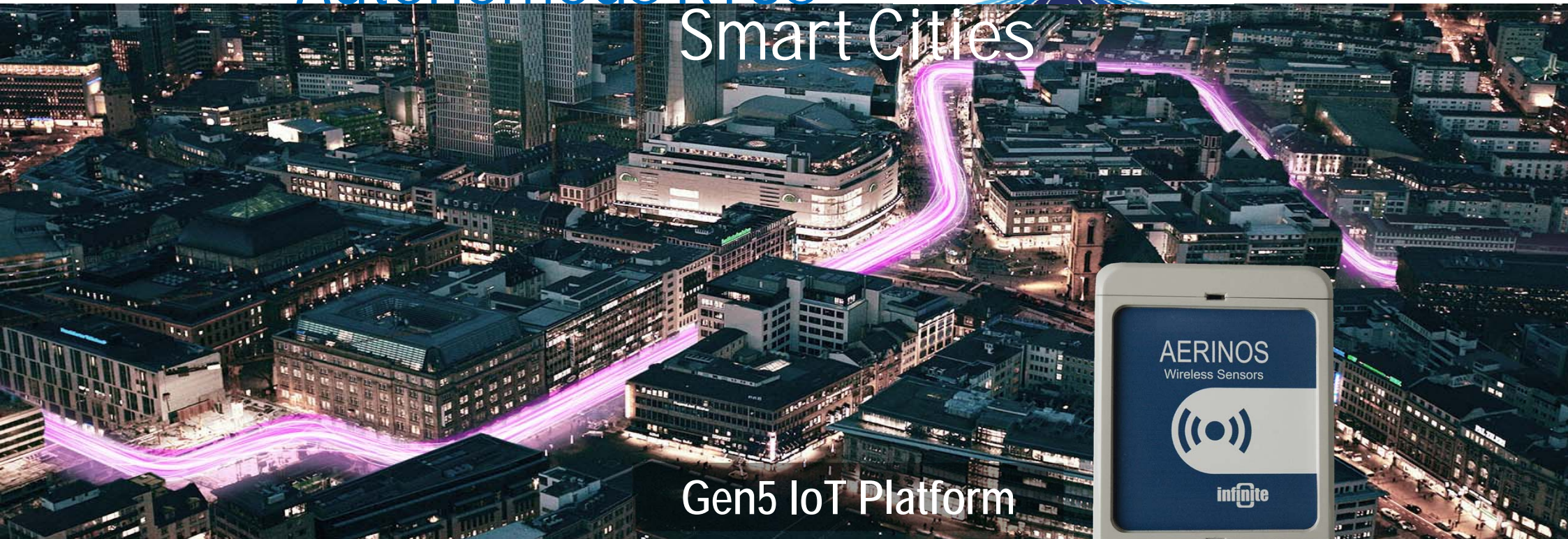


Autonomous RTUs Smart Cities



Gen5 IoT Platform



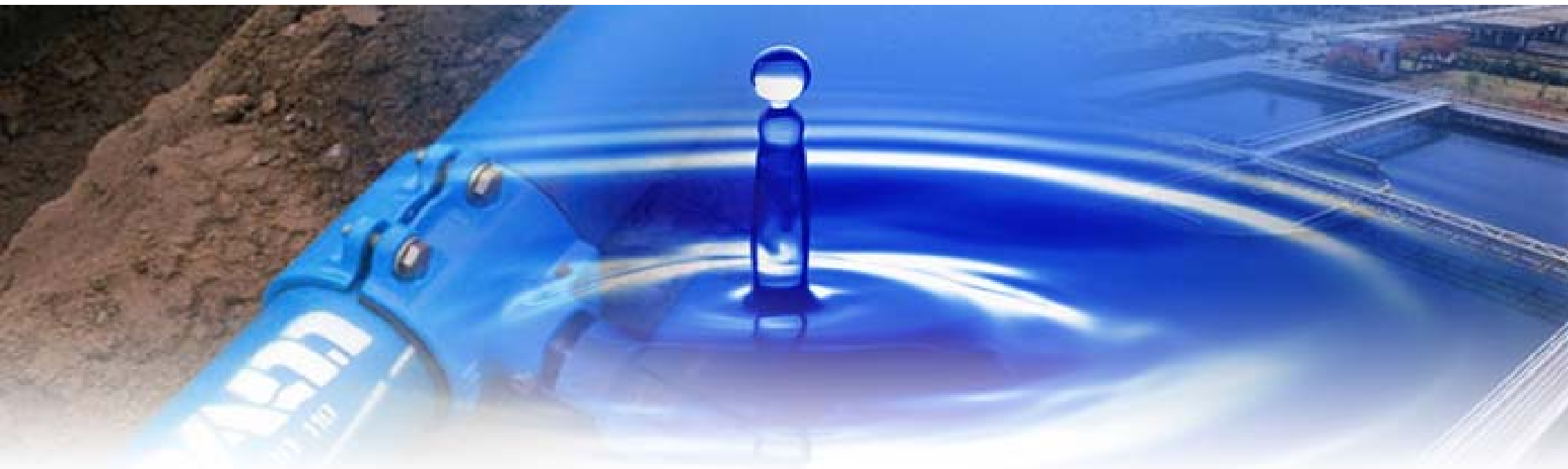
Design Principles

Autonomous RTUs are flexible devices allowing any modern power source scheme.

