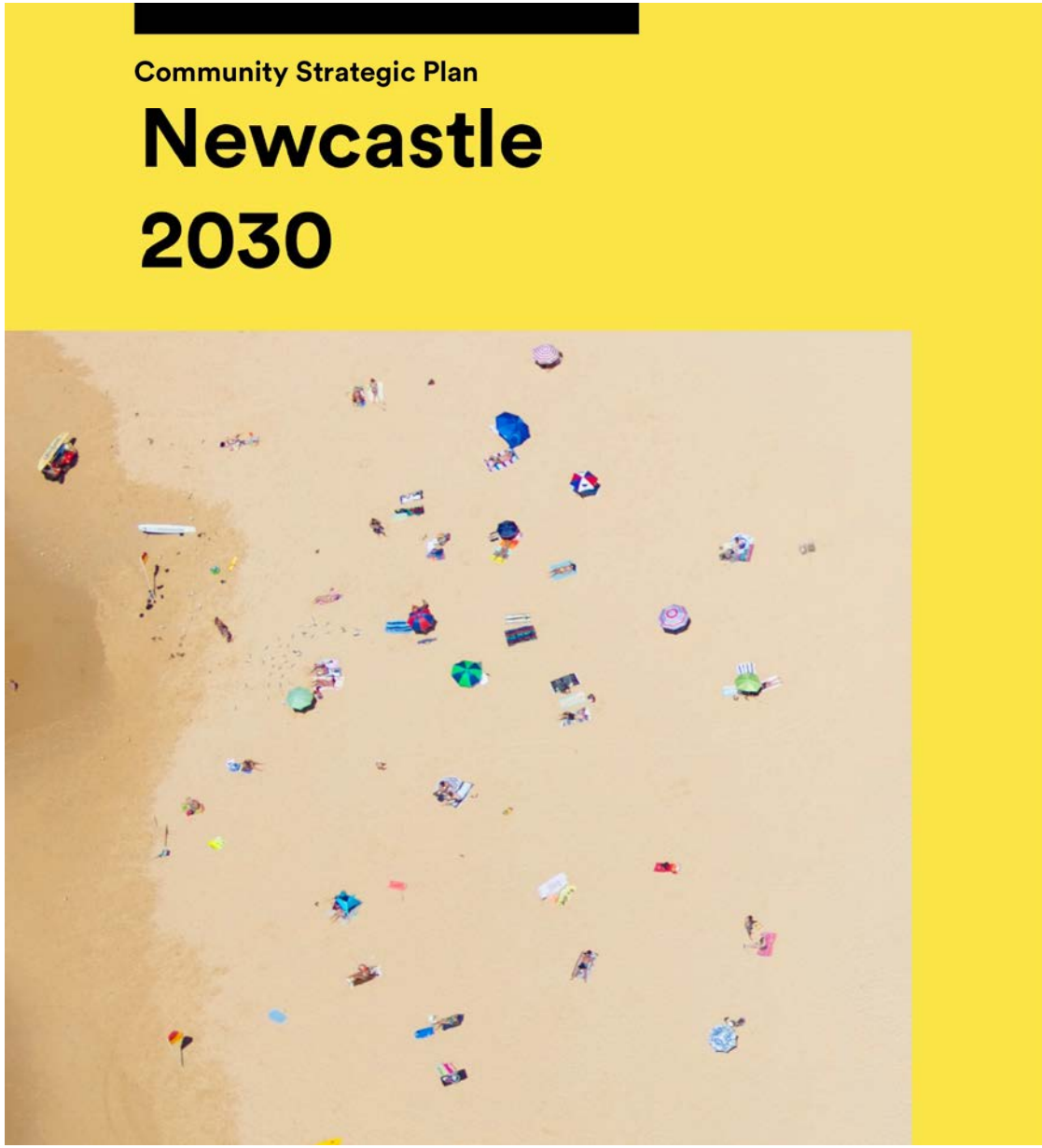
City of Newcastle

Environmental Sensing Network

Newcastle Community Consultative Committee Update

In 2030, Newcastle will be a **smart**, liveable, sustainable global city

Smart: refers to a city that puts its community at the centre; enjoys smart and digitally connected urban and public infrastructure; and works to develop a thriving ecosystem to drive innovation and creativity



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Smart City Vision

Newcastle is an open and connected smart city that uses technology to make things easier, more liveable and sustainable for everyone

