Datathink 2023

UNESCO Chair in Urban Lanscape at **Université de Montréal**

Digital Visual Studies DVS Universität Zürich UZH + Max Planck Society

27.02.2023 Biblioteca Hertziana (Roma, IT)

Fetching Data in the Urban Wild

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Computational Social Science | ETH zürich

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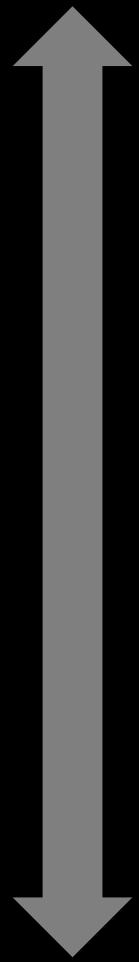

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Societal challenges

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To reveal hidden dimensions of urban life

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Societal challenges

What's Data

1640s, *"a fact given or granted," classical plural of datum, from Latin datum "(thing) given"*
In classical use originally "a fact given as the basis for calculation in mathematical problems."

https://www.etymonline.com/

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1954 Data-processing
1962 data-base (also database) "structured collection of data in a computer"
1970 data-entry.

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Co-Evolving City Life CoCi

How could innovative decentralized organizational approaches contribute to addressing humanity's societal, sustainability, and governance challenges?

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+ Resilient Cities & Digitally Assisted Cooperation

+ Sustainable Cities & Coordination

Self-Organizing Cities & Co-Learning

+ Innovative Cities & Co-Creation

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Know the air your breath

UZH+ETHZ+Citizen Science Center

https://citizenscience.ch/en/contribute/partner_project/knowtheairyoubreathe

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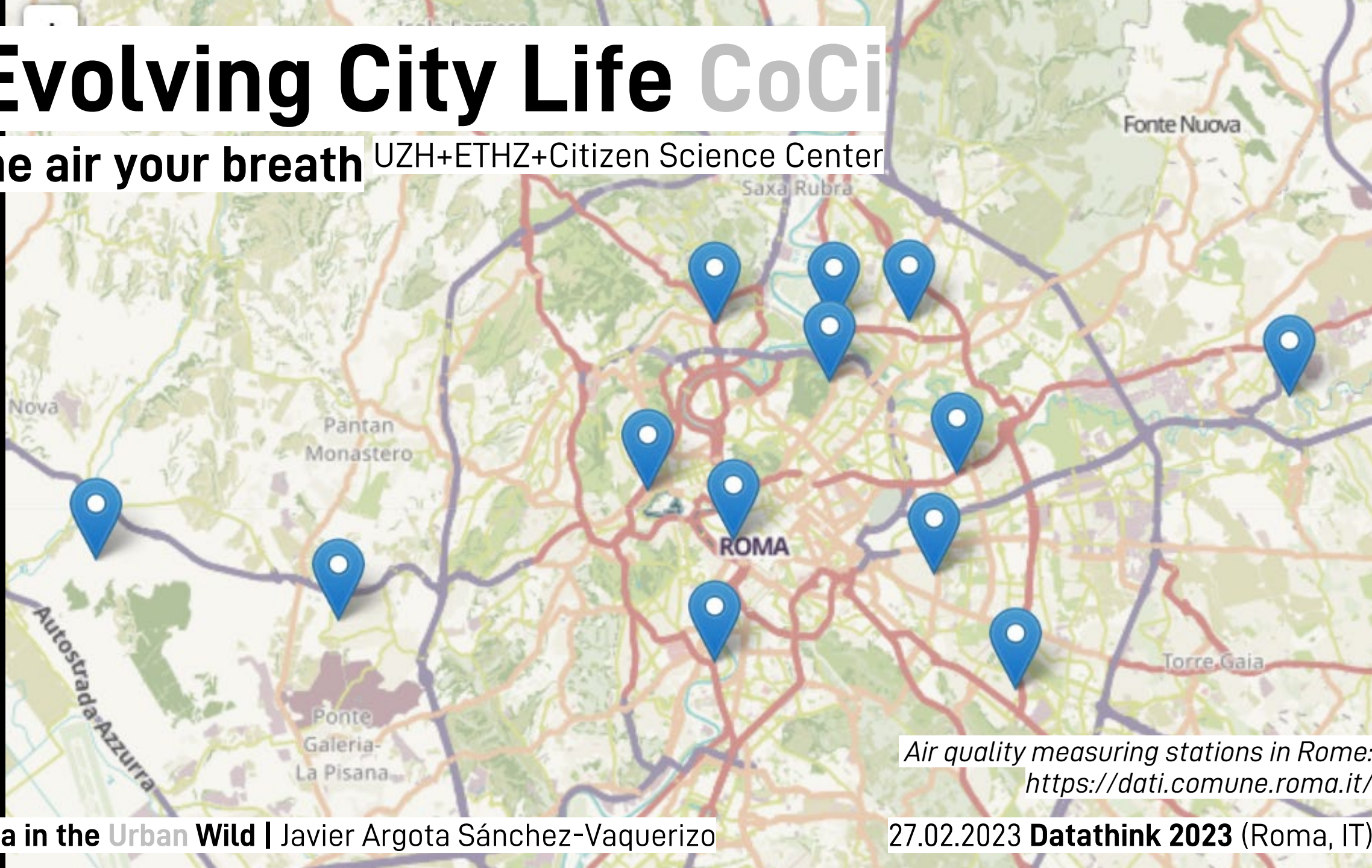

