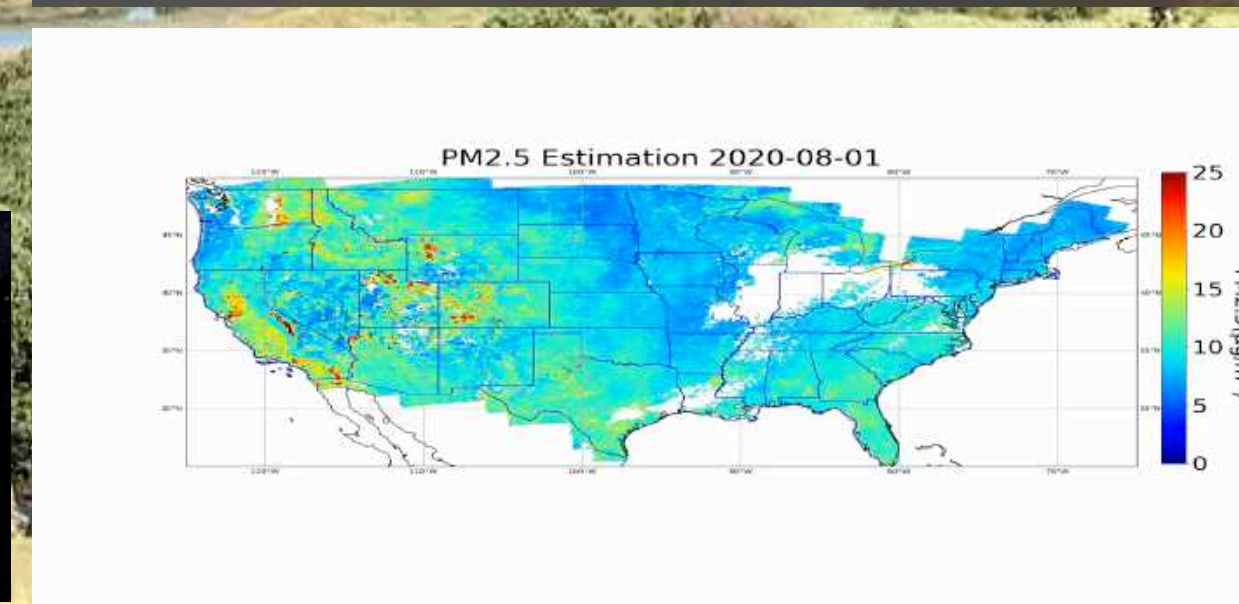
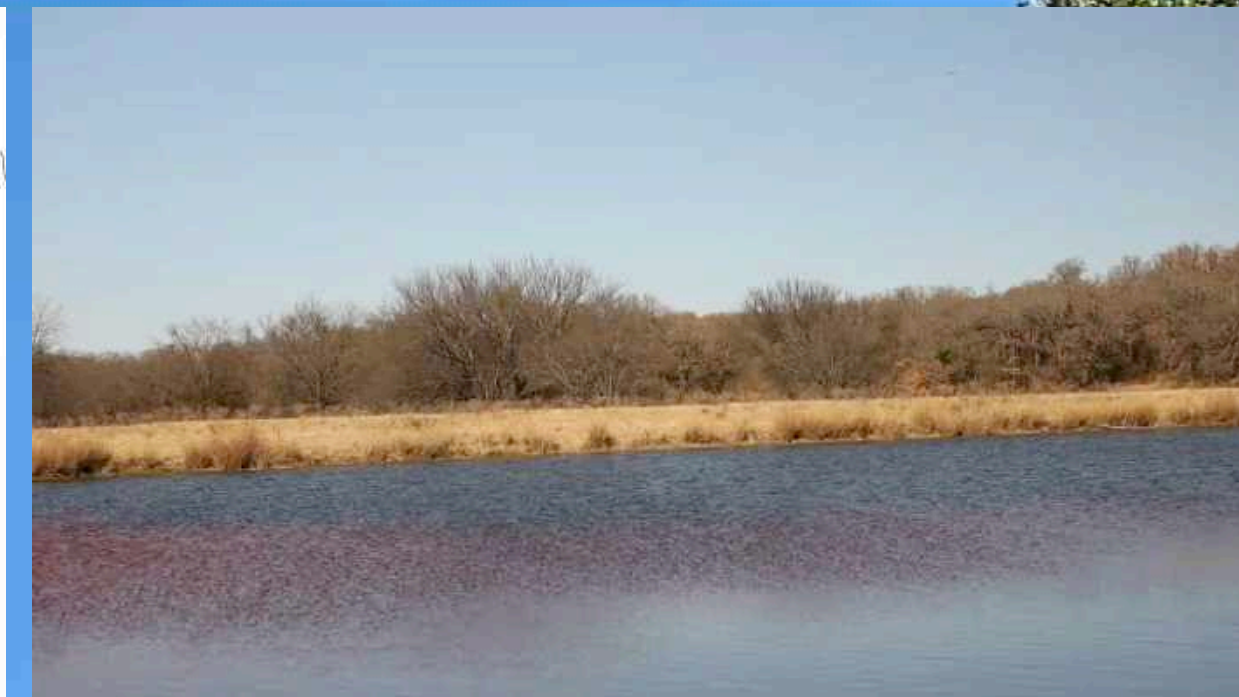
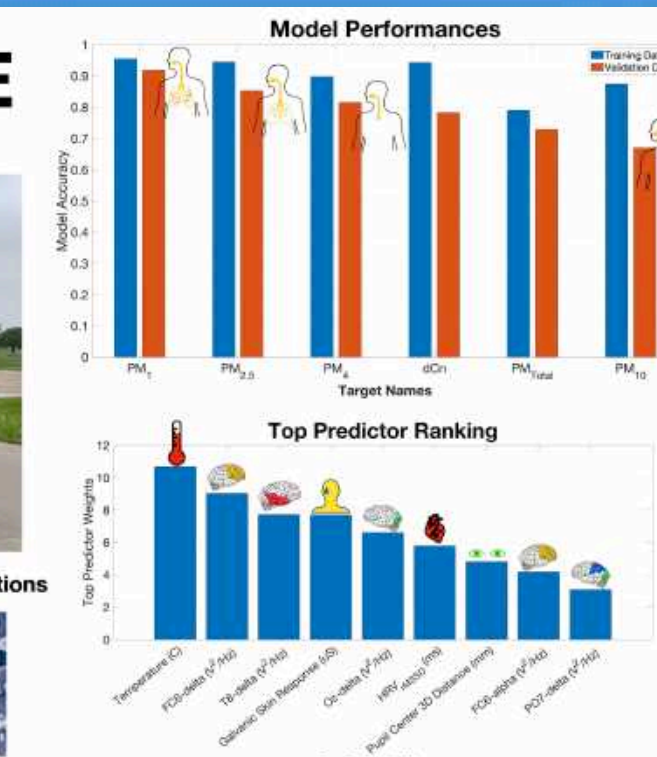
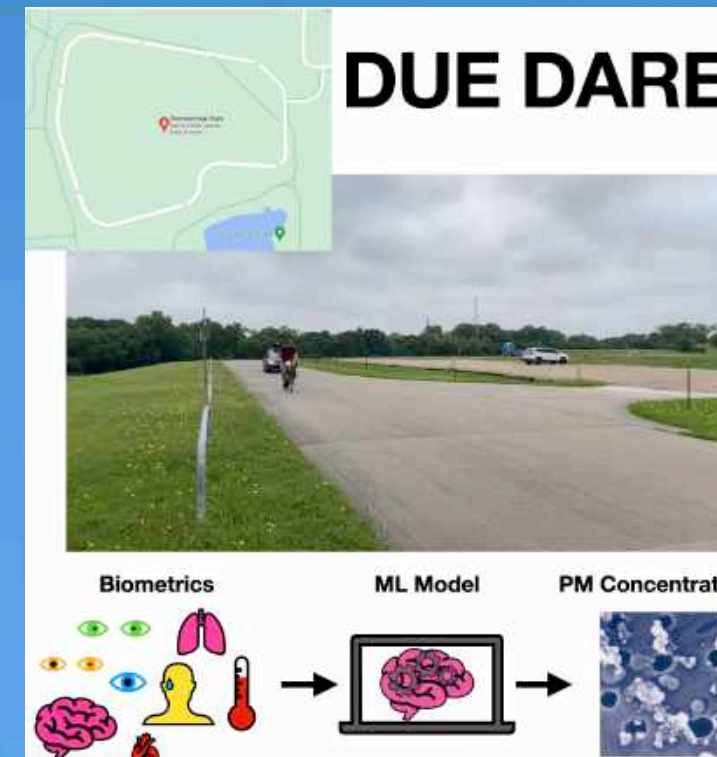
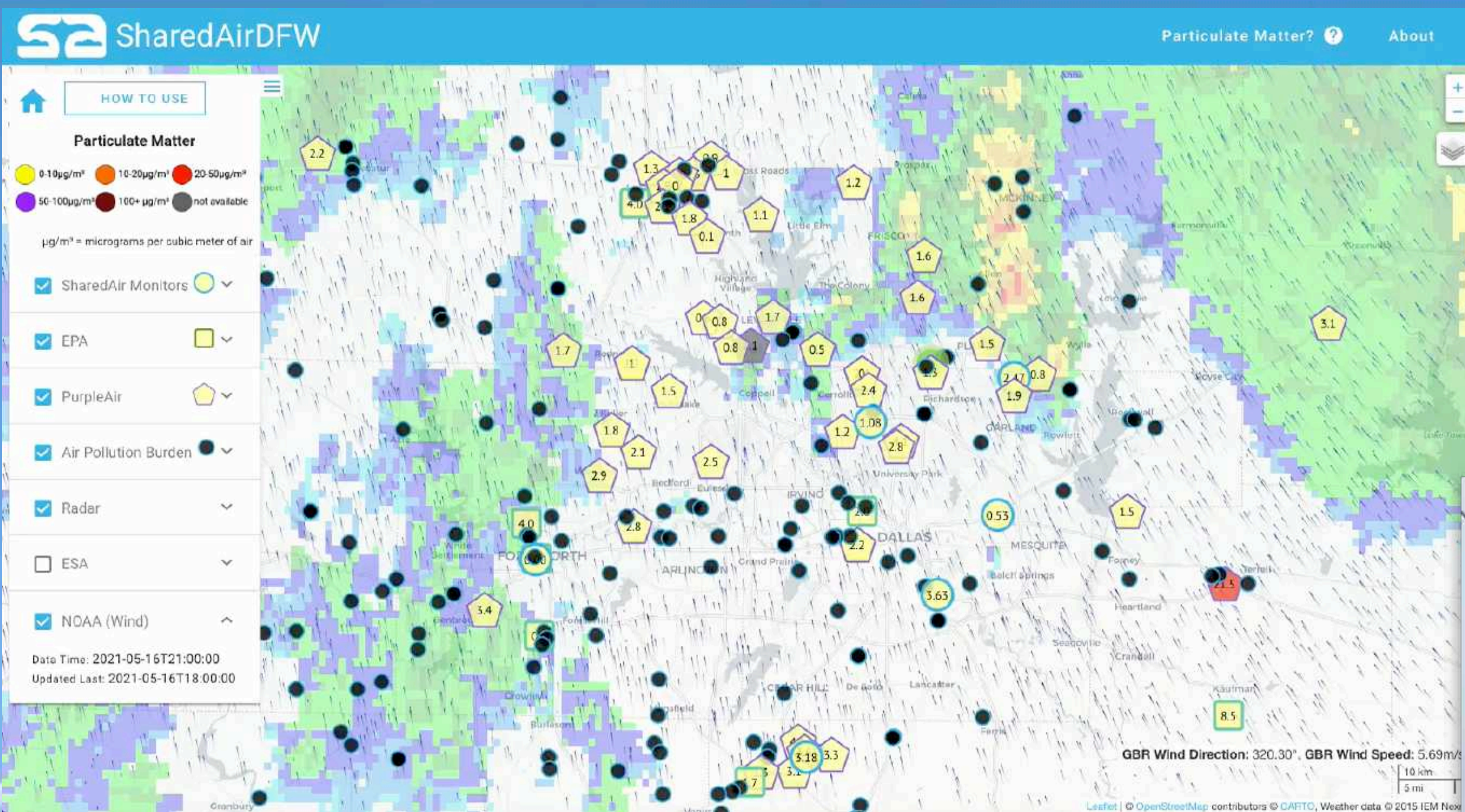