They are designed to operate autonomously using single lithium battery cells achieving maximum reliability, and long term solution robustness with operational lifetime >10+ years.

They can work on mains or photovoltaic power with automatic failover to internal lithium battery on power shortage.

They can be used in hybrid power solutions combining lithium battery for telecommunications with rechargeable power sources for sensor excitation allowing mixed power media applications seamlessly.



Water resources management

- Level & flow
- Groundwater monitoring
- Lake and reservoir level monitoring
- Leak detection in distribution pipelines
- Sewer water monitoring
- Water quality monitoring





Power grid

Earth fault detection and localization in urban power distribution systems.

In combination with earth ground fault detection relays,

- Seamless connection to SCADA via OPC server
- Earth faults can be located in the first minute after occurrence.
- Significant reduction of the CAIDI and SAIDI reliability indicators





Gas Distribution

- Flow and pressure
- Moisture and leak detection
- LPG level measurement on Gas Storage Tanks





Cathodic Protection

- Voltage DC
- Voltage AC
- Current
- Transient voltage drop



Rail & Train Wireless IoT Systems



Continuous monitoring of infrastructure minimizes dangerous conditions and eliminates accidents.

Rail line mount sensors

- Vibration monitoring of rail lines and slippers
- Temperature, ice, rain monitoring of rail lines

Alarming

- Embankment collapse alarming
- Structural monitoring of bridges, crossings





Environmental Monitoring

Air quality measurements

- Ozone, nitrogen dioxide, sulphur dioxide, carbon monoxide

Impact measurements in rivers

- pH, dissolved oxygen, conductivity, turbidity, color

Soil quality and sustainability

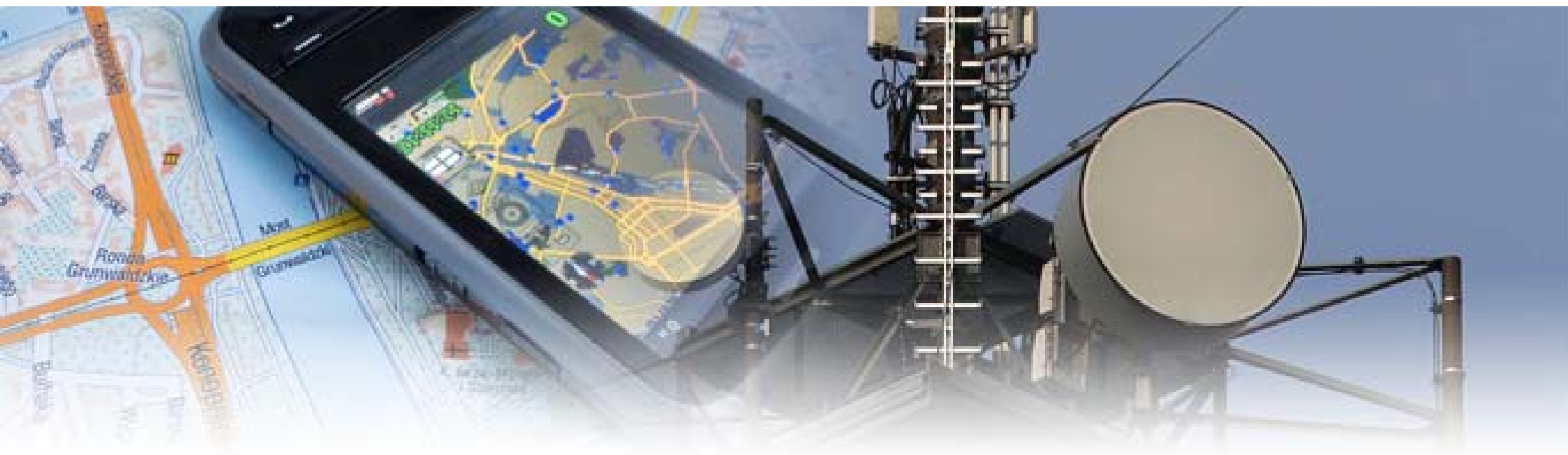
- Soil moisture, electrical conductivity, temperature

Itrón



IoT Autonomous RTUs

Application: Environment



Off-grid general purpose monitoring

- Generator voltage, current
- Diesel fuel tank level
- Backup battery readiness
- Fire, Smoke & water
- Intruder alarming
- Door open and motion detection

