# ecoforum SustRem 2023

# Modular IoT Integrated Systems

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HydroTerra

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# Modular IoT Integrated Systems

**Date**: October 2023 | **Presented by:** Steve Dudgeon

# What are Integrated Modular IoT Systems

The modular architecture facilitates easily integrating different components in different environments. These components includes

- PCBs,
- Microcontroller units (MCUs),
- Power Supply,
- Sensors,
- Cables,
- Loggers,
- Telemetry,
- Installation

We have developed and integrated numerous ‘recipes’ to meet our clients' various requirements across groundwater and surface water applications.

Our systems are pre-assembled and contain all the necessary components, including the sensors, the data processing unit, the communication interface, mounting and the power supply.

This makes them easy to deploy and use, and it also reduces the cost and complexity of environmental monitoring projects.

# Why?

Suppliers’ and developers can generally only provide you with their products and sensors, thus offering limited choices, less flexibility, limited functionality and fewer applications.

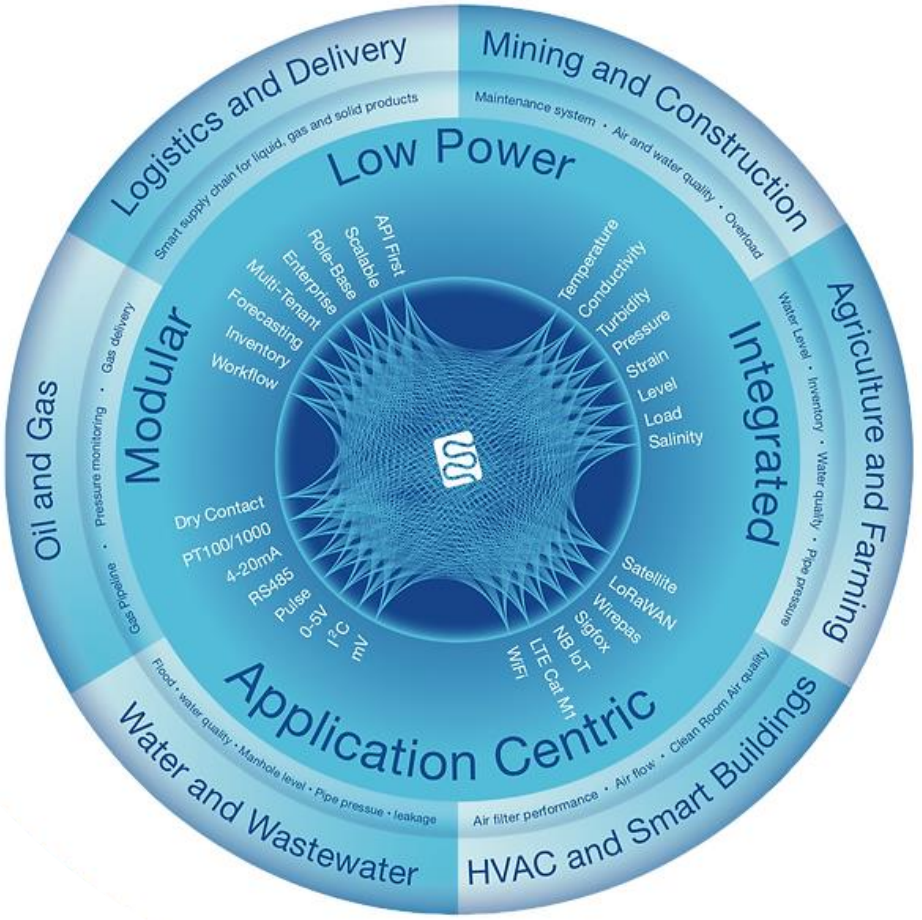
HydroTerra is an agnostic marketplace provider. This, combined with our electronic and software engineering expertise allows us the benefit of considering all the components to provide the best, and most cost-effective sensors, integrated telemetry, mounting and power options. This is a significant point of difference.

# Benefits of Integrated Modular IoT Systems

## Easy integration of components

The modular architecture facilitates the easy integration of different components in different environments.