MINTS-AI



Size Matters

Fine and ultrafine particulate matter tends to circumvent the mechanisms that the body has to deflect, detain, and destroy unwelcome visitors.

Harmful ultrafine
0.1 micron particles

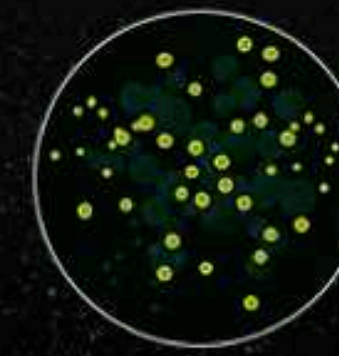
Airborne
pollutants

Ultrafine particles are like little Trojan horses, pretty much every metal known to humans can be found on them.

This is PM0.1 or 0.1 micron particles.

Fine and ultrafine particulate matter tends to circumvent the mechanisms that the human body has to deflect, detain, and destroy unwelcome visitors.

The health effects of air pollution are strongly influenced by particle size.



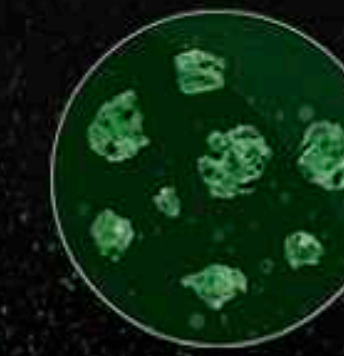
Harmful ultrafine
0.1 micron
particles



Airborne
pollutants



Formaldehyde
and benzene



Bacteria



Odours

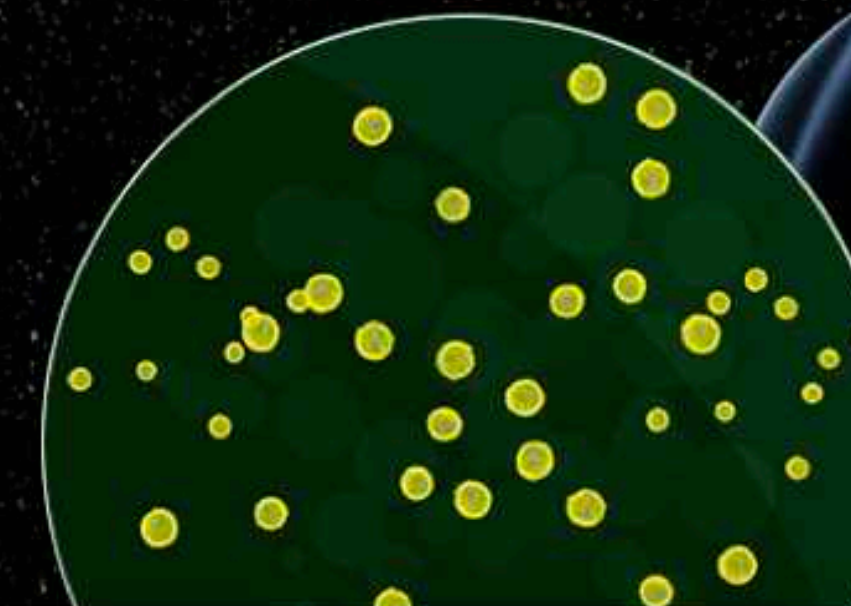
2.5 microns are tiny particles suspended in the atmosphere.

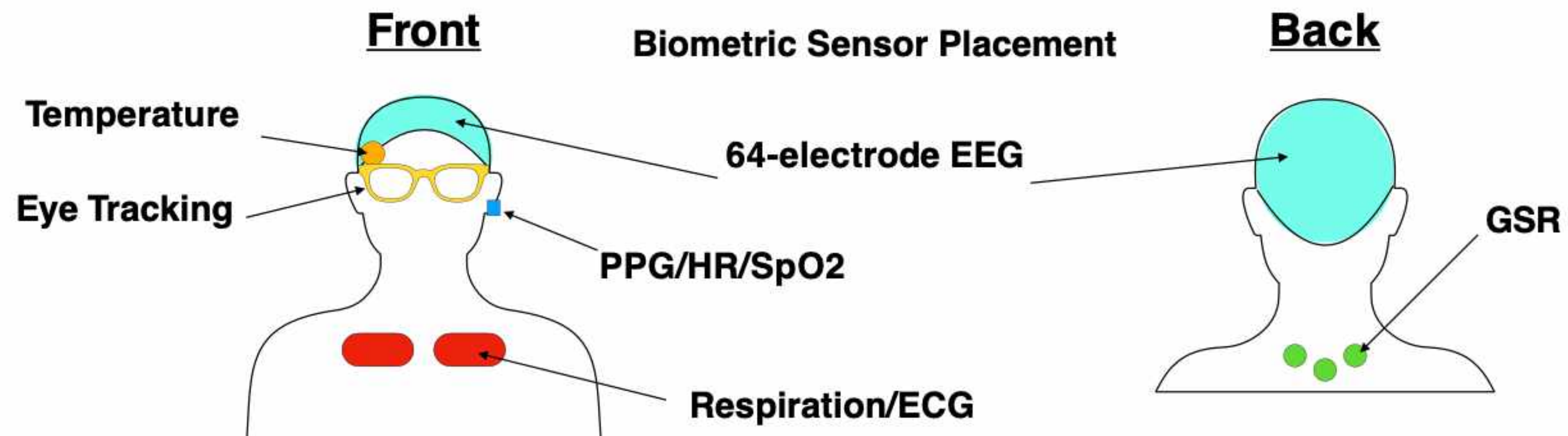
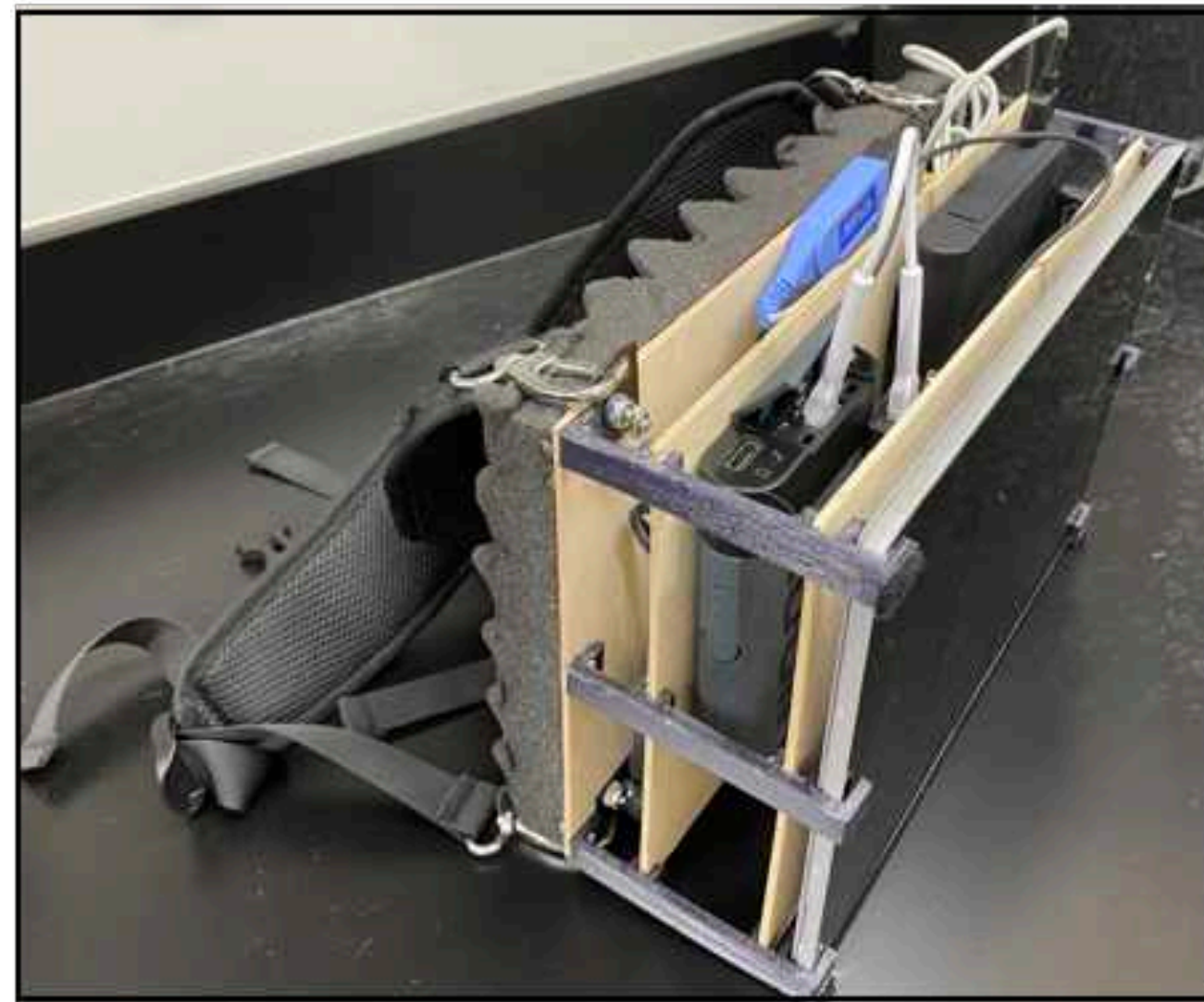
When we breathe them in they can cluster on the lining of the lungs. They've been linked to heart attacks, strokes and skin ageing.