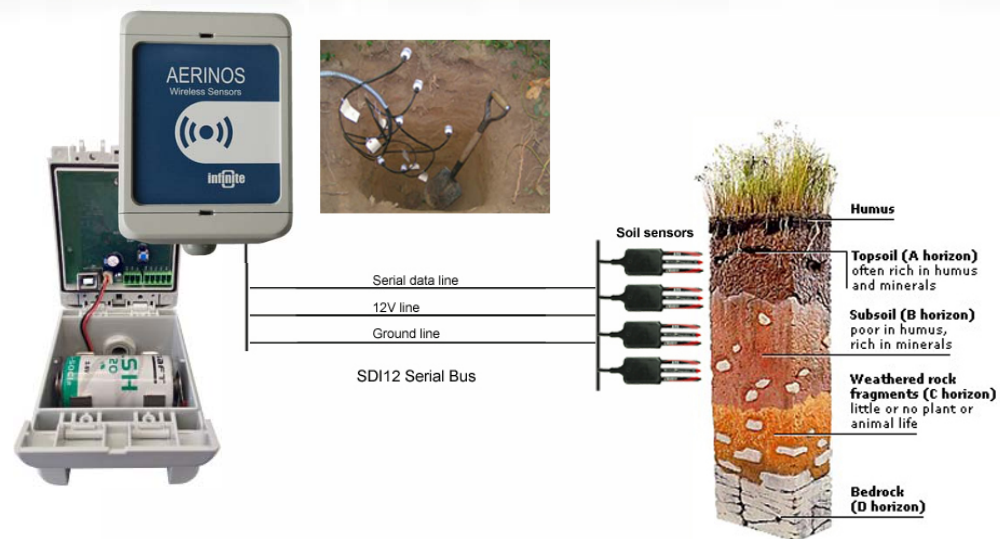




Precision Agriculture

Agriculture related weather measurements:

- Solar radiation
- Air temperature and relative humidity
- Wind speed and direction
- Rainfall
- Soil temperature and moisture
- All in one weather stations



IoT Autonomous devices

ADS-410, Itron IoT wireless end nodes

Autonomous IOT unit to connect any sensor for telemetry applications. The unit sends data to the cloud using the Itron Network.

It incorporates the Milli 5 embedded wireless communication module for connection to this network. The unit is battery powered for autonomous operation.

The purpose of the device is to connect multiple sensors from any vendor such as analogue (0-20mA, 0-1V), SDI12, RS485 Modbus, measure and transmit the data over the Itron network.

The ADS-410 can also power the sensors with up to 250mA@12VDC using its 3.6V lithium battery.

All telemetry applications can be realized with the ADS-410.

IoT Autonomous devices



ADS-410, Itron IoT wireless end nodes

Power supply:	3.6V, 13-18 Ah Lithium Thionyl battery, D-size 5VDC mains or photovoltaic power
Consumption :	Continuous 18 μ A
Discrete inputs:	IN1, configurable as: Digital input, 0-30VDC Analog input, 0-1VDC, 12 bit resolution Digital counter, 1 KHz
SDI-12 Bus:	8 Channels, up to 3 sensor support.
RS-485, MODBUS:	8 Channels, up to 3 sensor support, ASCII/RTU.
Transducer excitation	12V/250mA, 5V/200mA
Wireless modem:	Milli 5 Itron Silver Spring networks
Antenna	internal or external
Messages:	Data, Alarm
Temperature:	-20°...+65°C, operating
Dimensions:	79.5 x 125 x 61 mm (with cable gland)
Housing:	IP66, IP68 Nema 4x



Battery lifetime

ADS-410 RTU/Itron powered by one 3.6V, 13Ah lithium-thionyl battery

Excitation @12V [mA]	Sample/Send rate [S/hour]	Sampling delay [sec]	Battery life [Years]
1	4	1	6.9
1	12	1	4.7
1	30	1	2.7
25	6	1	2.6
25	30	1	1
5	4	1	6.2
5	6	1	5.4
5	30	1	2.1
25	4	5	1.8
50	4	5	1
100	4	5	0.5

Sensors

Water application SDI12 & Modbus sensors



Submersible water level sensors



Ultrasonic water level



Water velocity

Multiparameter Sensors

Temperature, Conductivity, Depth, pH, Dissolved Oxygen, Turbidity, ORP, Blue-Green Algae, Chlorophyll, Ammonium, Nitrate, Chloride