Air quality measuring stations in Rome:
https://dati.comune.roma.it/

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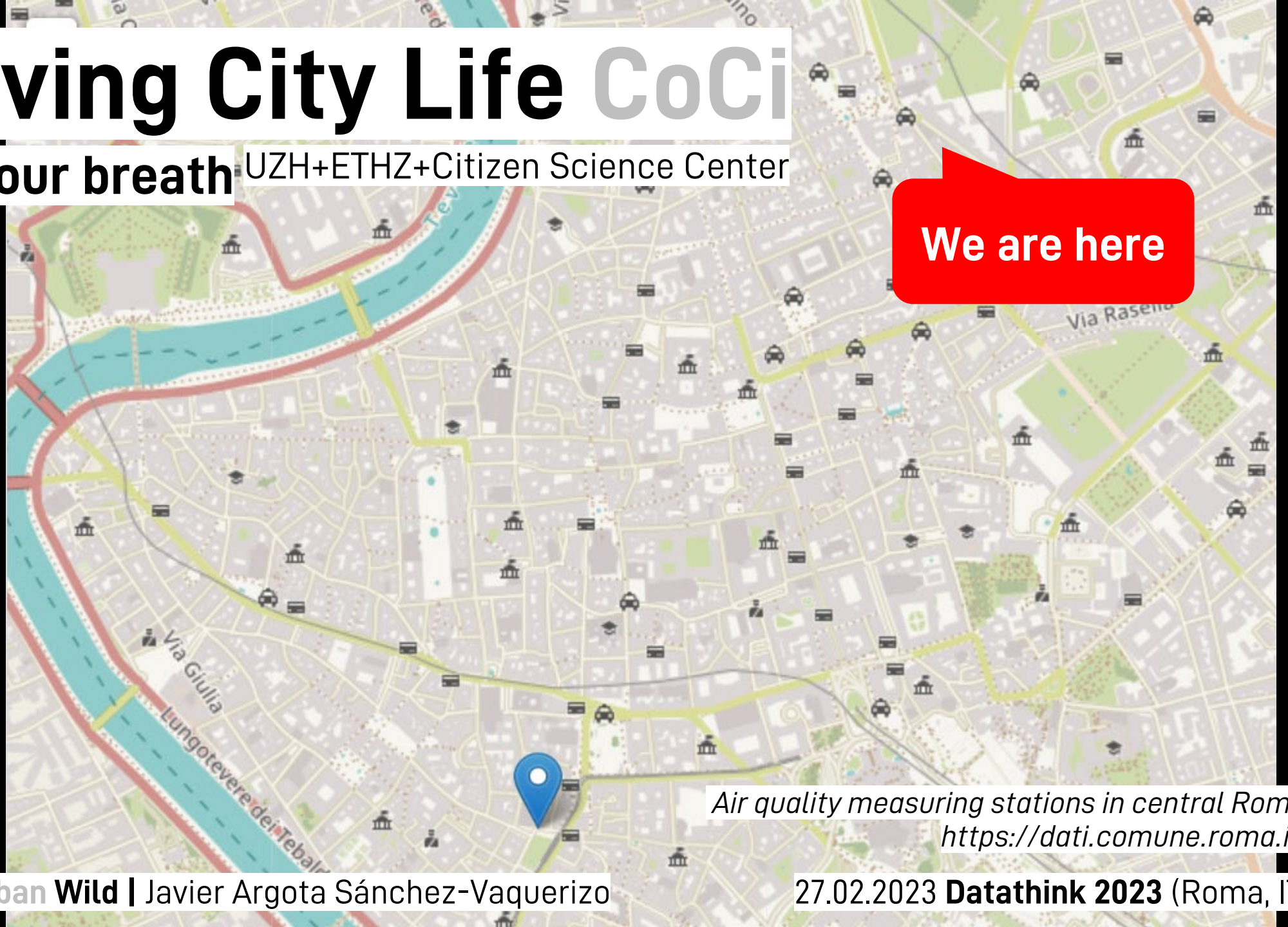