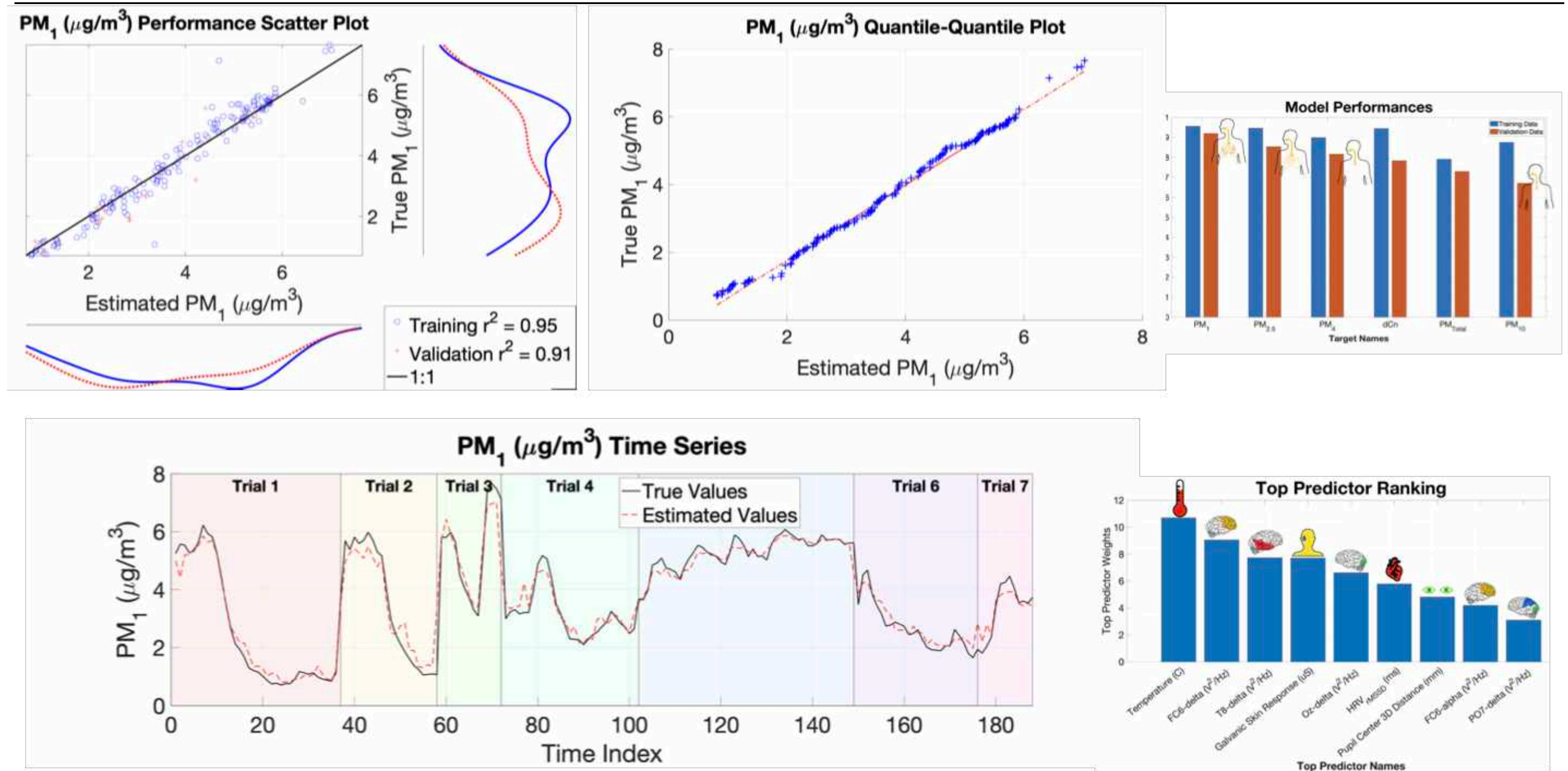
But particles of 0.1 microns are much smaller...

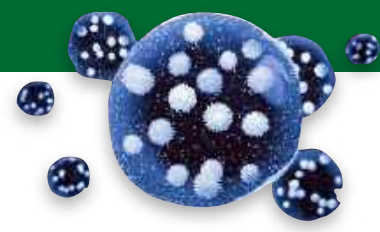
0.1 microns, or ultrafine particles, are much smaller. In fact, you can fit 1,000 across the diameter of a human hair. And they travel even further into the lungs. These ultrafine particles are much smaller, so they travel further inside our bodies. They collect in the smaller branches and gas exchange regions of the lungs.





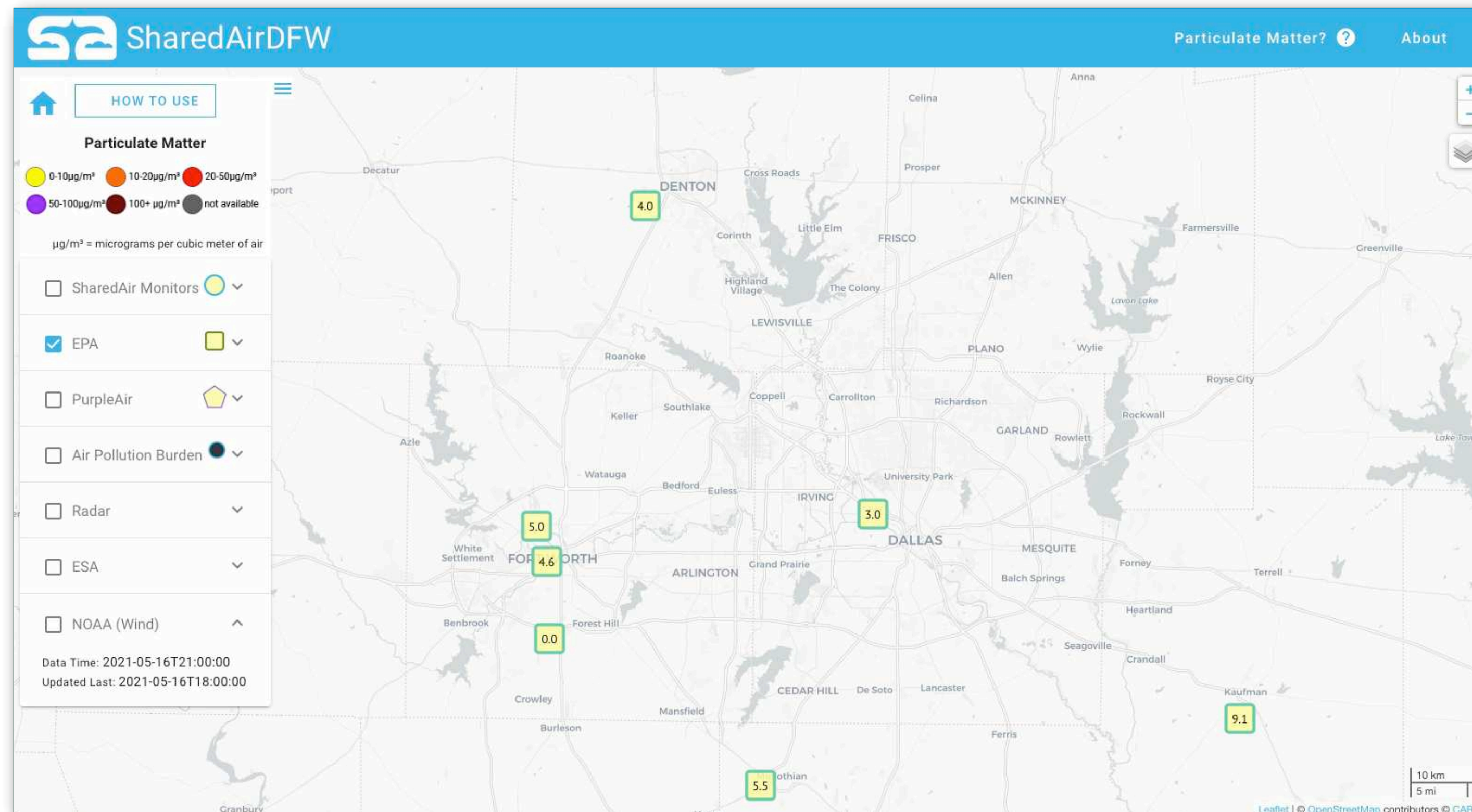
The Composition of the Air Impacts our Performance