Sensors

Environmental SDI12 & Modbus sensors



All in one weather stations

Ambient
Humidity & Temperature



Gas Sensors



Sensors



Wind Speed



Sun Radiation



Wind Direction

Sensors

Agriculture sensors

Leaf Wetness



Soil Moisture



Soil Moisture,
Conductivity,
Temperature



Soil Temperature



Sensors

Structural Engineering SDI12 sensors



Crack Propagation



Inclination

Critical
Structure
Monitoring



Bridge suspension



Sensors

Structural Engineering SDI12 sensors



Inclination

Crack Propagation

Critical
Structure
Monitoring



Sensors

Power Grid & Industrial



Earth Ground Fault
alarming



Substations & Transformers



Multifunctional RTUs, PLCs



Current Transformers

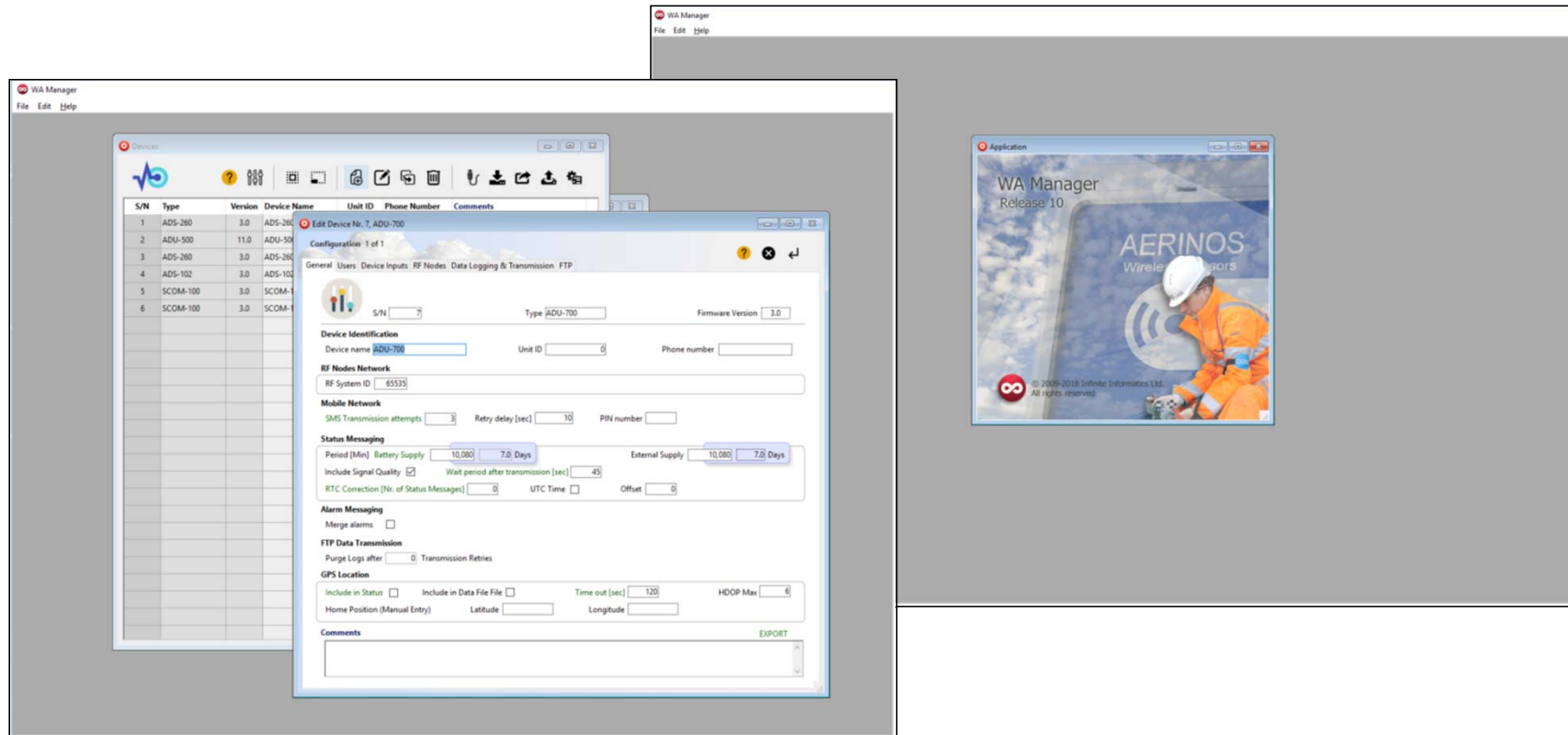


4-20mA, 0-20mA, 0-10V, 0-1V sensors



Fault passage indicators

WA Manager – Windows software to configure devices



Losant - Cloud Telemetry

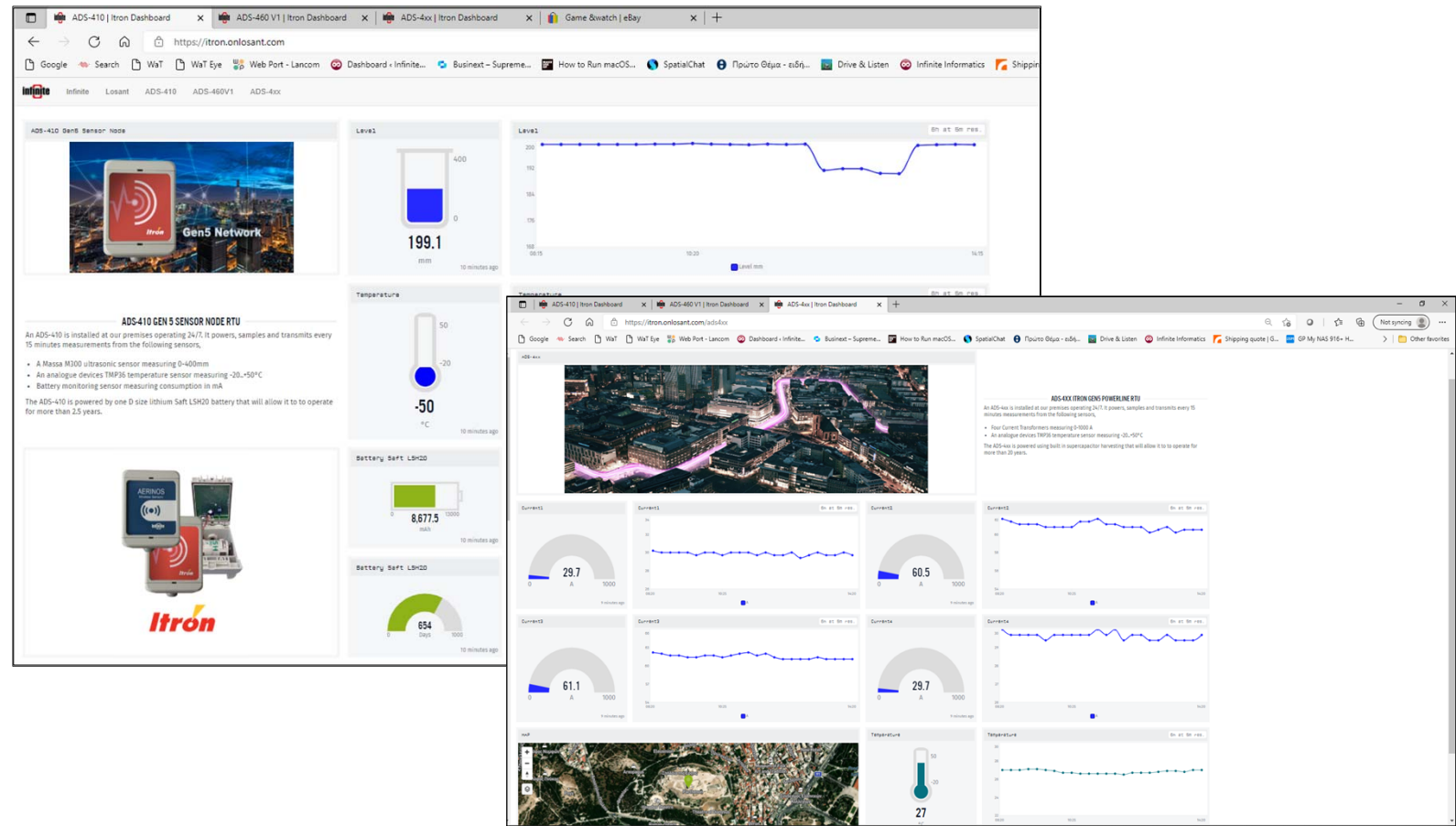


Live at Losant
ADS-410, ADS-460, ADS-470

<https://itron.onlosant.com>

User: guest@infinite.com.gr

Pass: infiniteitron

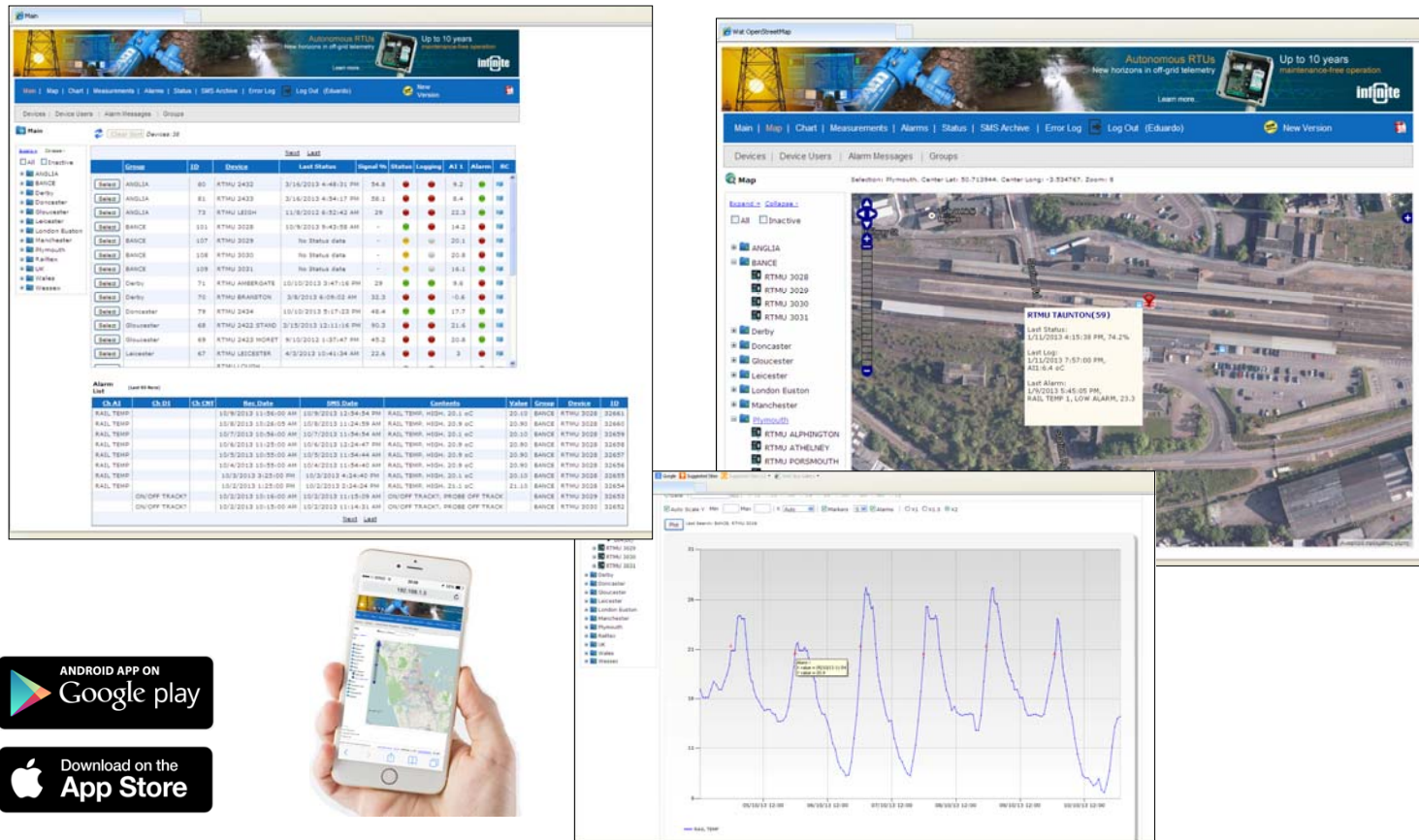


IoT Autonomous RTUs

Cloud Telemetry

WaT - Web aided Telemetry