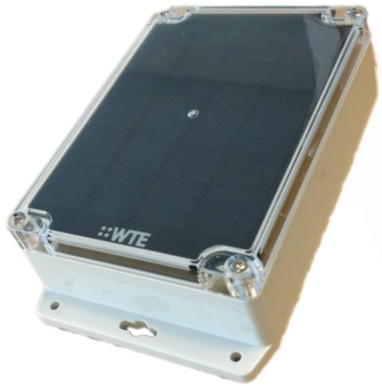
We have developed and integrated numerous ‘recipes’ to meet our clients' various requirements across groundwater and surface water applications.



# Components of Modular IoT Systems

## IoT loggers and Sensor Hubs

We have multiple suppliers of IoT Loggers and Sensor Hubs designed to support an extensive range of sensor integrations, controllers and power and housing options.







WTE Wireless Technologies

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# Components of Modular IoT Systems

## Sensors

We have multiple sensors from the best suppliers in the world





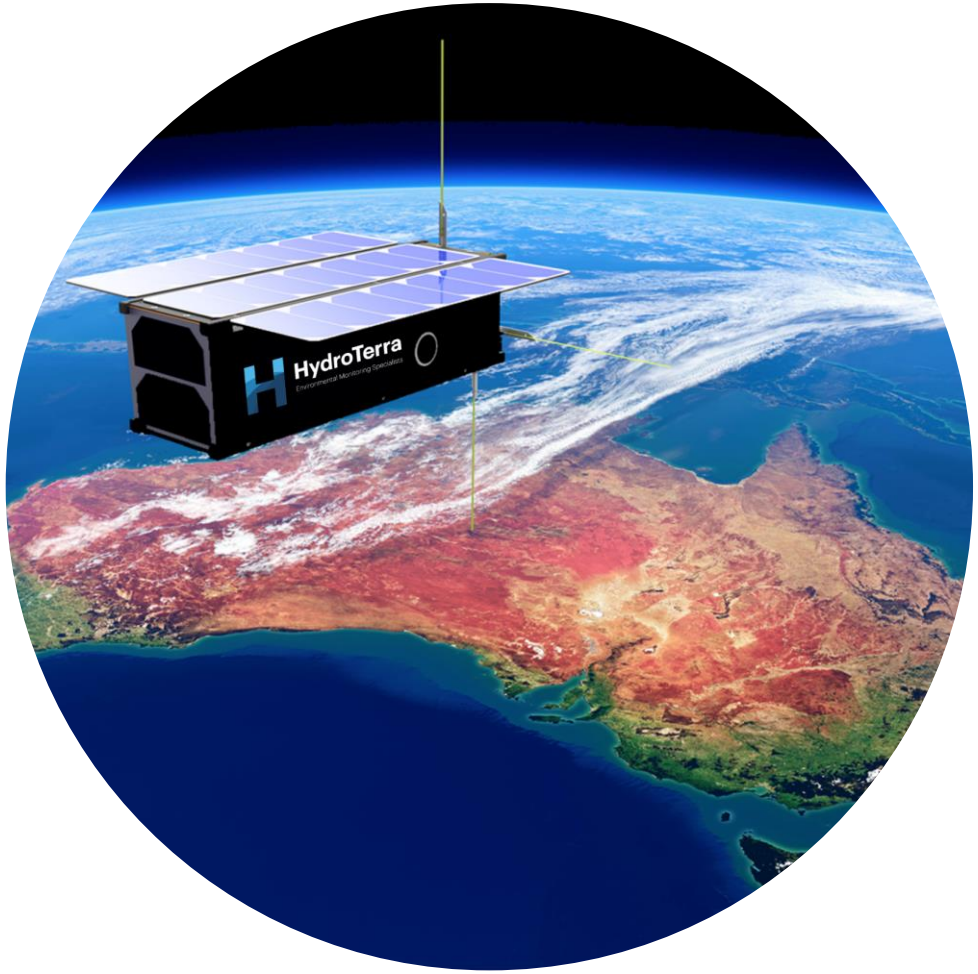





# Components of Modular IoT Systems

## Telemetry

We have multiple telemetry options including Bluetooth, Radio (Zigbee), Cellular, Low Earth Orbit Satellite (Myriota, SWARM and Iridium) and Geostationary Satellite (Inmarsat)



# Data Visualization, Retention and Alerts

Our platform is modular as well! We can setup your dashboard so you can visualize your data exactly as you would like.