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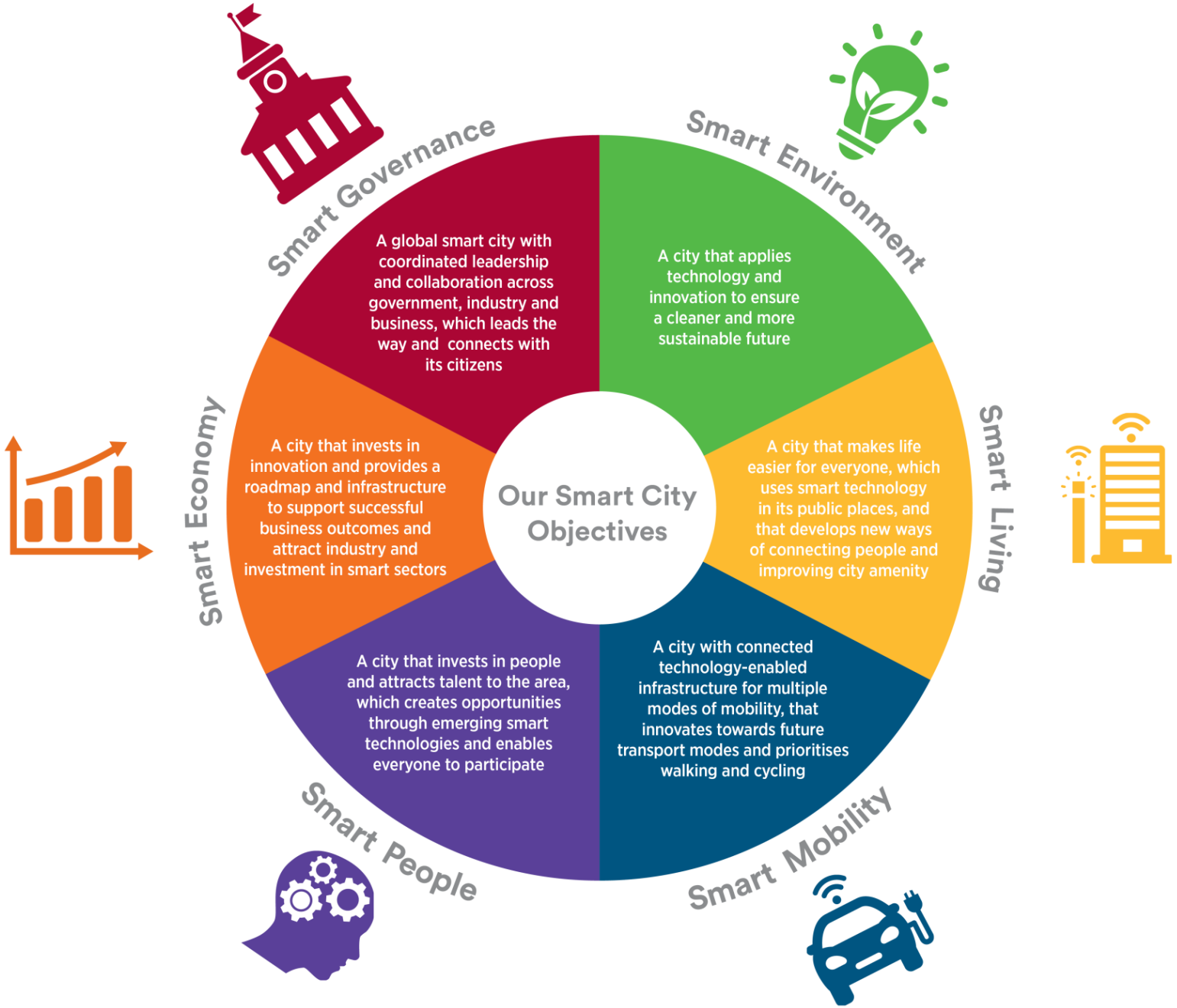
SMART CITY STRATEGY

The Newcastle Smart City Strategy is structured around six focus areas

In 2018 it was awarded best Australian strategy by the Smart Cities Council of Australia and New Zealand



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LoRaWAN – Briefest overview ever

What is LoRaWAN?

- Allows low powered devices to communicate over long distances

Why does that matter?

- Battery life
- Access to communications networks
- Cost

How does it do it?

- By sending small packets of data relatively infrequently.
- This saves battery power meaning a single sensor can last for years in the field.

