CityZcanHub User Guide

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CityZcanHub is a modular, portable, and cost-effective environmental sensor unit designed to document urban heat island (UHI) effects and environmental conditions. The device captures temperature, humidity, air quality data, as well as visual and thermal images.

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1. Usage

1.1. Key Features

- **Modular and portable design:** lightweight and flexibly deployable device
- **Multisensor measurements:** temperature, humidity, air quality, thermal and visual camera
- **Real-time data access:** via Wi-Fi hotspot or 4G modem
- **Web dashboard:** data visualization
- **8-hour battery runtime:** ideal for urban fieldwork and measurement campaigns

1.2. Use Cases

CityZcanHub is a versatile measurement system that can be used across different levels of the urban environment:

- Mapping urban heat island (UHI) effects
- Assessing the cooling effect of green infrastructure (e.g., trees, parks)
- Comparing the heat reflectivity of pavements and rooftops
- Educational applications (e.g., environmental workshops, student research)
- Community data collection campaigns, participatory science
- Calibration of satellite measurements using ground reference points

2. Technical Specifications

CPU & Controller	Raspberry Pi Zero 2 W
Communication	u-blox NEO-M8N GNSS module + SIMCom A7670E LTE
Camera (visual)	Raspberry Pi Camera v3
Thermal Camera	FLIR Lepton 3.5
Air Quality Sensors	SPS30 (PM1.0, PM2.5, PM4, PM10), BME680 (VOC, temperature, RH, pressure)
Data Storage	microSD card, accessible via Samba (SMB)
Battery	10,000 mAh Li-ion (~8 hours operation)
Charging	Via USB-C power adapter

3. Deployment

3.1. Placement

- It is suitable for both stationary installation and mobile deployments
- Do not block ventilation openings (required for sensor operation).

3.2. Powering On, Shutdown and Restart with PiVoyager

The CityZcanHub is powered by the **PiVoyager** smart UPS module, which:

- Charges the battery via USB
- Includes a real-time clock (RTC)
- Manages Raspberry Pi startup and shutdown

Power On

- Hold the power button for 3 seconds

Shutdown

- Hold the power button till shutdown
- Software control (via Voyager over I2C)

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4. Data Management and Access

4.1. Wi-Fi and Network Access

- Raspberry Pi operates as a hotspot
- Once connected, data can be accessed via SMB (Samba) file sharing through the dashboard

4.2. Dashboard

Access locally via: http://[IP] (when connected to the device hotspot)

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5. Contact and Support

- Email: info@ideas-science.com
- Website: https://city.zcan.eu/