

XO RADIUS

All-in-One Cellular Gateway + LPWAN SDI-12 Gateway

Xo is a complete monitoring station platform. It includes all hardware, software and services needed for data acquisition, cloud-based data storage, viewing and analysis. In addition, it also features Radius LPWAN (Low-Power, Wide-Area Network) technology, functioning as a Radius Gateway in an SDI-12 wireless network.

The Orbit Xo Radius will collect data from sensors directly connected to it and act as a data hub for all SDI-12 sensors (connected to Radius Motes) in an LPWAN network. All data collected is automatically forwarded to the cloud via a cellular connection. This eliminates the need to buy both a Gateway for your LPWAN network and a separate cellular uplink.

- ✓ All-in-one integrated system for quick, reliable deployments.
- ✓ Connects to Radius Motes/Slaves to permit cellular connection to remote SDI-12 sensors.
- ✓ Weatherproof packaging for deployment in harsh environments. Quick-connect military-style connectors
- ✓ Supports SDI-12, analog, and pulse sensors, providing flexible deployment options.
- ✓ Integrated cellular transceiver with intelligent network connection management ensures low-power, extremely reliable data acquisition.
- ✓ Data logged locally on an SD flash storage card as redundant backup.
- ✓ Pre-provisioned for instant cellular network connection and simple, reliable setup (use user-supplied SIM cards outside North America).
- ✓ One year subscription to CloudInsight cloud-based hub software included.
- ✓ Up to 10 sensors per Mote/slave, 6 Motes/slaves per repeater, 3 repeaters per network.



Xo Radius works great with GroPoint™ sensors, or use any other SDI-12 or analog sensor.

Pole not included.

User-installable connectors can be used to adapt any sensors to plug in to Xo.

Sensor expansion adapter connects multiple sensors to a single port.



Xo Radius reduces complexity, and increases reliability.

Simple setup.

Everything is included except your sensors. 3 simple steps to set up a station in minutes:

1. Connect solar panel.
2. Connect sensors.
3. Configure how and when you want to collect data, where to send it, data post-processing and alerts, with a simple web app.

No data logger required.

Data is collected and automatically forwarded to secure cloud storage for retrieval or processing.

Sensor-agnostic.

Regardless of the manufacturer, your sensors are fully compatible. Field-installable connectors can be used adapt your existing sensors.

Ultimate flexibility.

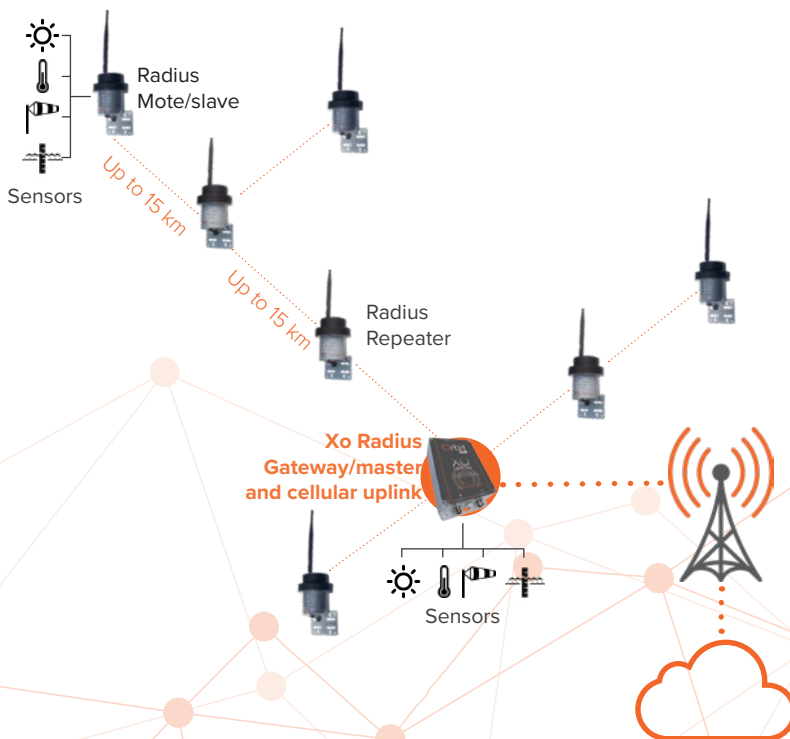
Up to 10 SDI-12, up to 4 analog (0-2.5 V or 4-20 mA) or up to 2 pulse sensors can be connected. The number of sensors that can be connected is limited only by the total power load.

All-in-one means the software's included too.

For logging, analysis, reporting, and storage of data from remote monitoring locations, Xo includes a one year subscription to CloudInsight (yearly plans available for purchase thereafter).

It stores and analyzes your data, notifies your smartphone when conditions are met, allows you to visually create custom calculations and “virtual sensors”, and it can receive and/or forward data from/to 3rd-party systems.

The Radius LPWAN Network

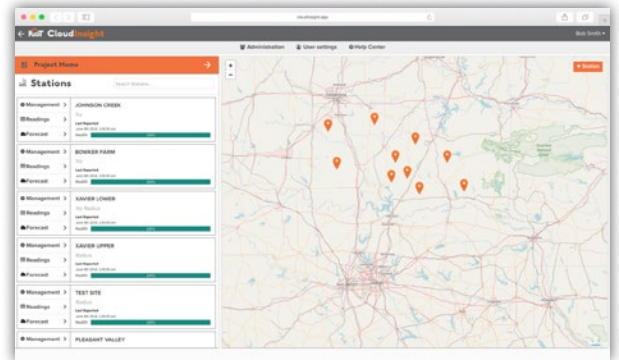


Each Mote/slave provides a wireless SDI-12 LPWAN bridge between a sensor and a Radius Gateway/master (which connects to data logger or uplink) or a Radius Repeater (extends the network even farther).