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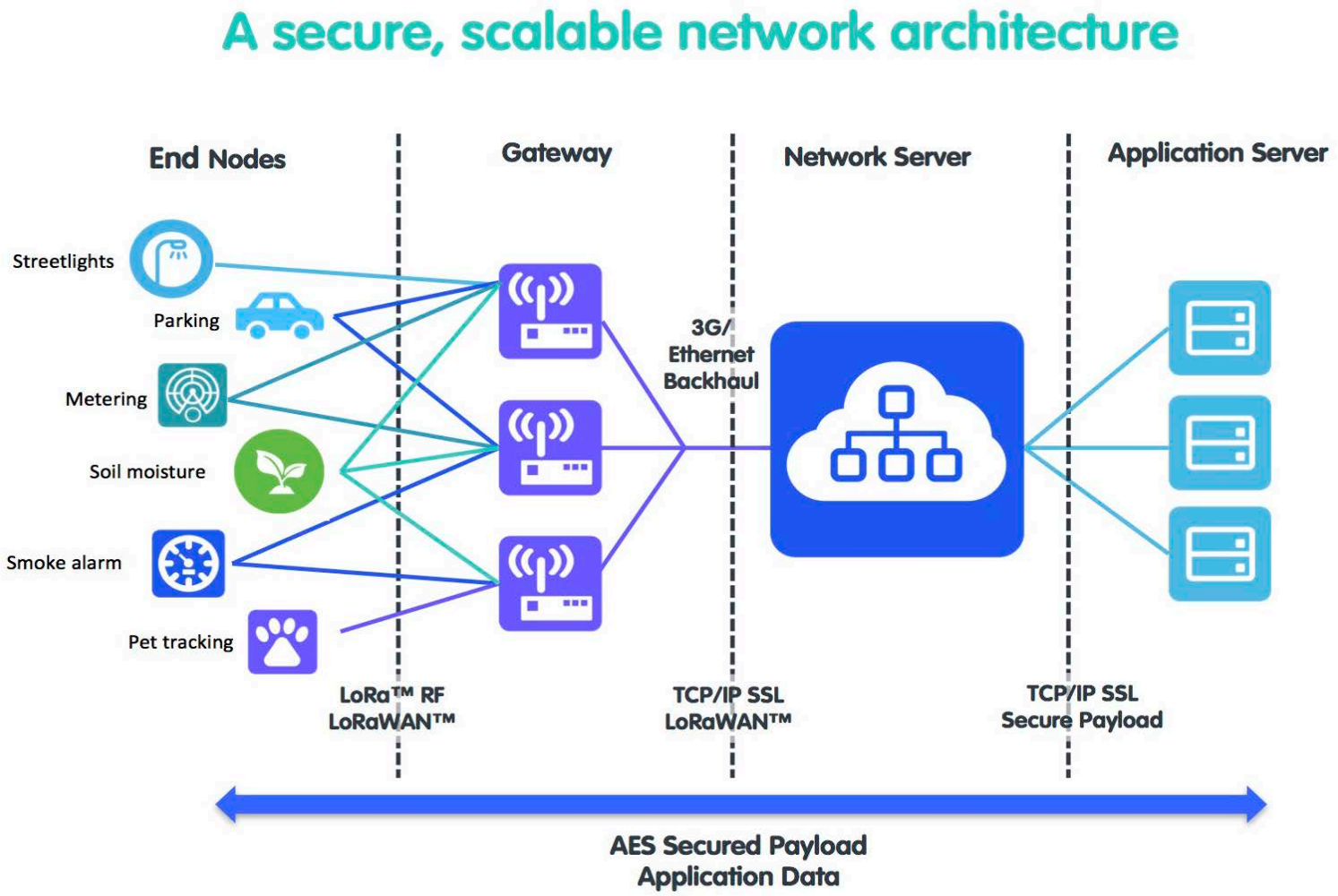
LoRaWAN – Network Architecture



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LoRaWAN – City of Newcastle Approach

What are we doing?

- Built a LGA wide LoRaWAN Network.

Where did we get the money?

- State Government – Hunter Innovation Project
- Federal Government – Smart Moves Newcastle
- City of Newcastle – Co-investment

Who is helping us?