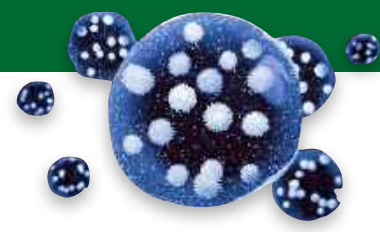




<https://www.sharedairdfw.com>

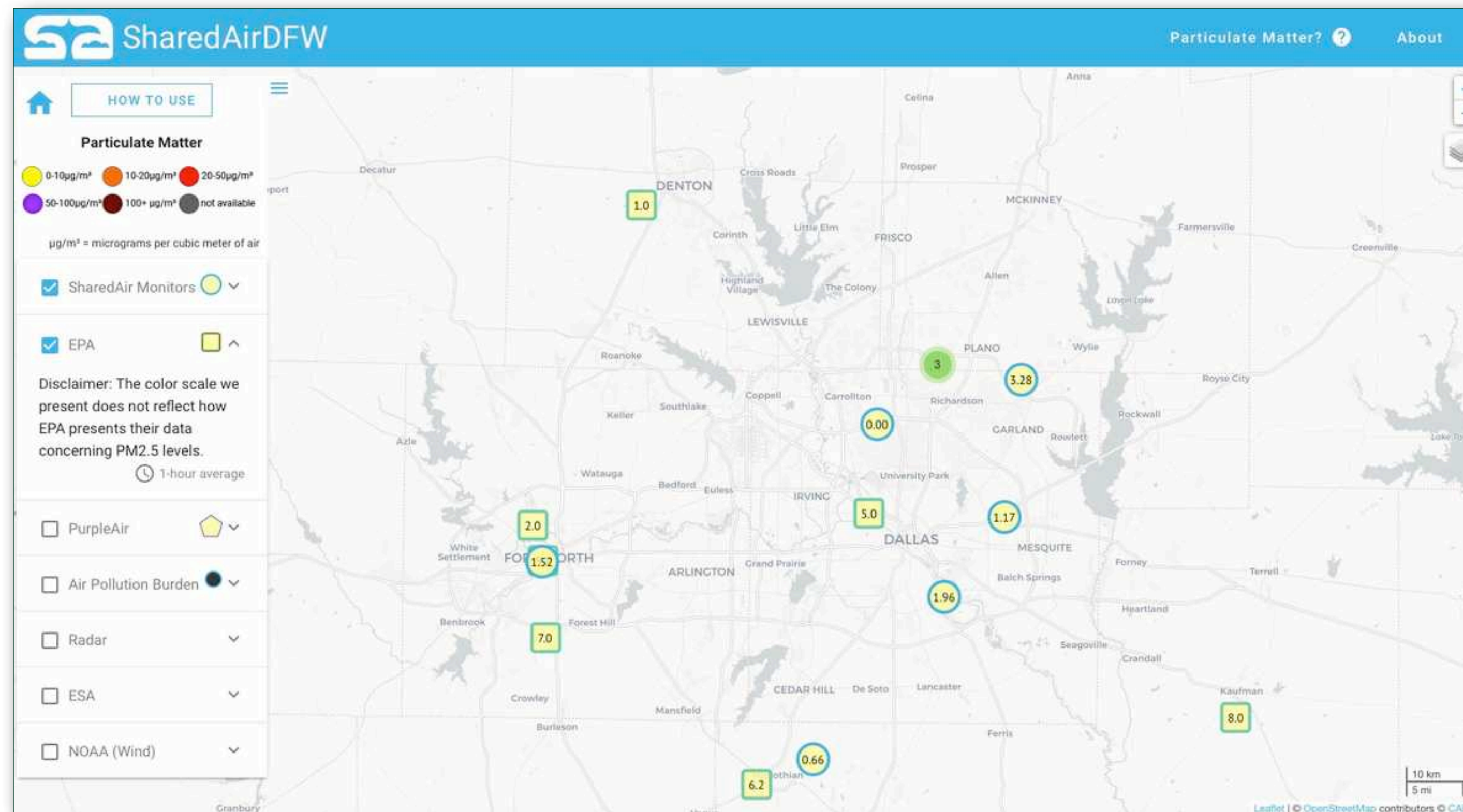
EPA Monitors

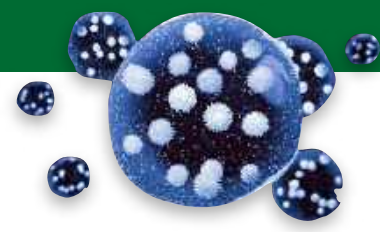




<https://www.sharedairdfw.com>

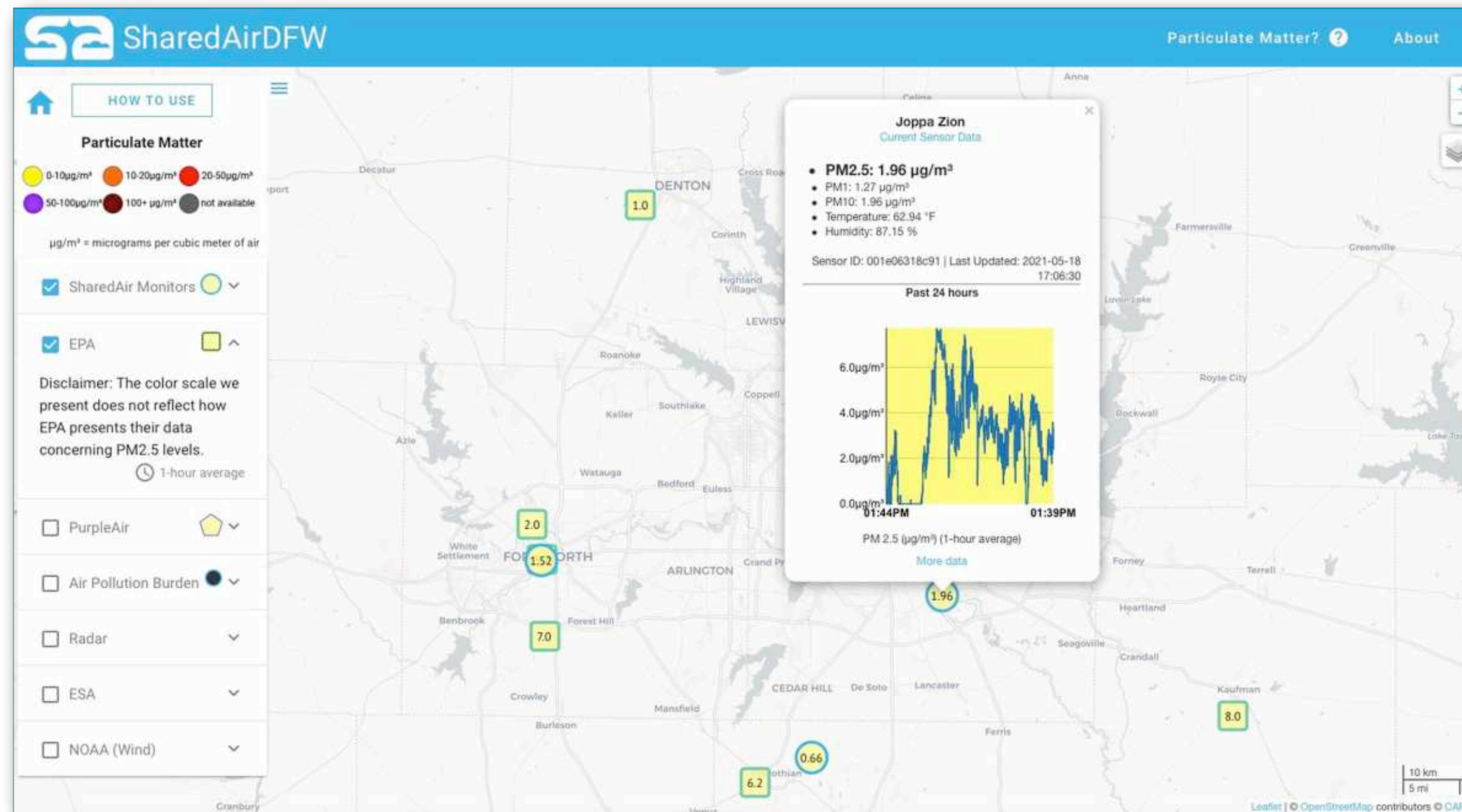
EPA Monitors and UTD Sensors

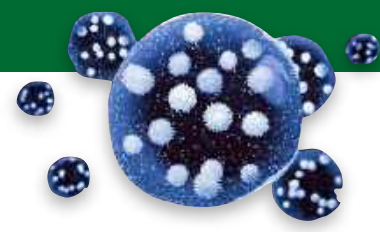




<https://www.sharedairdfw.com>

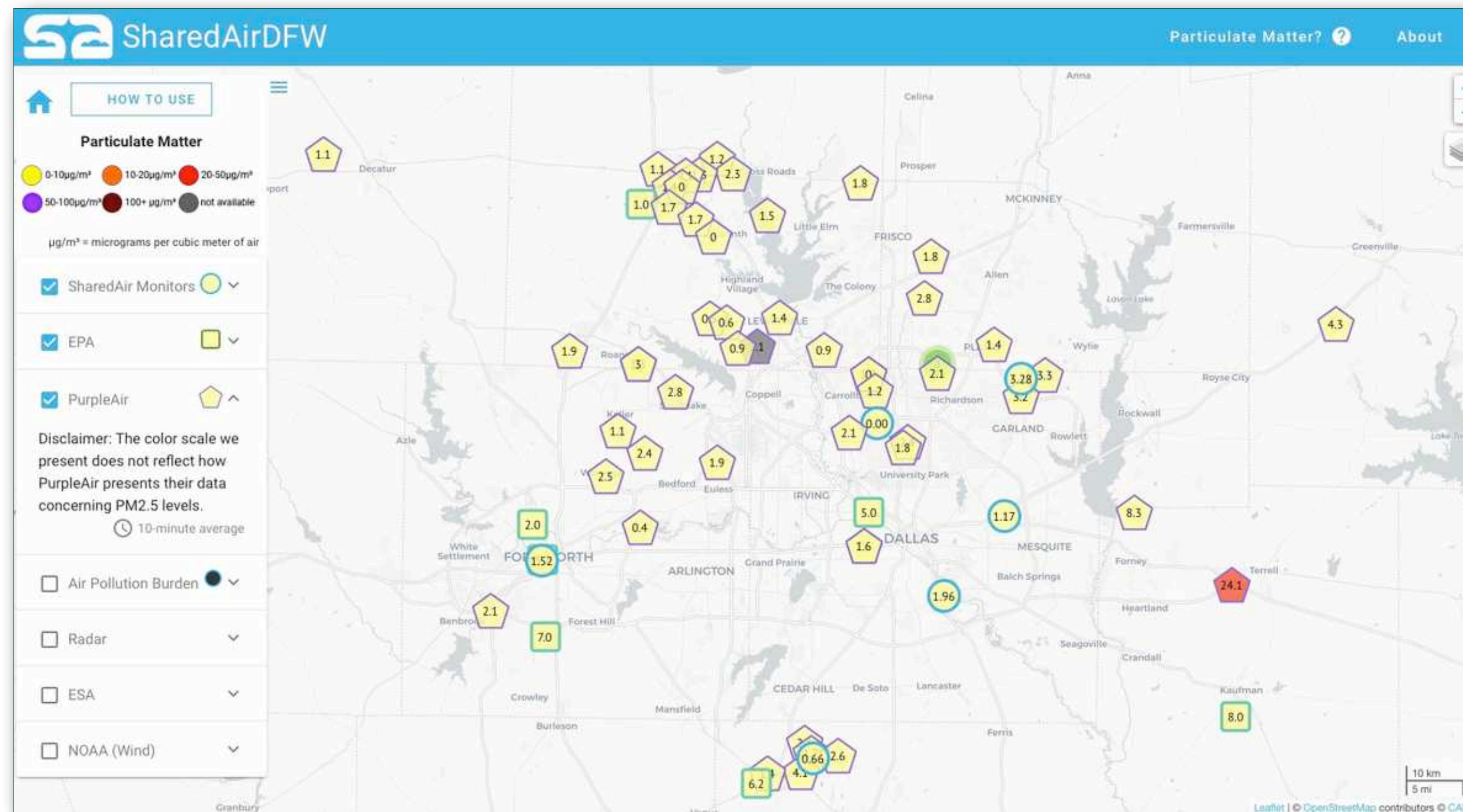
EPA Monitors and UTD Sensors

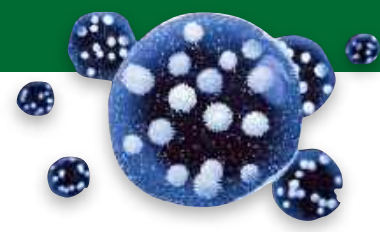




<https://www.sharedairdfw.com>

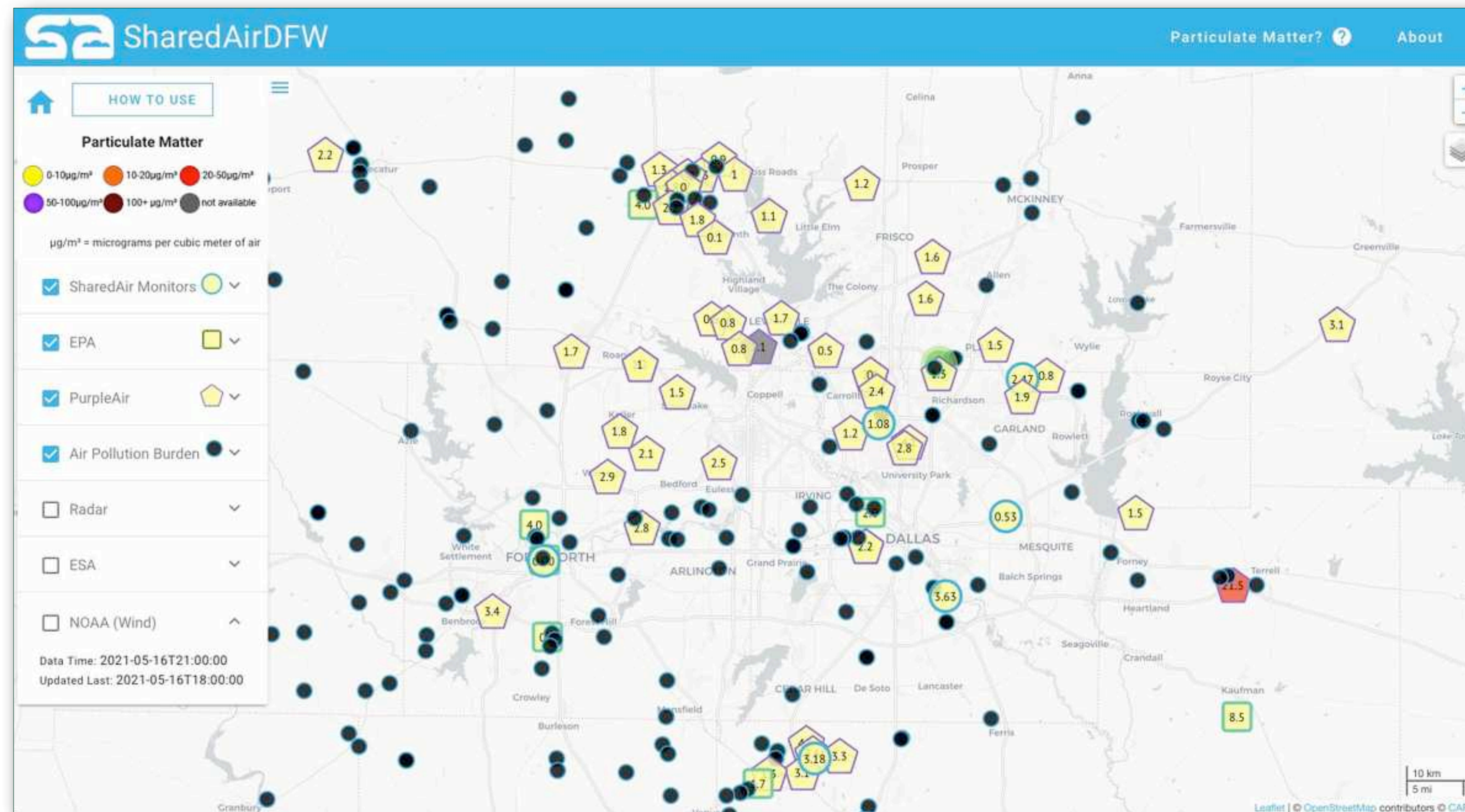
EPA Monitors and UTD and Purple Air

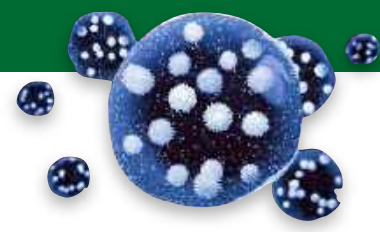




<https://www.sharedairdfw.com>

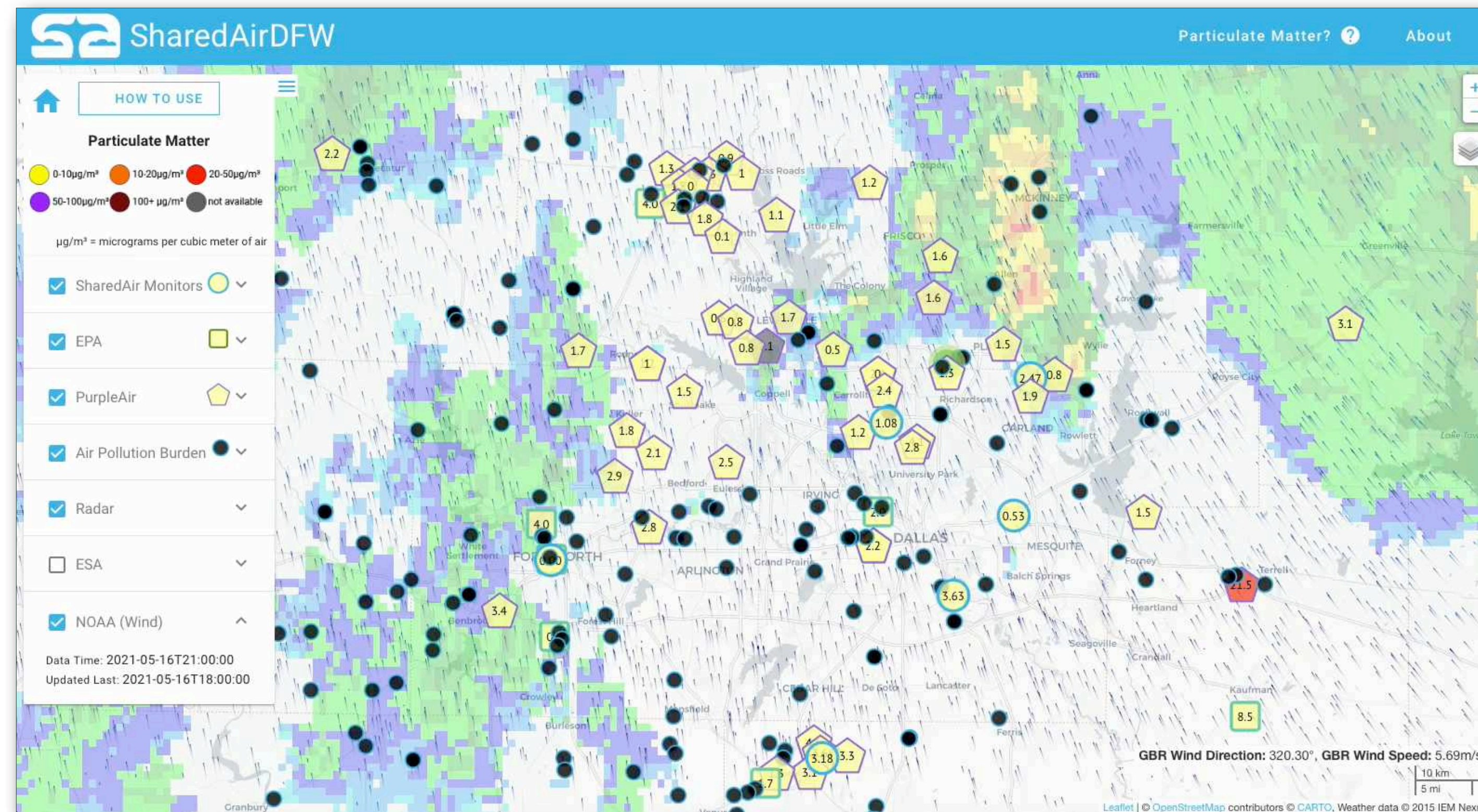
EPA Monitors and UTD and Purple Air





<https://www.sharedairdfw.com>

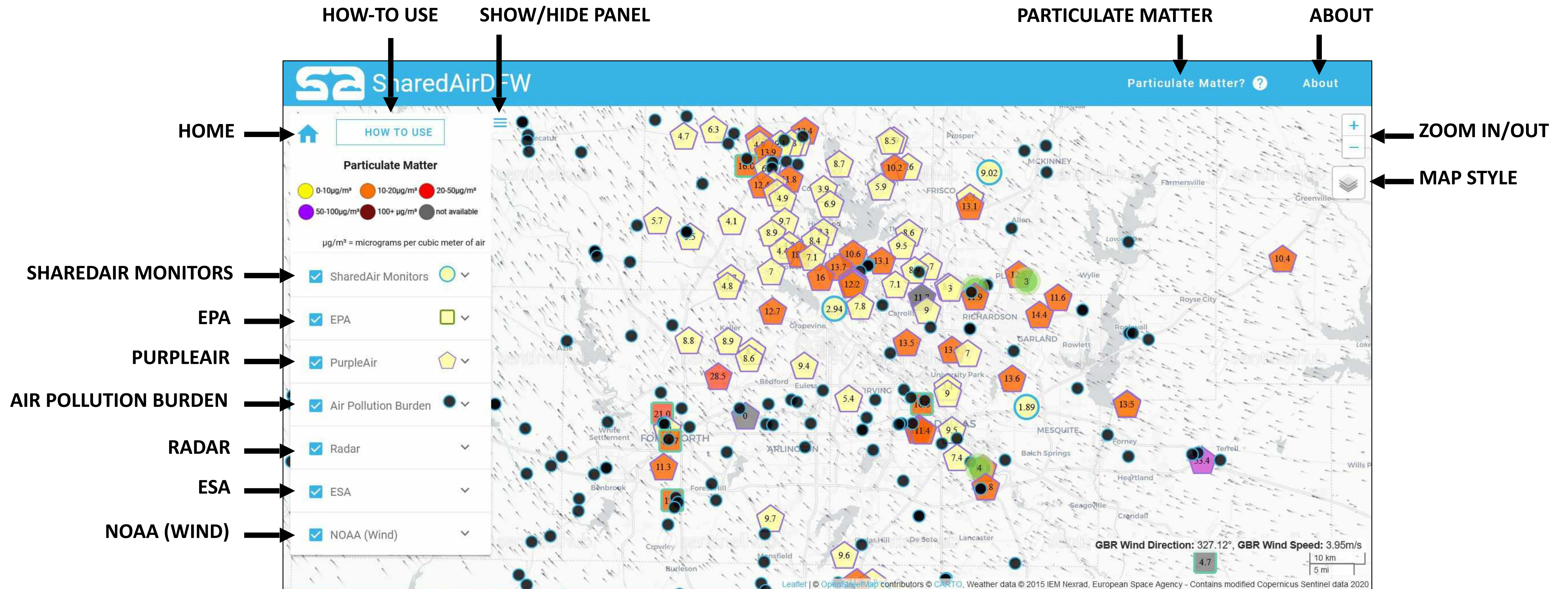
EPA Monitors, UTD and Purple Air Sensors,



SharedAirDFW

Here is a view of a sample SharedAirDFW page. This page is essentially a map for Particulate Matter (PM_{2.5}) ground monitor locations, where only PM_{2.5} data can be obtained for easier consumption.

You can access the SharedAirDFW using <https://www.sharedairdfw.com/>



HOME

This take you back to the default settings: It only display **SharedAir** monitors' locations on the **Carto Positron** map style with wind vectors.

SHOW/HIDE PANEL