Air quality measuring stations in central Rome:
https://dati.comune.roma.it/

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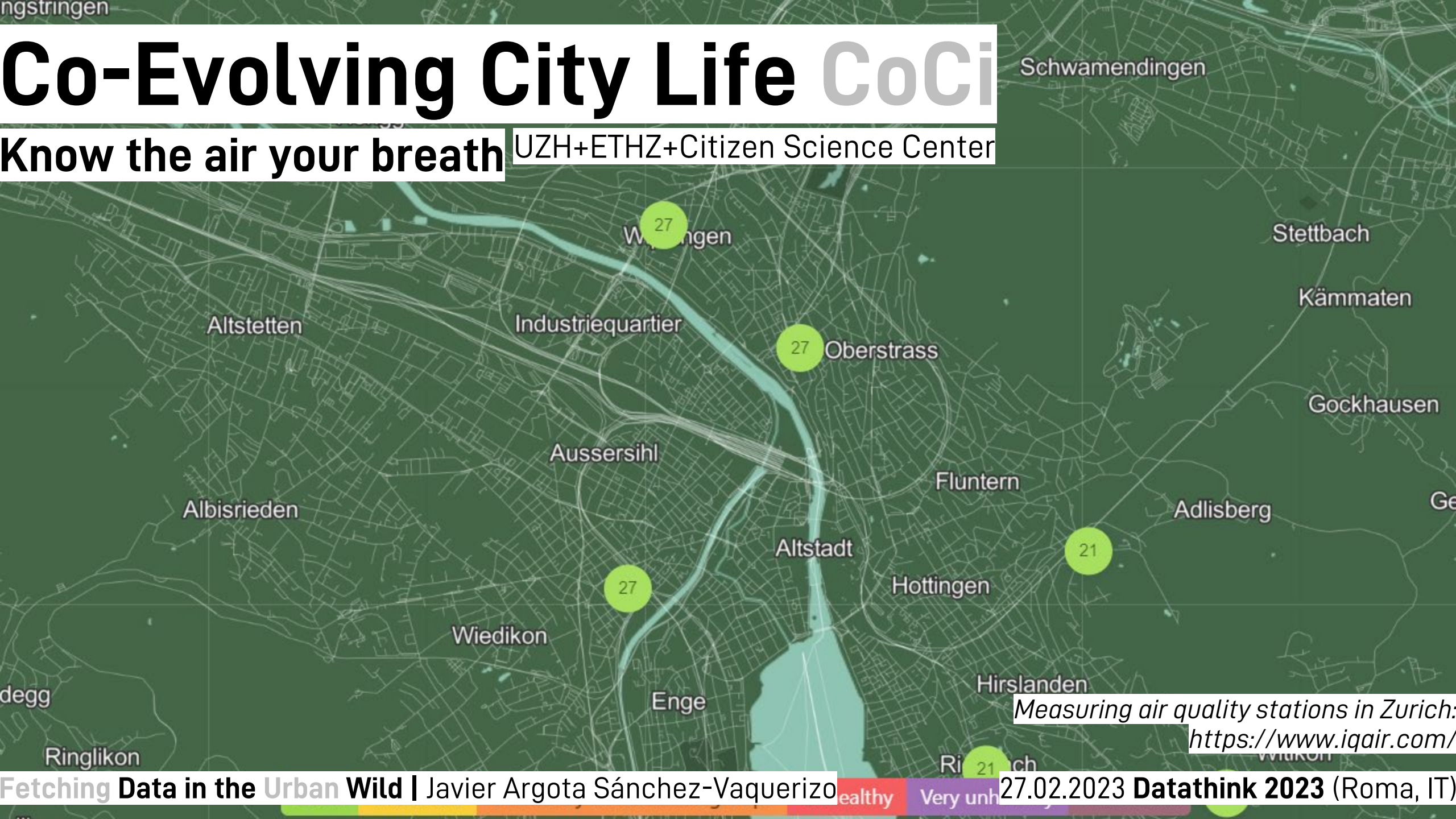