- NNNCo

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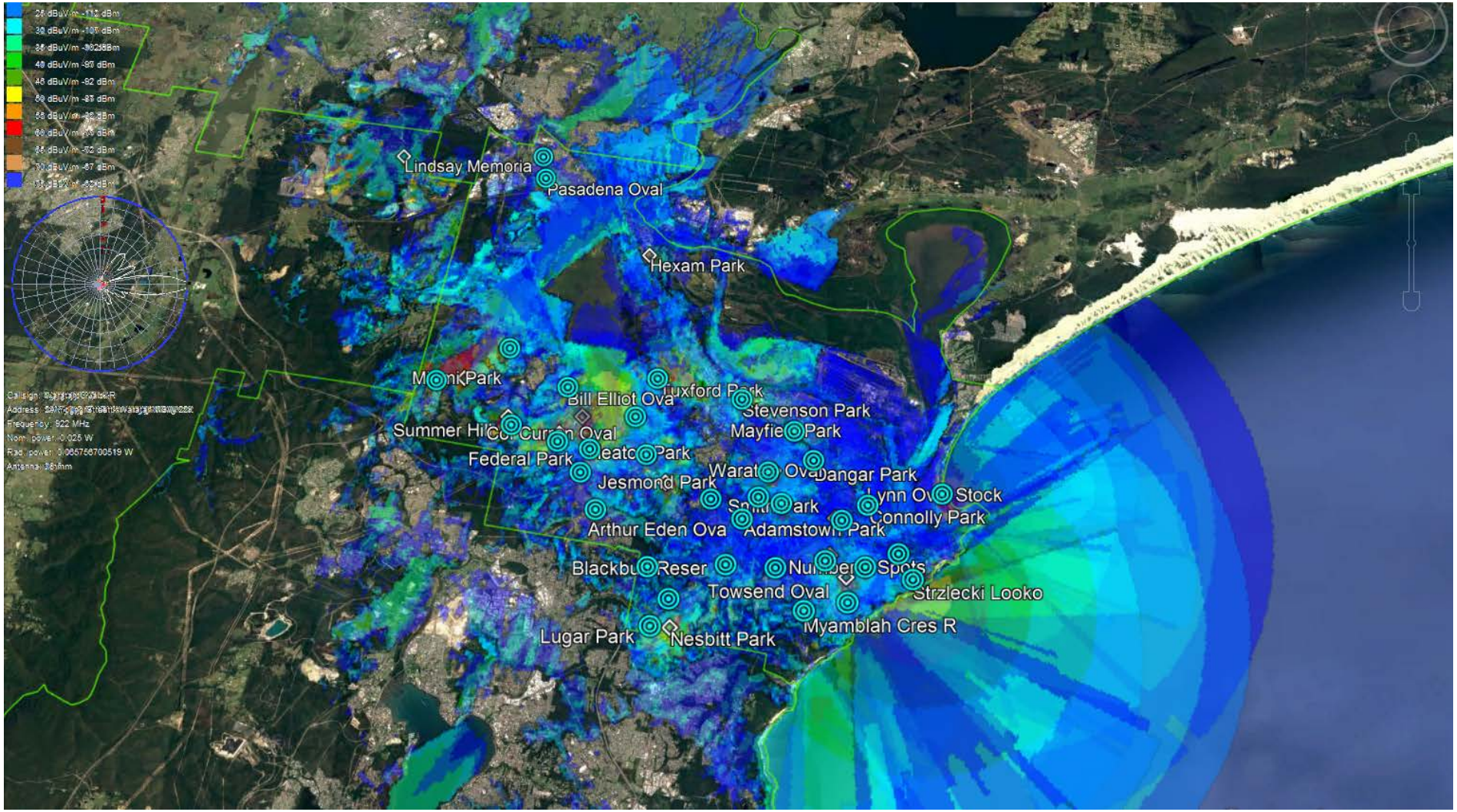
SMART LIVING

LoRaWAN – Gateway Locations

City of Newcastle

SMART LIVING

LoRaWAN – Gateway Locations



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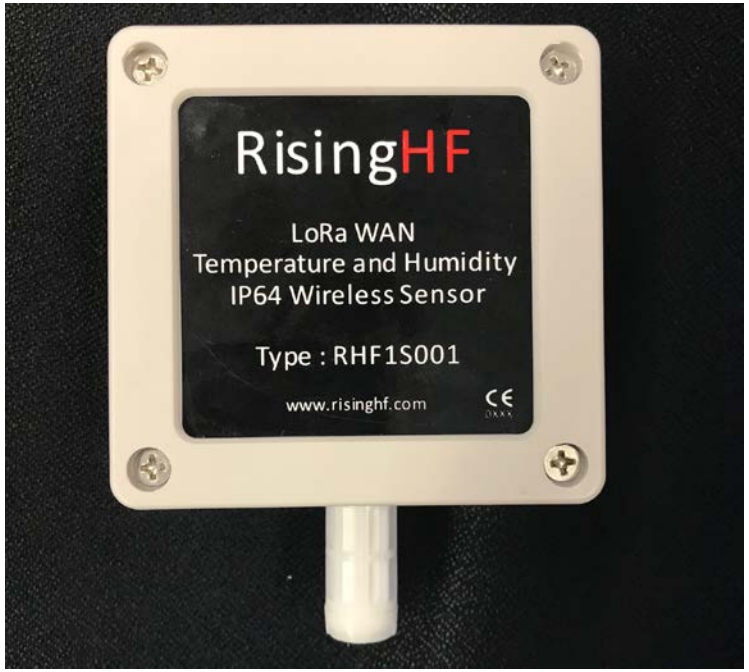
Sensors

libelium
libelium
Smart Cities PRO
libelium


RisingHF
LoRa WAN
Temperature and Humidity
IP64 Wireless Sensor
Type : RHF1S001
www.risinghf.com