Cloud telemetry platform with GIS information



IoT Autonomous RTUs

Cloud Telemetry



WaT - Web aided Telemetry

Cloud telemetry platform with GIS information

The screenshot displays the WaT web interface. The top navigation bar includes links for Main, Map, Chart, Measurements, Alarm Events, Alarm ACK, Status, GPS, File Archives, TCP Archives, and a Log Out button. Below this, a secondary navigation bar lists Devices, Groups, Server Recipients, Alarm Messages, and Weather. The main content area is divided into two panels. The left panel, titled 'Devices', shows a list of 77 devices with columns for Status, Alarm, Group, Device ID, Device Name, Phone Number, Type, Latitude, Longitude, Zoom Level, and Show. The right panel, titled 'Map', shows a satellite map of a coastal area with numerous green location markers. The map includes a search bar, a date selector (14/02/2017), and a zoom level selector (1d, 2d, 1w, 2w, 1m).

#	Status	Alarm	Group	Device ID	Device Name	Phone Number	Type	Latitude	Longitude	Zoom Level	Show
22/I	Active		309	B-267	+30698555376	BSC-50-E	40.613761	22.960675	12	Yes	
22/I	Active		310	B-49	+30698555378	BSC-50-E	40.611438	22.959543	12	Yes	
23/I	Active		311	B-10	+306979440747	BSC-50-E	40.614305	22.957654	12	Yes	
23/III	Active		313	166	+306975850674	BSC-50-E	40.643439	22.946430	12	Yes	
23/III	Active		312	N-37	+306975850668	BSC-50-E	40.640908	22.952879	12	Yes	
24/I	Active		315	O-3	+306979440909	BSC-50-E	40.641245	22.960855	12	Yes	
24/I	Active		314	N-537	+306975850441	BSC-50-E	40.642286	22.951364	12	Yes	
25/III	Active		321	702	+30698555349	BSC-50-E	40.634777	22.936283	12	Yes	
25/VIII	Active		320	B-214	+306979440649	BSC-50-E	40.610653	22.952909	12	Yes	
25/X	Active		319	PIE-81	+306972307079	BSC-50-E	40.501590	22.923310	12	Yes	
26/IX	Active		318	Z-83	+30698555379	BSC-50-E	40.663834	22.933113	12	Yes	
27/IV	Active		317	K-577	+30698555337	BSC-50-E	40.581534	22.949494	12	Yes	
27/IV	Active		322	K-799	+30698555336	BSC-50-E	40.596705	22.953391	12	Yes	
27/XI	Active		326	111	+306975850658	BSC-50-E	40.636033	22.947371	12	Yes	
27/XI	Active		325	130	+306975850666	BSC-50-E	40.634069	22.952770	12	Yes	
28/III	Active		323	20X	+30698555377	BSC-50-E	40.634371	22.939710	12	Yes	
28/III	Active		324	581	+30698555372	BSC-50-E	40.637809	22.936708	12	Yes	
29/III	Active		332	5	+30698555354	BSC-50-E	40.633250	22.940097	12	Yes	