Measuring air quality stations in Zurich:
https://www.iqair.com/

Multisensor Data Fusion

This exercise invites to explore **how to combine and aggregate data** which **differs** in specifications (i.e., aggregation, scope, type, topic, format, source) effectively for storage, analysis and visualization.

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The type of data and sensing devices initially proposed are:

- GPS tracks from location devices (i.e. smartphones, smartwatches, activity trackers, etc.)
- Gas / air quality data from the CoCi's CoSense unit by COSS@ETHZ
- GQ multimeter for electric+electromagnetic+radiofrequency

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One-fits-all does not work, this is just one possible pipeline

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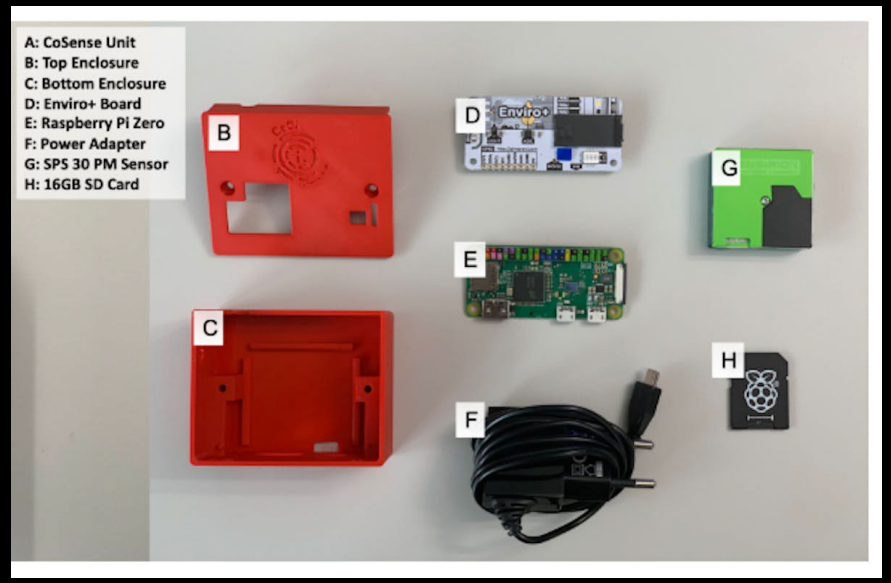
Some sensors

CoSense Unit



Credit: *Dr. Sachit Mahajan*

Temperature

Humidity

PM1

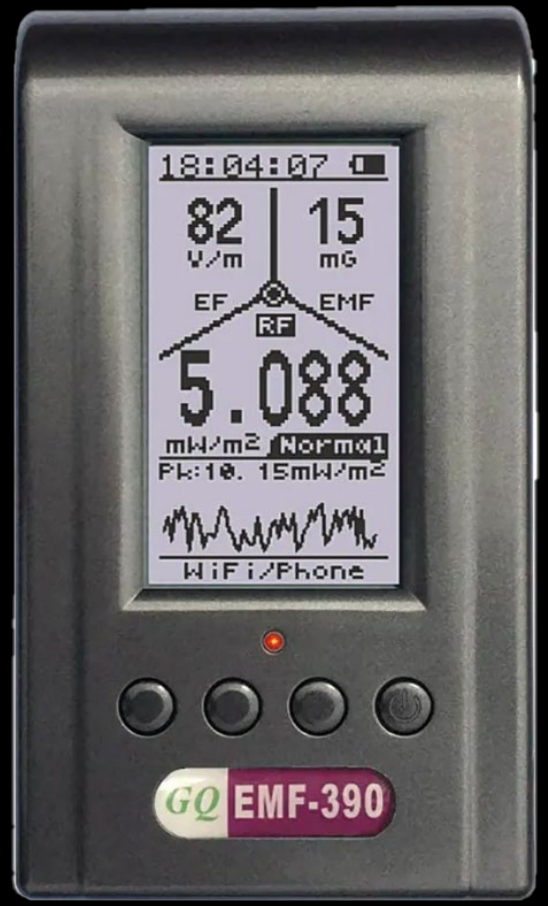
PM2.5

PM5

...