LoRaWAN – Sensor types deployed

Environmental

- Temp and Humidity
- Air Quality
- CO2
- Water Moisture
- Water flow

Service Oriented

- Parking
- Garbage Bins
- Water Meter
- Power Meter

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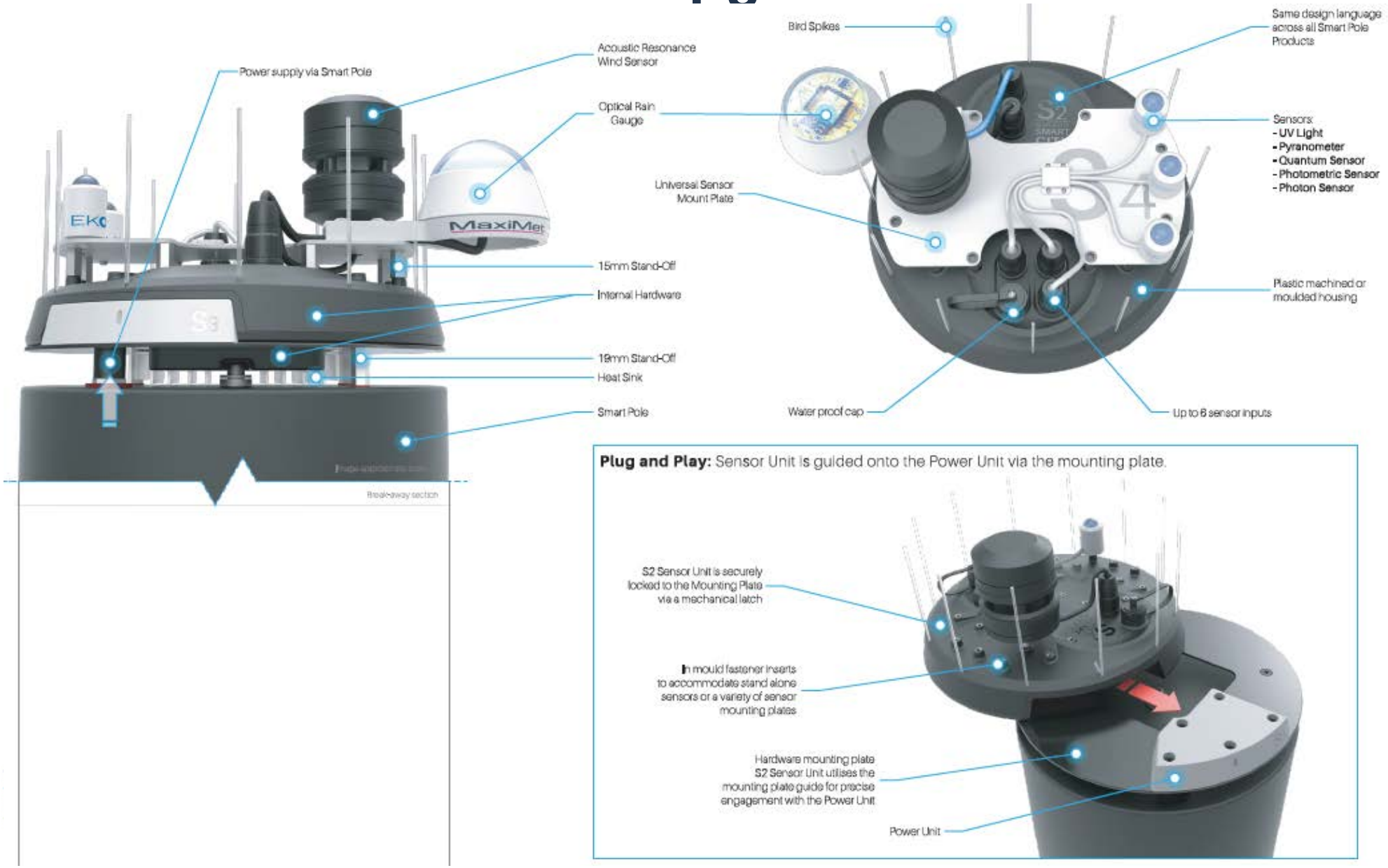
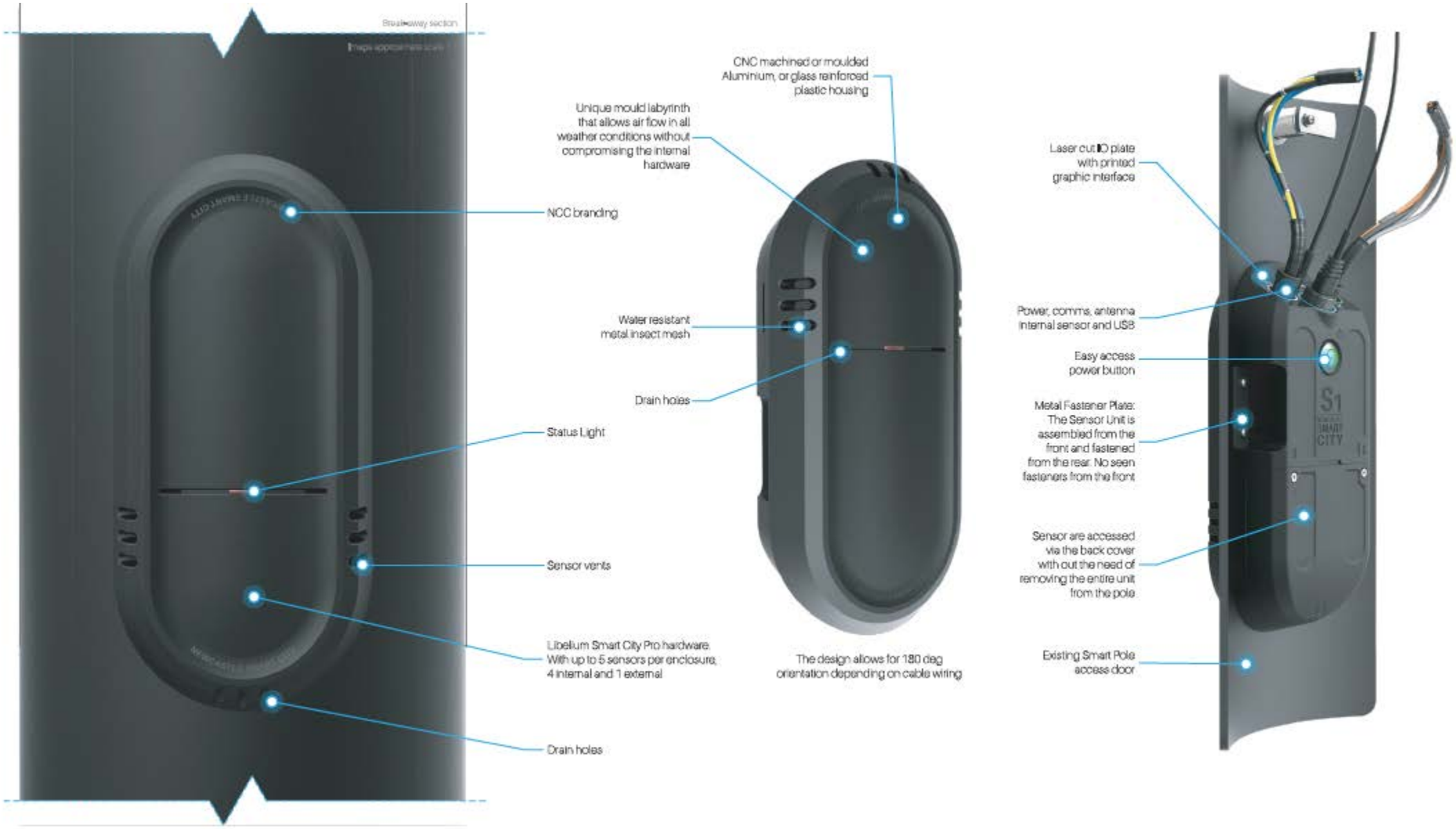
LoRaWAN – Potential Air Quality Capabilities