- **Synthetic Variables** - Transform raw data into insights with Synthetic Variables that compute complex math formulas and statistical expressions.
- **Data backup and storage** - Up to 3-years
- **Live Dashboard** - Visualize data with stock graphs, charts, tables, indicators, maps, metrics, and control widgets. We can create custom-made widget as well.
- **Share your data** through public links, or by embedding dashboards or widgets into private web and mobile applications.
- **Reports** - Scheduled Reports. Send PDF or Excel reports and exports to those who need to know or schedule the report for delivery when the data sets are needed.
- **Events** - we can customize rules so that messages are triggered and delivered through Email, SMS, Telegrams, Slack, Voice Call or webhook.  Triggers can be things such as low water levels, pump stopped, pH is high, no communication for 24hrs, etc

# Other Benefits of Integrated Modular IoT Systems

## Scalability

Modular IoT systems can be easily scaled up or down by adding or removing modules as needed.

## Flexibility

With modular IoT systems, you can mix and match different hardware and software components to build a solution tailored to your specific requirements.

## Cost-Efficiency

Organizations can choose the components that best fit their budget and needs, avoiding unnecessary expenses on features or capabilities they don't require.

## Easier Maintenance

When a component in a modular IoT system needs maintenance or replacement, it can be done without disrupting the entire system.

## Customization

Modular IoT systems allow organizations to create tailored solutions that meet their specific needs.

# Best Solution for your requirements

The correct modular system will depend on multiple factors such as:

- Type of installation – standpipe, well cap, etc.
- Parameters other than level – EC, Temp, pH
- Standing water level variation
- Distance to groundwater
- Groundwater water quality
- Accuracy
- Number of readings and transmissions
- Connectivity
- Remoteness of deployment and duration
- Latency (how quickly the data is read and received)
- Redundancy requirements (internal logging)
- Data Visualization, Retention, APIs, Alerts.

We have several tools, interactive questionnaires and internal expertise to assist with finding the best solution for your requirements

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DataStream
by HydroTerra

**Groundwater Integrated Monitoring Clarification Questions**

| Technical | Answers |
|---|---|
| **Where is the site located and industry?** i.e. Moranbah QLD Coal Mine, Coffs Harbour Bypass NSW Infrastructure, Heathcote Landfill VIC. | |
| **What parameters do you want to monitor?** i.e. Level, EC, Temp, pH | |
| **Are the wells in good cellular coverage?** We also offer satellite telemetry options | |
| **How are the wells installed?** In a monument (standpipe cover), standpipe or in the ground under a well cover | |
| **What is the depth of cable required?** Alternatively, we can provide a per meter cost | |
| **What is the SWL variation?** i.e. 10m, 20m etc | |
| **How accurate do the need to be?** The range is from ±0.05% FS to ±0.2% FS. This means for a SWL range of 10m the accuracy would range from 0.5cm to 2cm. Higher accuracy is more expensive. | |
| **Do you want redundancy logging with the probe?** This means that the probe also logs the results and if there are any issues with connectivity then you can download from the probe. Logging probes are more expensive. | |
| **How often do you need a reading of the water level?** i.e. every 30 minutes | |
| **How often do you need this information transmitted?** i.e. every hour, 2 times a day, etc | |
| **If you need Satellite what is an acceptable latency?** This is the time taken from the reading to when appears on the platform. Geostationary Satellite is within 5 minutes, Nanosatellite can range between 30 minutes to a few hours. Generally, the quicker the more expensive | |