This button can be used to change the appearance of right-side **Control panel**. You can access full map hiding the **Control panel** by hitting on this button.

ABOUT

This provides you about this website by opening new window. It is a brief description about the **SharedAir** monitors and the developer of sensor and the website.

MAP STYLE

There are four map styles can be selected using this button. Once you get the mouse cursor on this icon it expand with map options: **Carto Positron**, **Dark mode**, **Satellite** and **Street map**.

HOW-TO USE

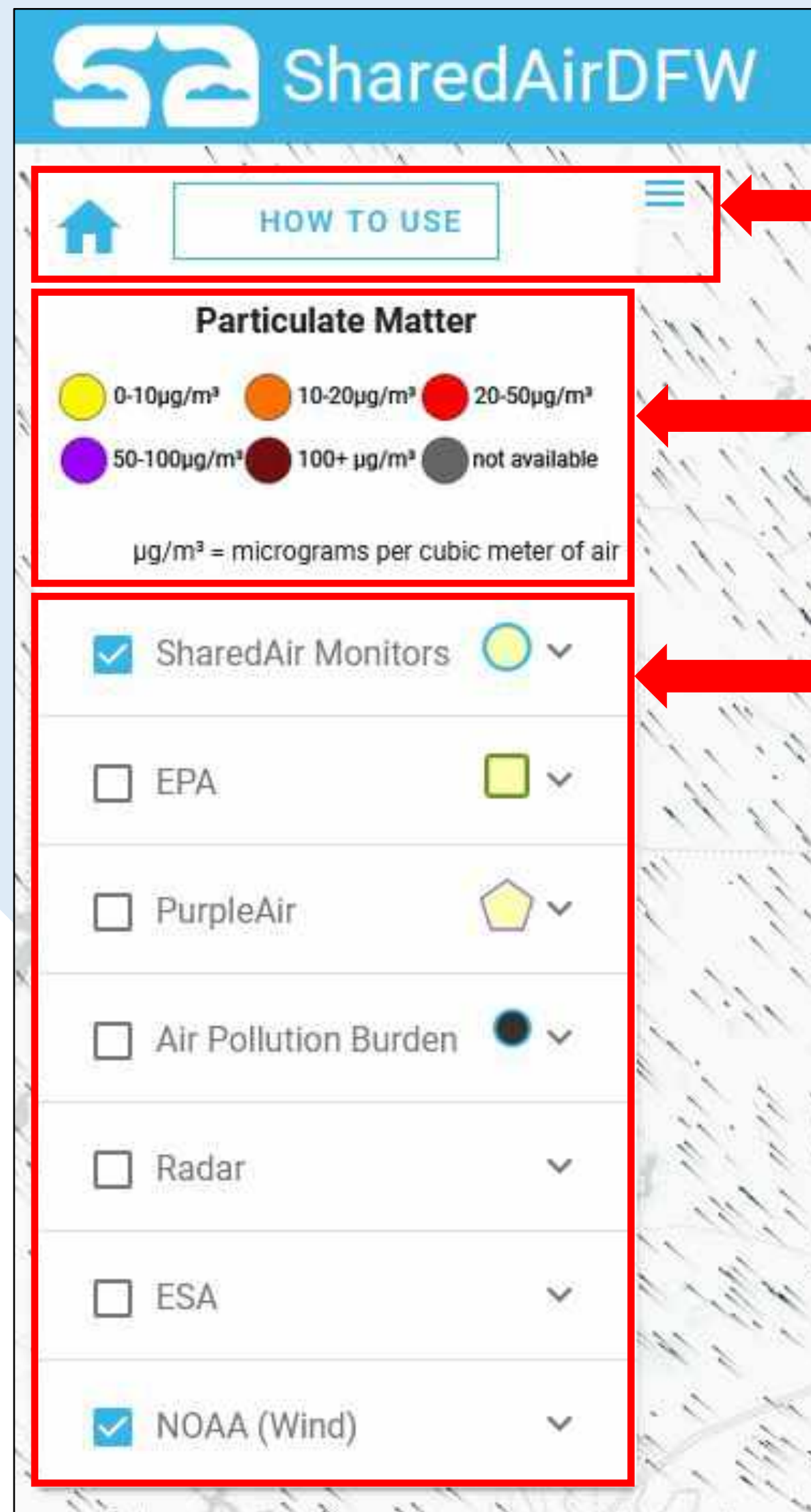
You can use this **HOW-TO USE** button to pop up brief instruction window. It provides how to see the real time data in each sensor and how to change the map style.

PARTICULATE MATTER

Once you hit this button it pops up new window with a brief description about **Particulate Matter**.

ZOOM IN/OUT

There are two separate buttons, “+” and “-”. These allows you to **zoom in** and **zoom out** the map area.



At top of the Control panel includes HOME, HOW TO USE and SHOW/HIDE PANEL buttons.

Color chart for different concentration range of Particulate Matter display right bellow the buttons

There are seven individual panels series bellow the Color chart.

Each panel has a check box and a drop-down menu.

- By selecting check box make sensor location visible on the map (except NOAA (wind),).
- By selecting check box of NOAA (wind) allows to display the wind vectors.
- By hitting on drop-down menu of each panel shows more details and options available.

SHARED AIR MONITORS

SharedAir monitors made in MINTS lab at UTD. Mainly PM_{2.5} concentration data available on this site. Under the drop-down menu two options are available for data averaging: hour average and 30 second average. Default is 30 second average.

PURPLE AIR

PurpleAir, a community system of PM low-cost sensors that are installed, controlled and maintained by members of the community. Only PM_{2.5} data obtained from this database.

RADAR

Some of weather data obtained from Radar

NOAA (WIND)

Wind data obtained from NOAA (National Oceanic and Atmospheric Administration's) database. Selecting this display wind vectors on the map. Wind direction and speed at the location where the mouse cursor displayed on the right bottom.

EPA

PM_{2.5} data obtain from the EPA's Air Quality System (AQS) database collected by state, local, tribal, and federal air pollution control agencies from thousands of monitors around the nation. Only PM_{2.5} hourly averaged data available on this site.

AIR POLLUTION BURDEN

Yearly estimated PM_{2.5} concentration where major air pollution are permitted.