Some sensors

GQ EMF-390



Electric field

Electro-magnetic field

Radio-frequence

...

Some sensors

Garmin Forerunner 55

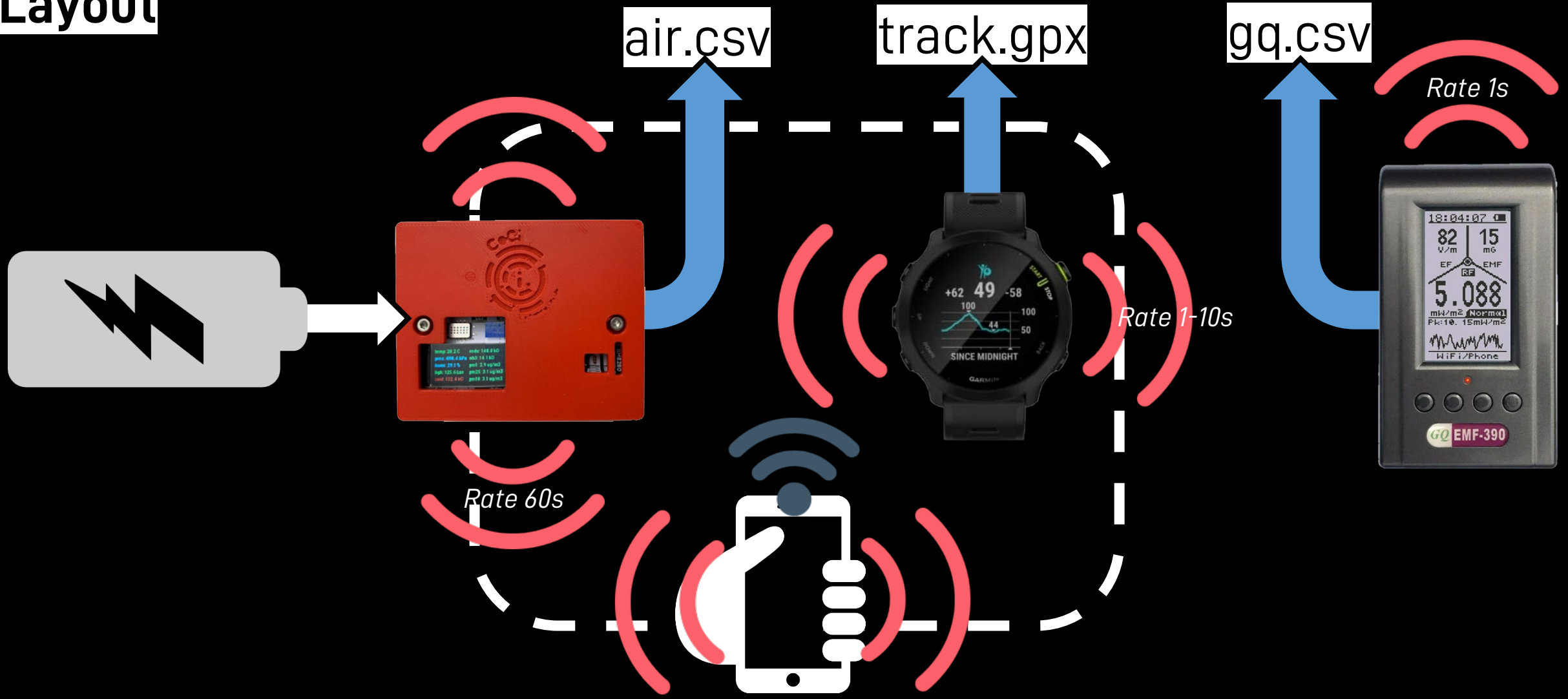
GPS

(biometrics)

...