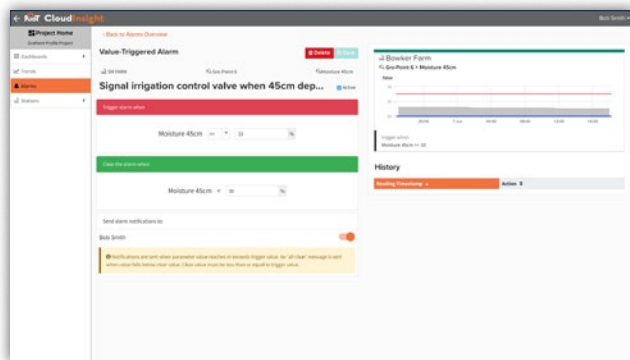
CloudInsight Turns Data Into Actionable Information

Remotely Configure

The web-based CloudInsight data hub is incredibly powerful and intuitive. It's used to configure all aspects of the station including logging and reporting intervals and all analog, pulse and SD-12 sensors. Make changes at any time, from any device.



Easily locate and access current and historical data, and configuration of all stations and sensors.



Send alarms (email or SMS) when a parameter reaches a threshold or changes by at least a specified value over a period of time. Parameters can be measured by sensors or "virtual" (computed based on one or multiple sensors with a formula applied).

Data Processing for Irrigation Insight

- Insert saturation and stress markers
- Mark irrigation or water events
- Track rainfall and water events
- Create your own ag index
- Build a growing degree day "virtual" sensor by combining data from multiple real sensors and applying a calculation.



Plot data from segments at each depth of a GroPoint Profile to determine optimal irrigation to penetrate the bottom of the root zone.

- **Unified data interface experience:** Sensor configuration, data storage, custom algebraic equations, custom data formats and forwarding, control, analysis, alarm notifications (email, SMS), reporting and actions all done with one simple cloud-based user interface.
- **Redundancy:** All data is saved locally on an SD storage card, and once in the cloud is replicated on a redundant data server and backed up nightly.
- **Connection verification:** Xo verifies connection with cell network and server connection before data is sent. If no connection is available or if data reception is not confirmed, data is saved and sent the next scheduled transmission.
- **Direct data access options:** Third-party programs can access data using REST API or HTTP post.
- **Data format flexibility:** Optionally forward data in various formats for third party software platforms, like Aquarius or WISKI, and in other formats such as binary, pseudo-binary, SHEF, and more.
- **Custom calculations and data transformations:** Use the visual formula builder to create simple to complex math functions using any sensor data as variables. Create a “virtual sensor” from this data to create new graphs or serve as inputs to other calculations.
- **Drag-and-drop customizable dashboard:** Configure what data to show and how with dashboard widgets. Place them where you want and stretch to resize. Choose high-visibility single data values, line graphs, bar charts, fuel-gauge style graphs, or 360° directional graphs, for any parameter.

Technical Specifications

GENERAL

Data storage	Removable 2 GB SD memory card (FAT 32)
Non-volatile memory	All setup parameters
Logging interval	1 second to 24 hours (sensor dependent)
Reporting interval	2 minutes to 24 hours
Cellular communications	<ul style="list-style-type: none"> • Dual band CDMA 800, 1900 MHz • Penta-Band HSPA+ • GSM Quad band 850, 900, 1800, 1900 MHz • UMTS/HSPA Penta Band 850, 900, 1700, 1900, 2100 MHz • EGPRS/WCDMA/HSDPA/HSUPA protocol stack

CURRENT CONSUMPTION

Listen/trigger mode/idle	<2 mA
Data receive/store/prepare for transmission	150 mA
Data transmit	250 mA

LPWAN COMMUNICATIONS

Range	Up to 15 km (9.3 miles). Signals can penetrate certain foliage, buildings and obstructions. Range depends on antenna height/type and obstacles in path of line of sight.
Wireless frequency	915 and 868 MHz certified, 860 930 MHz frequency range

ELECTRICAL

Battery	10Ah Li-ion included. Optional external battery.
TX output power	24.3 dBm (270 mW)
Solar panel	5W, 12V

SENSORS

Maximum number of sensors	10 directly connected, 180 SDI-12 sensors in an LPWAN network
Analog input	4 analog channels, single-ended Input type: 2 wire, 0 – 2.5 V or 4 - 20 mA current loop Sensor power: 24 VDC switched (under firmware control) Analog to digital (0-2.5 VDC): 21-bit resolution
Pulse input	2 pulse channels Continuity or TTL: 0 V to 2.2 V - 5 V Maximum rate: 10 pulses per second
Sensor power	12VDC switched, during measurement
Maximum output current	138 mA (12V), up to 500 mA pulse (12V) with capacitor battery option (available 2018-Q3)
On-board sensors	Temperature sensor for optimizing power management and battery charging in cold operations.

ENVIRONMENTAL

Environmental sealing	IP65
Operating temperature	-40°C to 75°C (-40°F to 167°F). Battery won't charge below 0°C (external battery options available for colder conditions)
Storage temperature	-40°C to 75°C (-40°F to 167°F with extended temperature option)
Lightning protection	AC transient voltage suppressor (TVS) on each sensor port input

PHYSICAL

Dimensions (H x L x W)	4.1 cm (1.6") x 17.0 cm (6.7") x 12.2 cm (4.8")
Weight	10.78 oz (305.6 g)
Warranty	1 year limited parts and labour



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