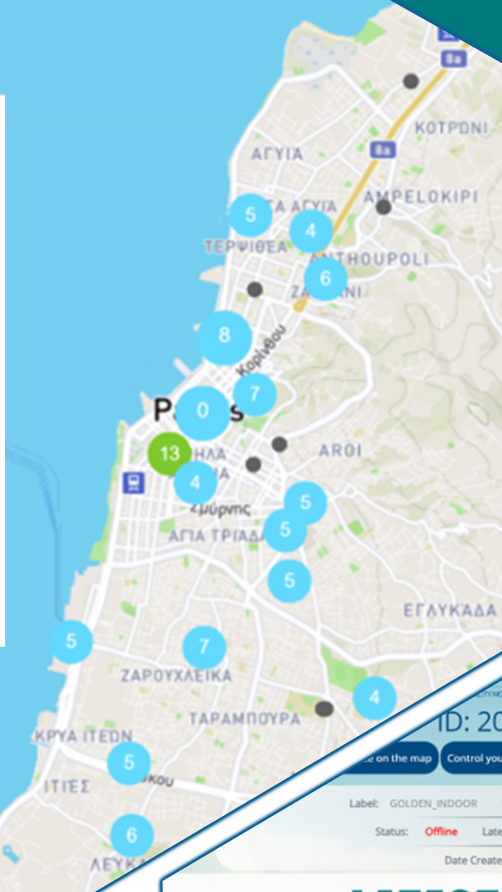
LATEST READINGS

Displaying non-corrected readings

Switch

PARTICULATE MATTER (PM$_{2.5}$)	PARTICULATE MATTER (PM$_{10}$)	CARBON MONOXIDE
Units: µg m^{-3}	Units: µg m^{-3}	Units: ppb
24.0 MODERATE	**25.0** GOOD	**868.1** GOOD

NITRIC OXIDE	NITROGEN DIOXIDE	OZONE
Units: ppb	Units: ppb	Units: ppb
	4.0 GOOD	

TOTAL VOCS

ENSENSIA Environment Sensing

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CONFIGURE YOUR ENSENSIA

ENSENSIA Dashboard | Refresh | See your device on the map | Report an issue | Replace a sensor | Troubleshooting | Documentation

YOUR DEVICE SETTINGS ARE SHOWN BELOW

Please note that any changes you make will appear to the form only after the Raspberry has responded and actually changed its settings. Therefore, to verify that the parameters have changed, please reload the page after 5 minutes.

DEVICE IDENTITY SETTINGS

SensorId	Latitude	Longitude	Label	Last Check	Last Reboot
2023010400_	38.297133378472516	21.809641692805688	GOLDEN_INDOOR	2023-06-23 10:22:01	2023-06-23 09:48:46

Date Created
2023-01-01 00:00:00

DEVICE SOFTWARE

Python Version	Python scripts version	Last firmware update	Available Memory in GBs
3.6	artemis_v1	2022_11_22	5.18

SENSORS

CO sensor	NO sensor	NO$_2$ sensor	O$_3$ sensor	CO$_2$ sensor	VOC sensor
1	1	1	1	1	1

H$_2$CO sensor	SO$_2$ sensor	PMS sensor	BME sensor
1	0	1	1

EC SENSOR PARAMETERS

| CO_AE0	CO_WEr
	347

Air Pollution prediction

Span

Predictions on major gas and aerosolo pollutants are available for a three-day period anc can be provided on a daily basis leveraging the chemical transport models developed and mainted at FORTH/ICE-HT by members of C-STACC

Features

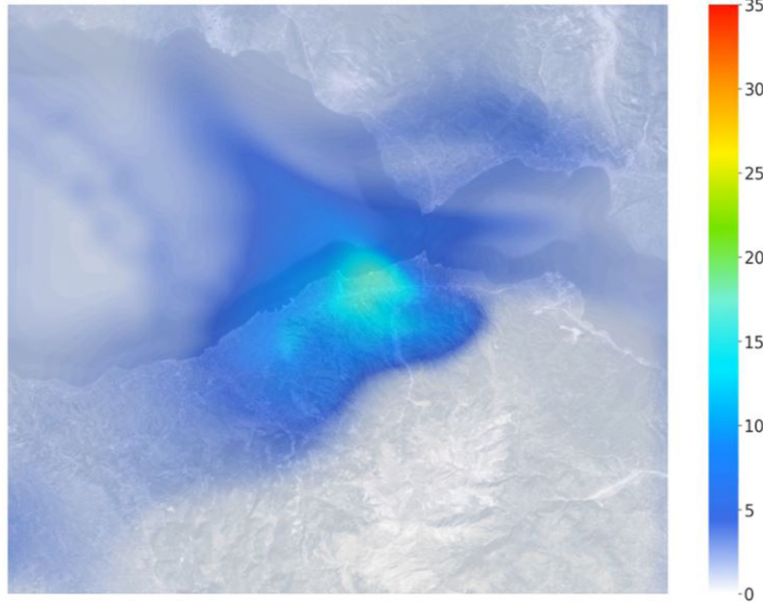Prediction over areas with spatial resolution of 36x36 km