Some sensors

Layout



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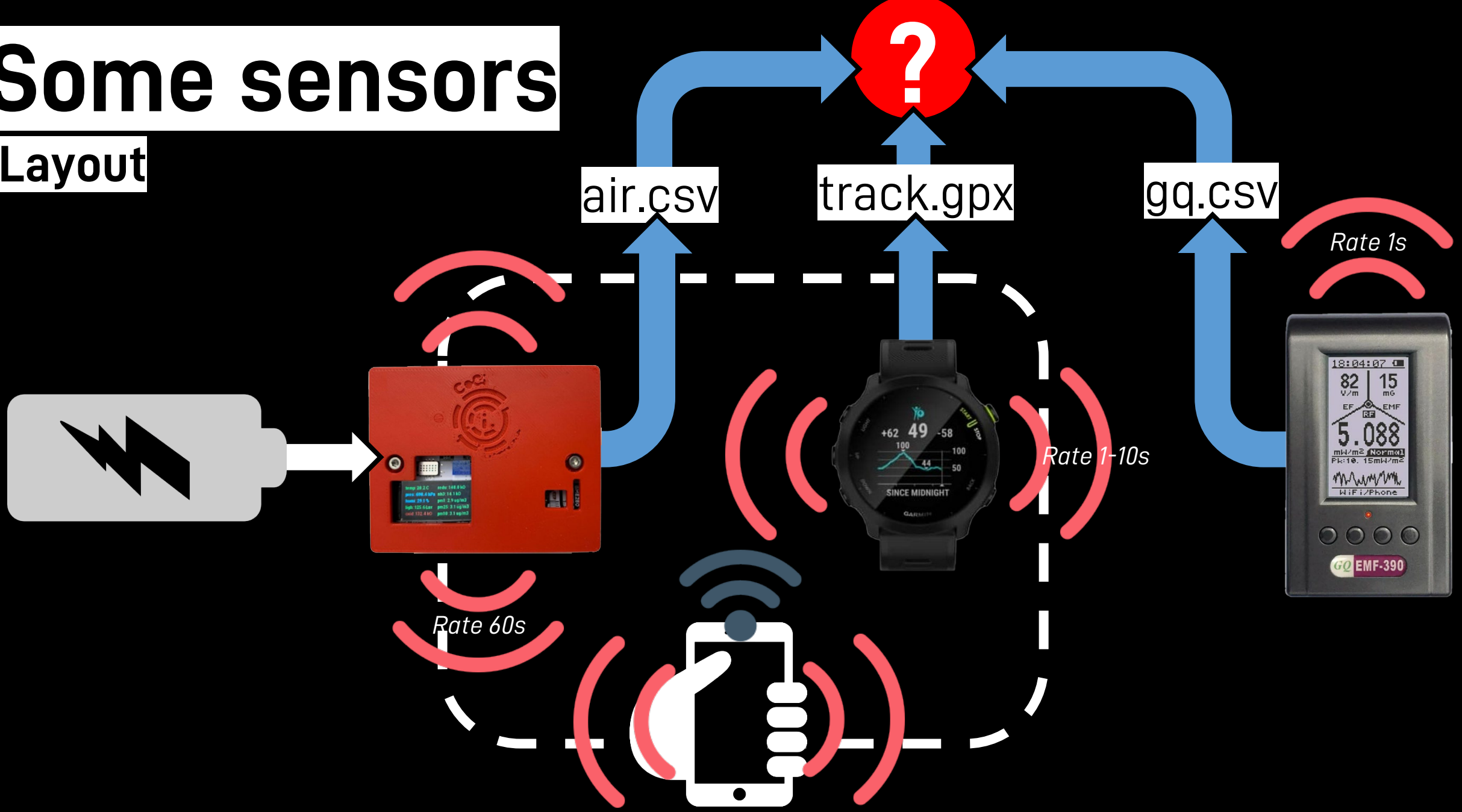