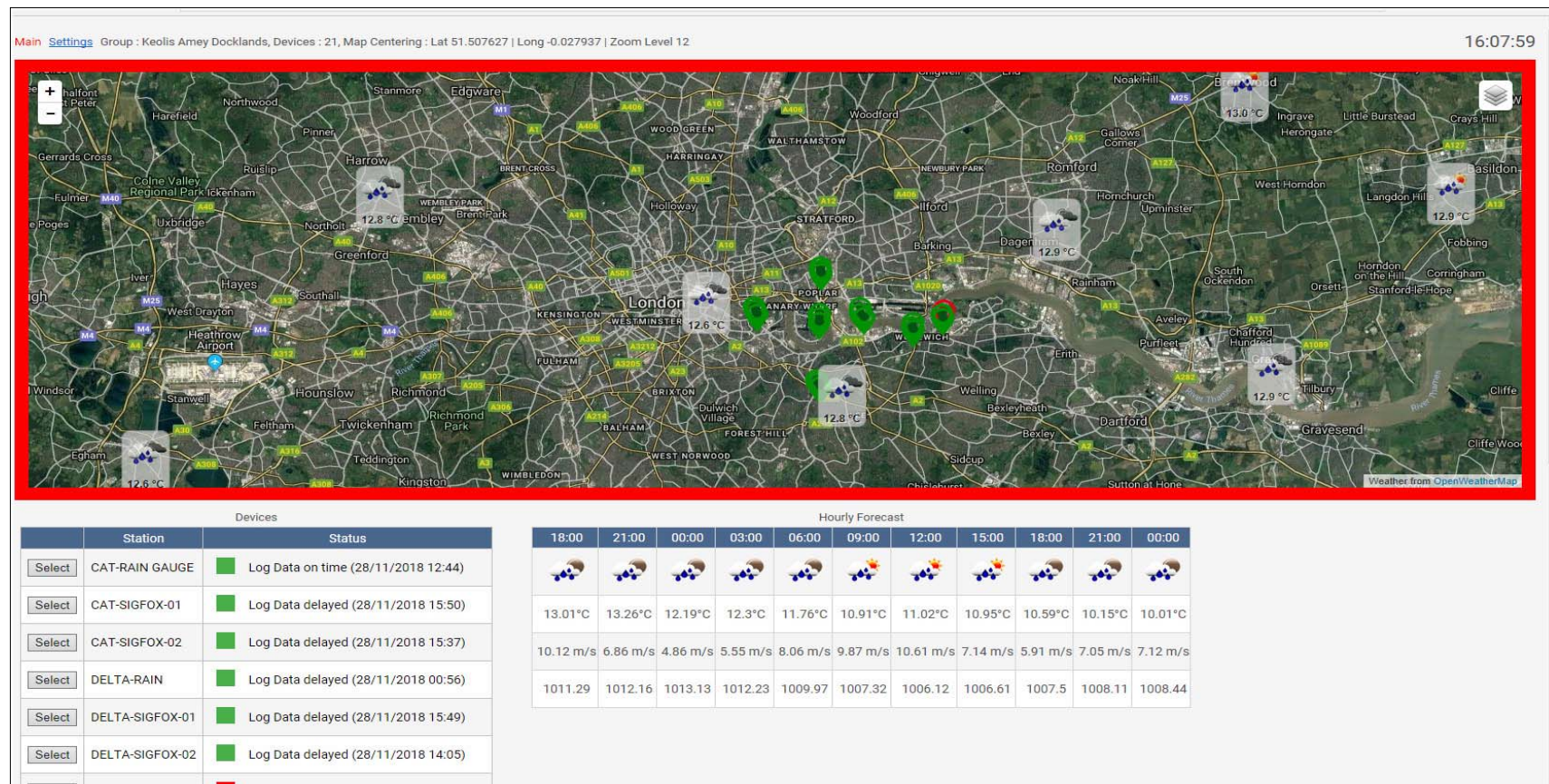
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IoT Autonomous RTUs