Point source pollution predictions at sites where ENSENSIA devices have been installed

Analysis of the sources of major aerosol and gas pollutants (e.g. long range transport, marine, cooking and more)
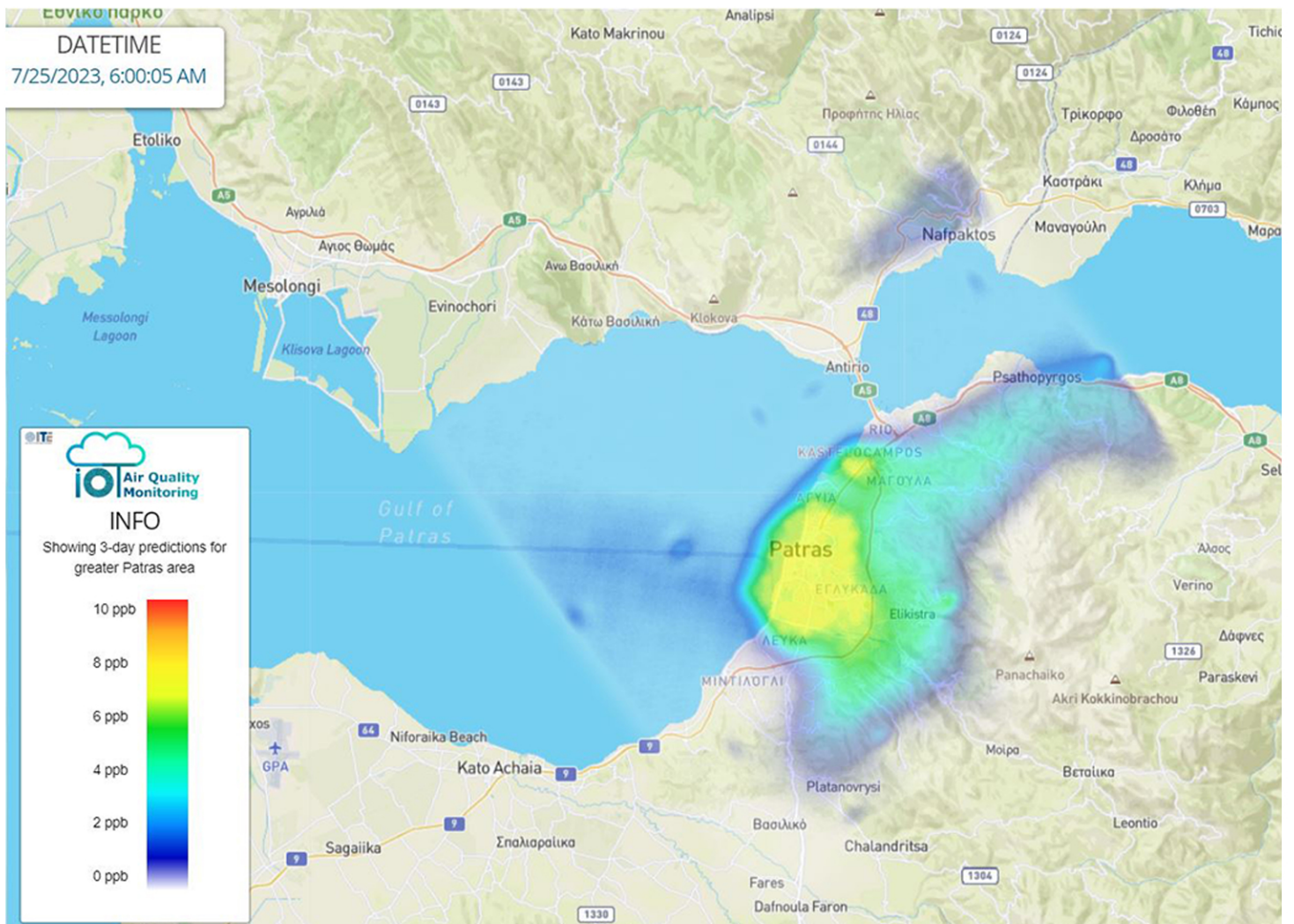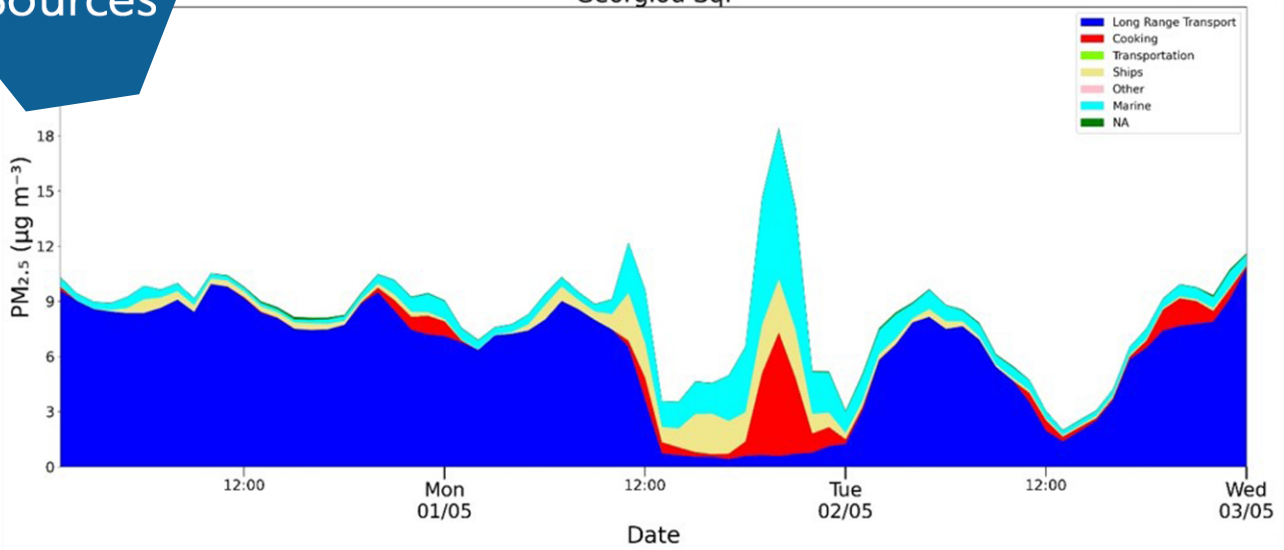
Air Pollution prediction
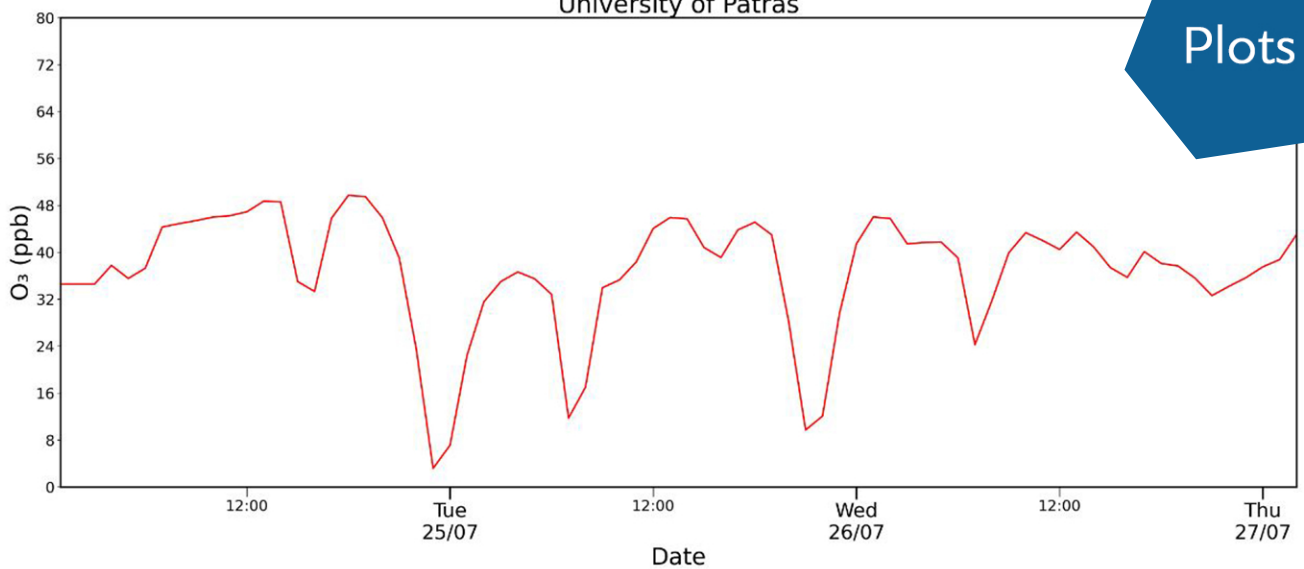

NO₂ (ppb) heatmap. DATETIME: 2023-06-27 00:00 UTC

MAP

Sources

Georgiou Sq.

Plots

OZONE (O₃)

University of Patras