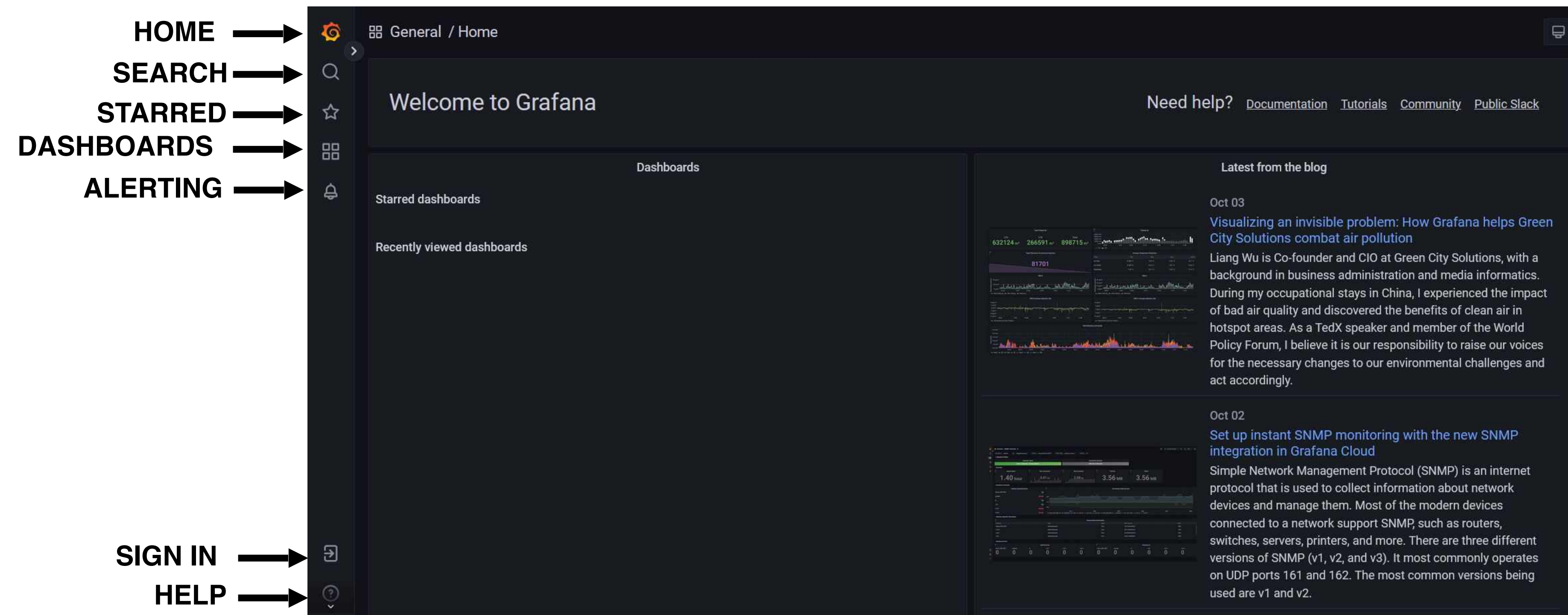
ESA

Three types of data can be monitored: NO₂, CO and CH₄. Data obtained by ESA (European Space Agency)

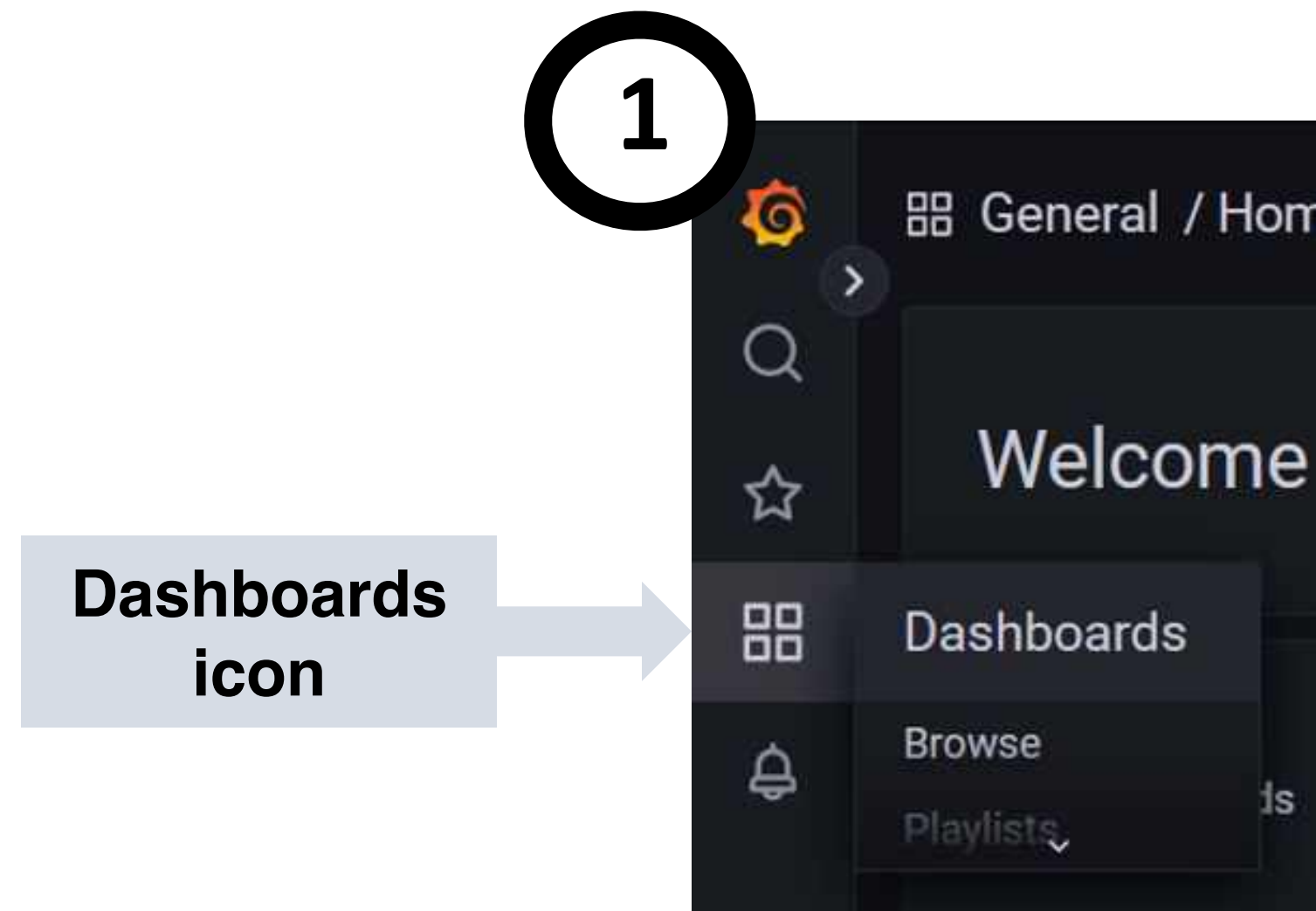
Grafana Dashboard

You can access MINTS Lab's Grafana dashboard using <http://mdash.circ.utdallas.edu:3000>

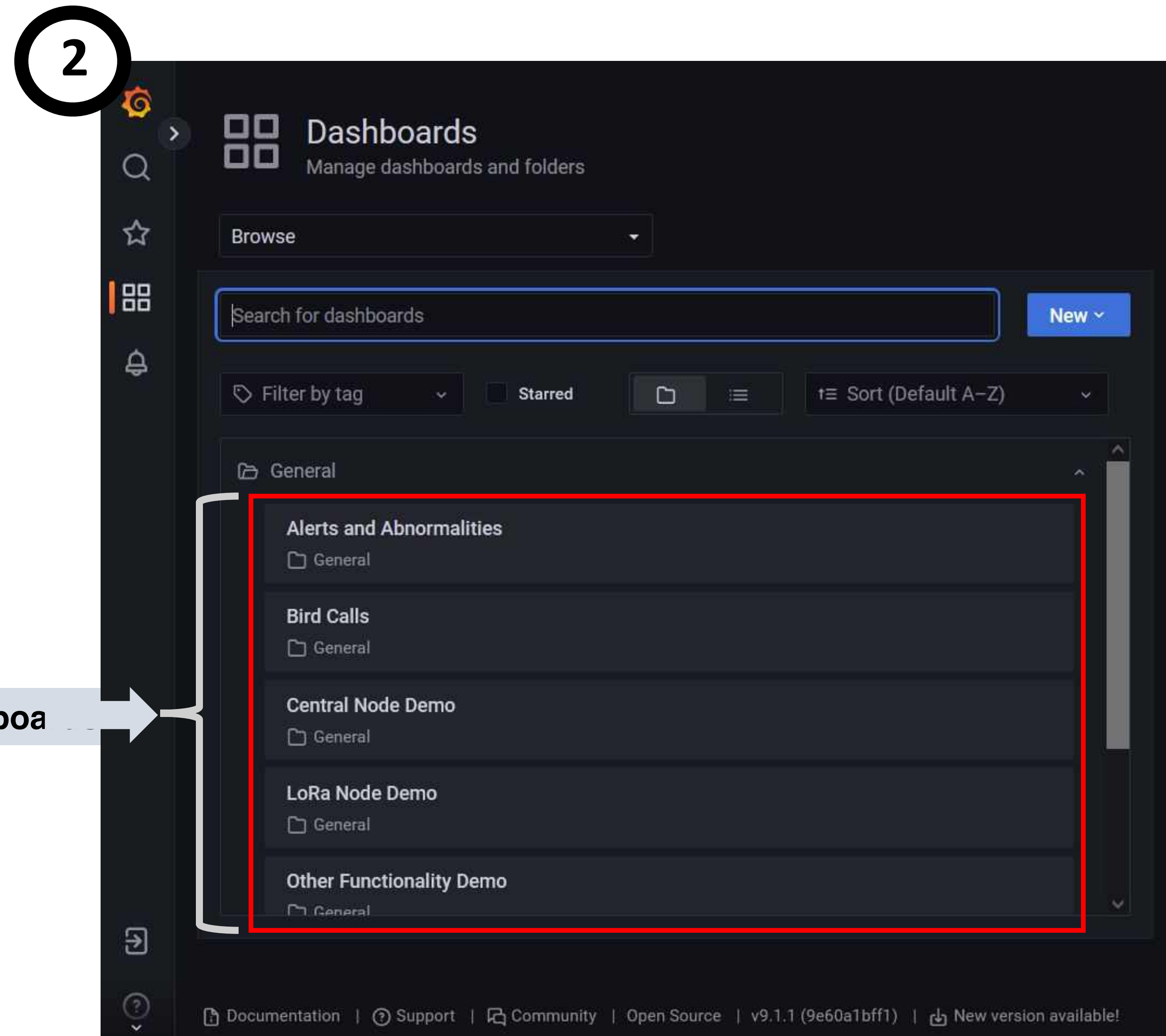
Here is a view of a sample Grafana Dashboard home page:



MINTS Lab Grafana Dashboard

**1**

When you get your mouse cursor on Dashboards icon, it expand a drop-down menu.