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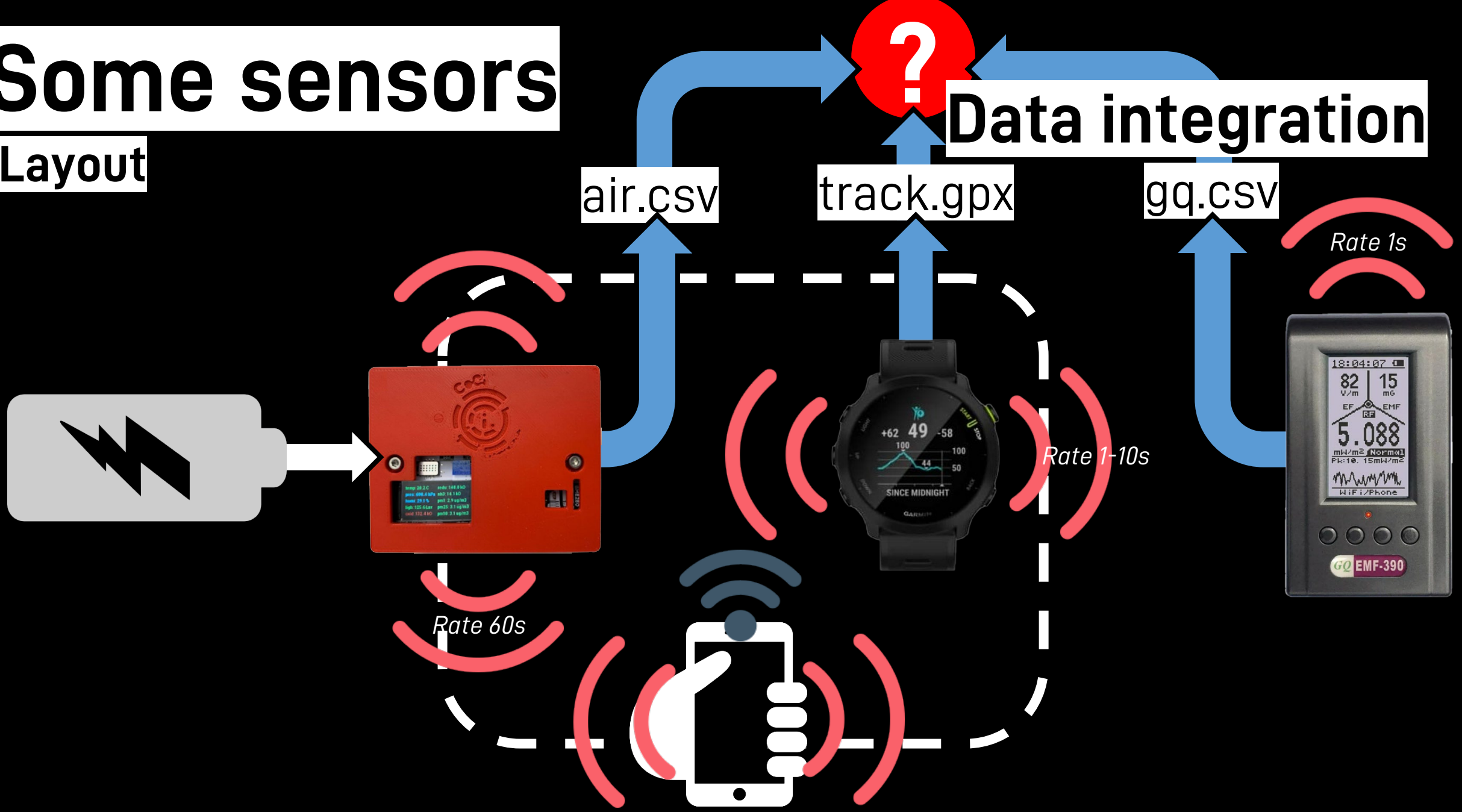

Data integration

To keep in mind

- Explore and understand your data (type, scope, format, completeness)
- Find the common points between your data sets
- Clean, transform, and adapt (80 % of work)
- Design a clear pipeline
- Share your finding with amazing viz (the extra mile, but accounts for the 80% of the impact into your audience)

Data integration

Types of data: many faces

- Variability: Static vs Dynamic
- Spatial dimension: Points, Lines, Polygons, Volumes.
- Definition: Concrete vs Continuous.
- Has measurement?: Qualitative vs Quantitative.
- Attachment to reality: Real vs Synthetic.
- Format.
- Medium.
- Density.
- Completeness.

Thank you