- Carbon Monoxide (CO) [Calibrated] (low and high concentrations)
- Carbon Dioxide (CO_2) [Calibrated]
- Molecular Oxygen (O_2) [Calibrated]
- Ozone (O_3) [Calibrated]
- Nitric Oxide (NO) [Calibrated] (low concentrations)
- Nitric Dioxide (NO_2) [Calibrated]
- Sulfur Dioxide (SO_2) [Calibrated] (high accuracy)
- Ammonia (NH_3) [Calibrated] (low and high concentrations)
- Methane (CH_4) [Calibrated] – and other combustible gases
- Molecular Hydrogen (H_2) [Calibrated]
- Hydrogen Sulfide (H_2S) [Calibrated]
- Hydrogen Chloride (HCl) [Calibrated]
- Hydrogen Cyanide (HCN) [Calibrated]
- Phosphine (PH_3) [Calibrated]
- Ethylene Oxide (ETO) [Calibrated]
- Chlorine (Cl_2) [Calibrated]
- Particle Matter (PM1 / PM2.5 / PM10) - Dust Sensor
- Temperature
- Humidity
- Atmospheric pressure
- Luminosity (Luxes Accuracy) for Smart Lighting
- Ultrasound (distance measurement)

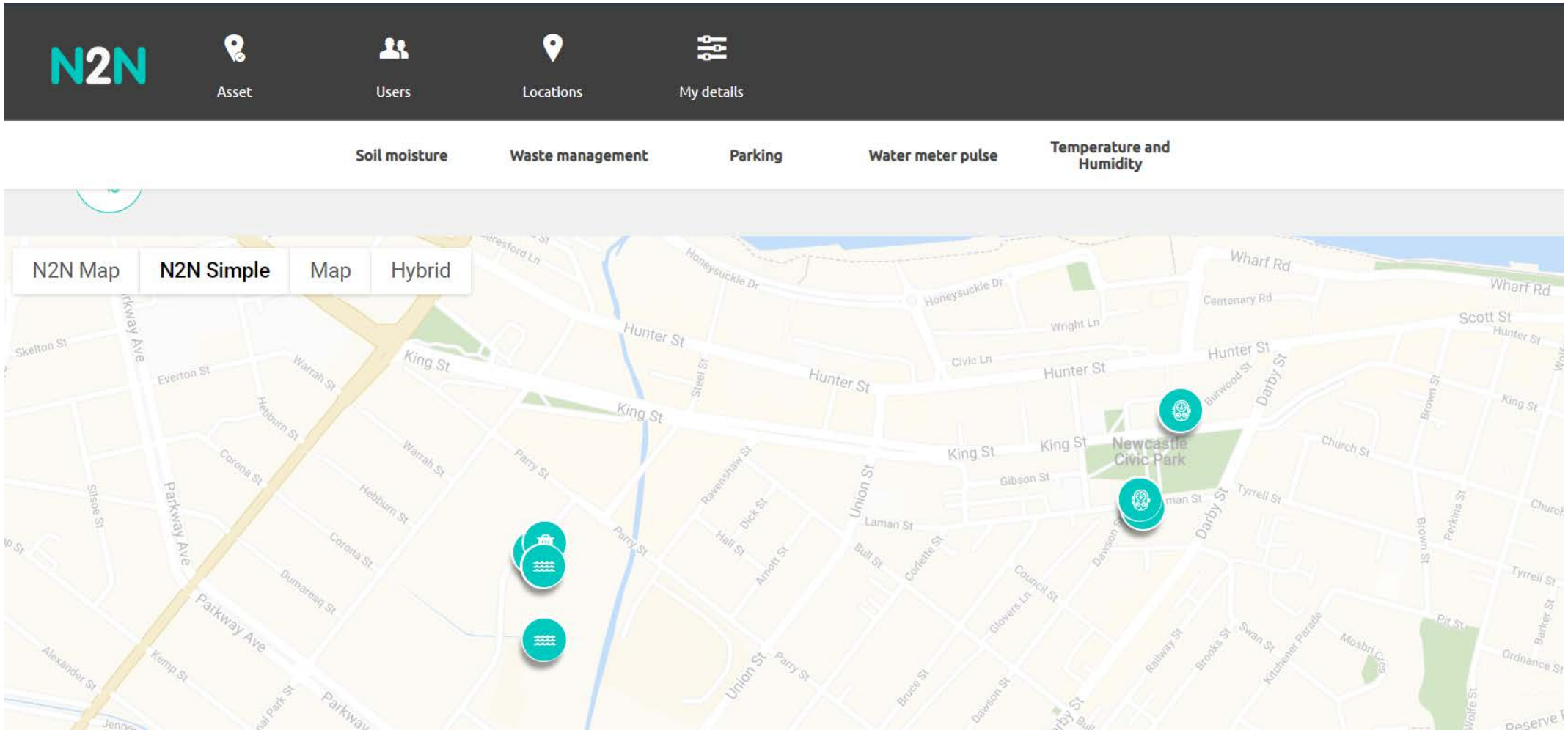
Sensors – Smart Pole Upgrade



Sensors – Smart Pole Upgrade



LoRaWAN – Data Visualisation and Sharing



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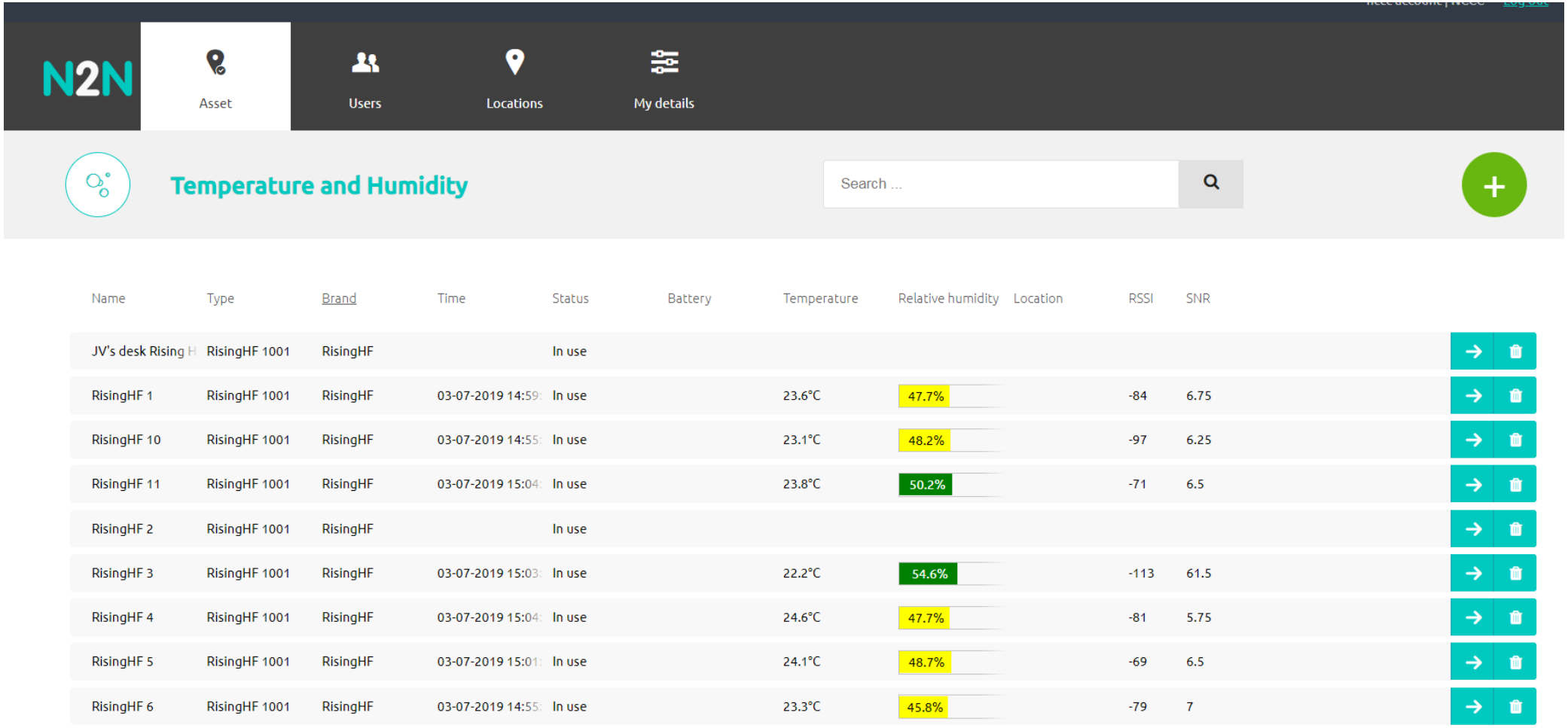
LoRaWAN – Data Visualisation and Sharing



Name	Type	Brand	Time	Status	Battery	Temperature	Relative humidity	Location	RSSI	SNR
JV's desk Rising H	RisingHF 1001	RisingHF		In use						
RisingHF 1	RisingHF 1001	RisingHF	03-07-2019 14:59:	In use		23.6°C	47.7%		-84	6.75