**2**

Browse option in the Dashboards drop-down menu allows you to access all the available Dashboards of MINTS Lab

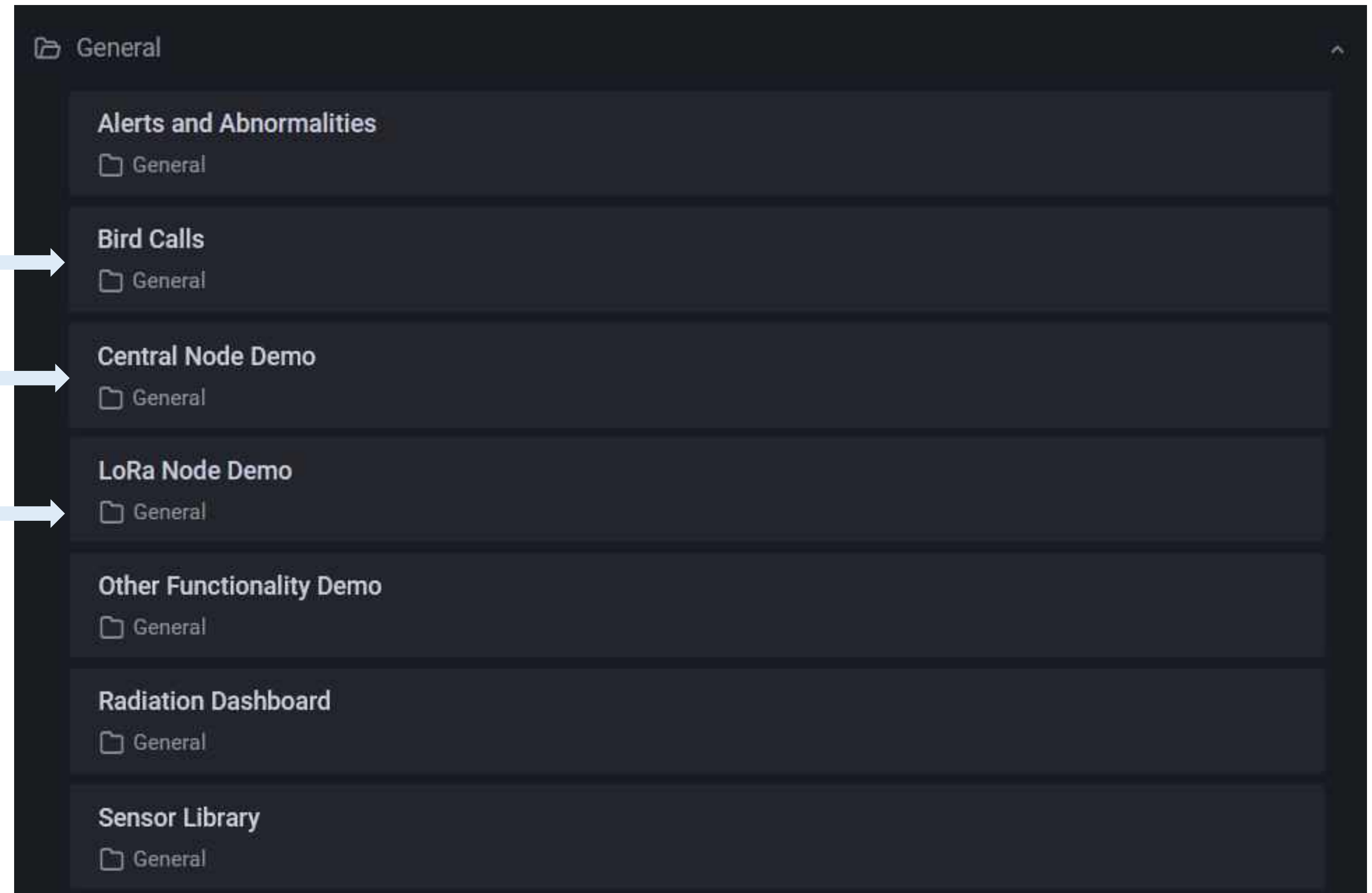
You can open any Dashboard under the General folder by selecting the relevant tile.

Currently available MINTS Dashboards

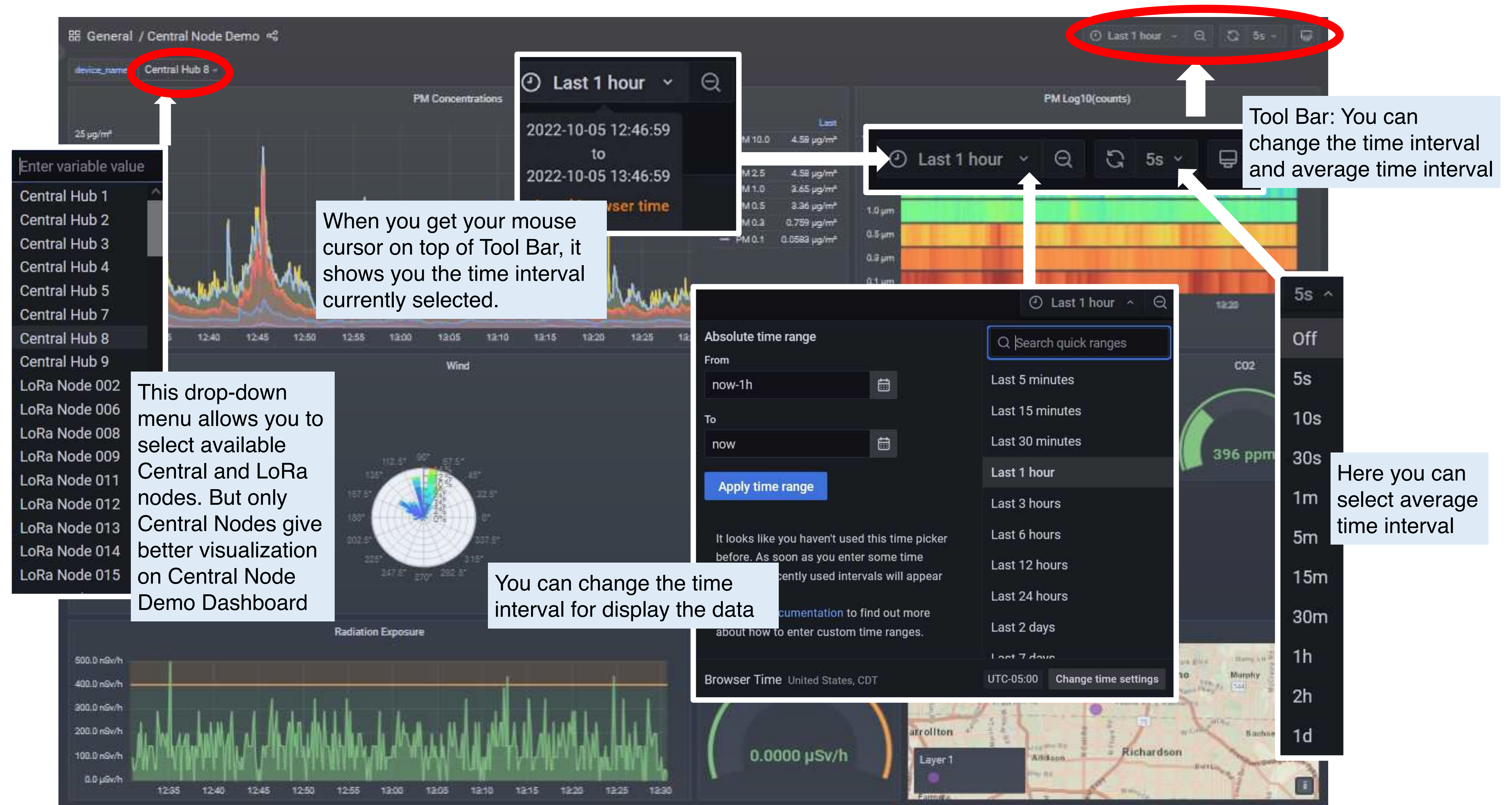
Bird Calls data classification

Central Nodes comprehensive data: PM data, Ozone, CO₂ and some of climate data

LoRa Nodes data: PM data and some of climate data



Sample Central Node Demo Dashboard page:



Sample Dashboard display data of Central Hub 8

1 PM data for last hour. The data visible time duration depend on selected time interval from Tool Bar

2 Spectrum of log value of PM.

3 Wind data from Airmar. Angle represent the wind direction, color code for wind speed and radial length for duration as a percentage.

4 Real time weather data, CO₂ and Ozone.

5 Radiation data for last hour. The data visible time duration depend on selected time interval from Tool Bar.

6 Real time radiation data.

7 Sensor location from GPS. You can zoom in and out.



Sample Dashboard display data of LoRa Node 008

- 1

Spectrum of log value of PM.
- 2

Real time weather data.
- 3

PM data for last 6 hours. The data visible time duration depend on selected time interval from Tool Bar.
- 4

Real time current and voltage status of Battery and solar panel.
- 5

Power usage of sensor from battery and solar panel for last 6 hours.
- 6

Sensor location from GPS. You can zoom in and out.



Sample Dashboard display Bird calls data

Bird calls: Central nodes includes microphone which record the bird calls and classify the species.

- 1 Bird calls classification: Number of bird calls for different species for last 6 hours.
- 2 Total number of bird calls for last 6 hours.
- 3 Sensor location from GPS. You can zoom in and out.