Cloud Telemetry

WaTEye - Web aided Telemetry Eye dashboard

Online dashboard with live weather and telemetry data

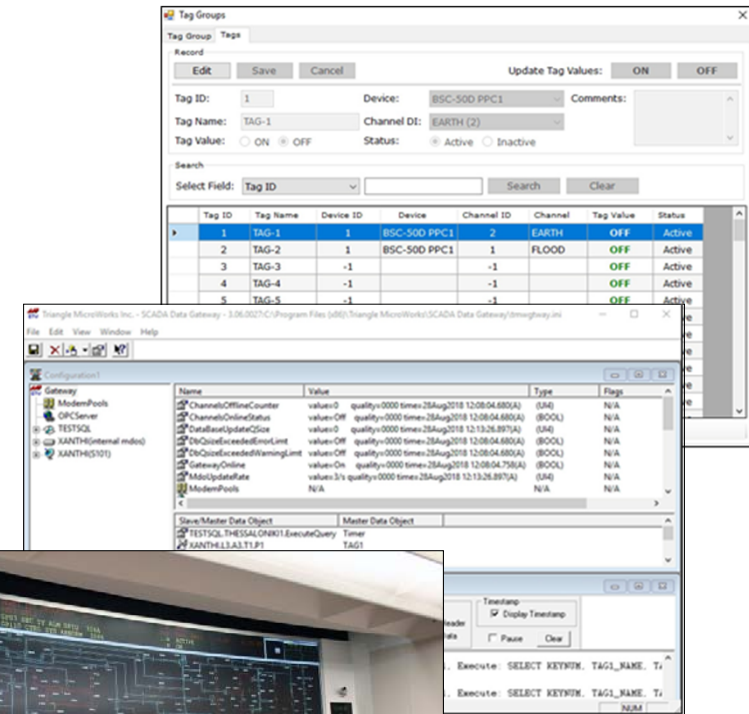


MSG – Multiprotocol Scada Gateway

The MSG is a modern SCADA communication gateway, supporting multiple protocols,

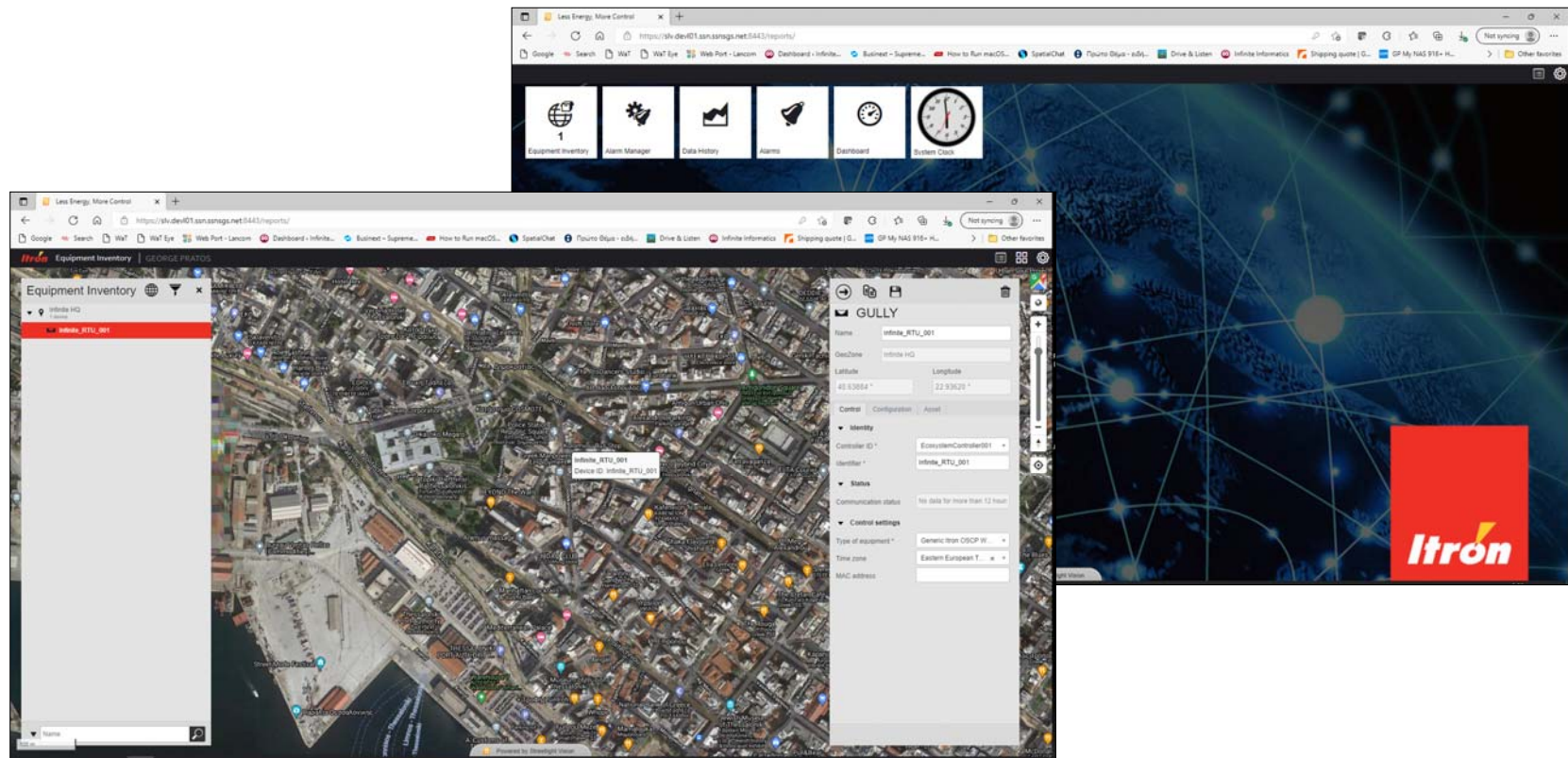
- DNP3 Secure Authentication v5 (SAv5)
- IEC 60870-5-101, 102, 103
- IEC 60870-5-104
- IEC 60870-5 Secure Authentication for -101 and -104
- OPC Data Access
- OPC XML Data Access
- OPC Alarms & Events
- IEC 61850
- IEC 60870-6
- Modbus

MS SQL server database backend for
Historical data storage and management.



Itron SLV- Streetlight Vision

SLV cloud platform integration



IoT Autonomous RTUs

Cloud Telemetry