RisingHF 10	RisingHF 1001	RisingHF	03-07-2019 14:55:	In use		23.1°C	48.2%		-97	6.25
RisingHF 11	RisingHF 1001	RisingHF	03-07-2019 15:04:	In use		23.8°C	50.2%		-71	6.5
RisingHF 2	RisingHF 1001	RisingHF		In use						
RisingHF 3	RisingHF 1001	RisingHF	03-07-2019 15:03:	In use		22.2°C	54.6%		-113	61.5
RisingHF 4	RisingHF 1001	RisingHF	03-07-2019 15:04:	In use		24.6°C	47.7%		-81	5.75
RisingHF 5	RisingHF 1001	RisingHF	03-07-2019 15:01:	In use		24.1°C	48.7%		-69	6.5
RisingHF 6	RisingHF 1001	RisingHF	03-07-2019 14:55:	In use		23.3°C	45.8%		-79	7

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LoRaWAN – Projects

Current Pi

- Pilots (parking, Waste, Temp & Humidity, Soil Moisture, Water meter)
- Environmental Sensing
- In Building Sensing

Planned

- Smart Parking
- Water Level Monitoring
- Smart Bins
- Environmental Sensing

LoRaWAN – Opportunities

Research

- Universities
- CSIRO / Data61
- Living Lab

Trials

- Utilities
- Government Agencies
- Commercial entities
- Other Third parties

Outcomes

Better service local community needs

Stimulate economic development and investment activity

Improve Council operational efficiency

Achieve higher levels of sustainability

Increase community inclusion and participation

Position Newcastle as a smart city internationally

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