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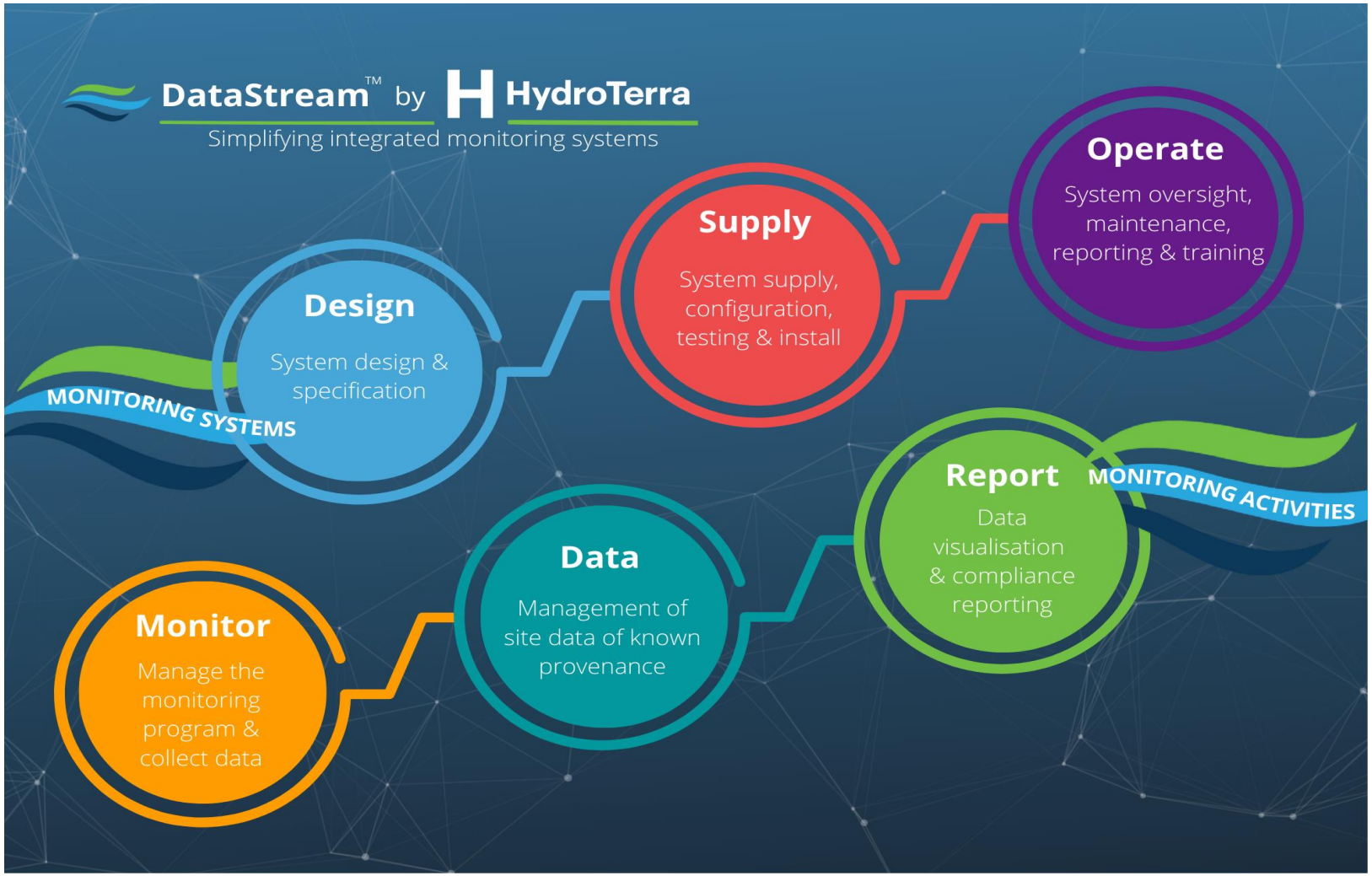


# We provide a turn key service.

# Ongoing Oversight & System Support

## DataStream™ oversight & support

HydroTerra provides oversight and support for DataStream™ systems structured in a range of Service Level Offering (SLA) Tiers:

| SLA Tier 1 | SLA Tier 2 | SLA Tier 3 | SLA Tier 4 |
|---|---|---|---|
| Monitoring system provision | Monitoring system provision | Monitoring system provision | Monitoring system provision |
| | Oversight | Oversight | Oversight |
| | | Data validation | Data validation |
| | | | Provenance reporting |
| For account management of SIMS, software and data hosting services | For oversight of monitoring system for faults, including receipt by Help Desk for site generated alarms | For use where data checking is required | For use where maintaining a monitoring system specification and equipment register is required, including a record of maintenance activities |

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## CONTACT US

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