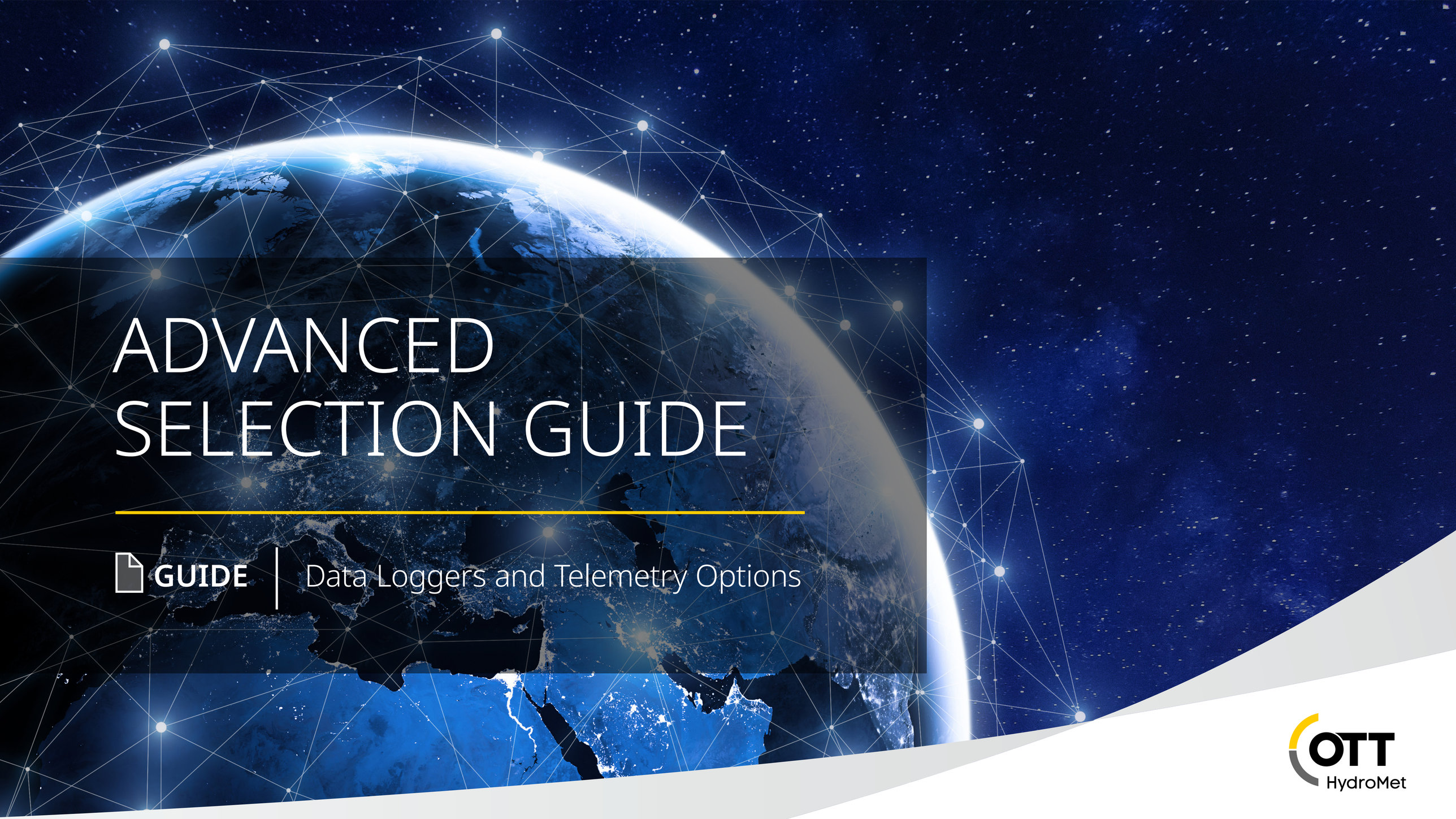

ADVANCED SELECTION GUIDE

GUIDE | Data Loggers and Telemetry Options

OTT HydroMet

Data logging is a crucial step of the data value chain when it comes to monitoring environmental parameters. Data loggers allow you to not only collect data directly from sensors at a monitoring station, but also act as the brain of the station to calculate derived parameters, store results on site, and in some cases send alarms or control other devices. You can transmit data automatically and remotely to your server using telemetry and then use your computer or smart phone device to view or further process. Adding telemetry to a data logger will reduce unnecessary field visits and reduces costs over time while also giving nearly instant access to your data.

Choosing the right data logger and telemetry method for your use case takes careful consideration. We've leveraged several decades of expertise from working across numerous hydrology, meteorology, and solar energy applications to create this selection guide, to help you choose when to select each type of technology.

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Checklist for Selecting Your Ideal Solution

Selecting these solutions is not always a “one size fits all”. The following recommendations should act as a starting point to begin designing your complete solution. Our team will work with you to confirm each detail and ensure that your solution is fully tailored to your unique monitoring needs.

When choosing data logging and communication methods, it’s important to ask important questions such as:

1. What application is it for?
2. What are you going to use the data for?
3. How critical is real-time data?
4. Where is it being collected?
5. How important is remote communication with the site?
6. What telemetry methods are available to your organization and the chosen station location?
7. What is the likelihood the data logger may need to do more in the future?
8. How often do you need the data?
9. How critical is it to receive your data during events?
10. Is it acceptable not to receive your telemetered data if a (Cellular/Radio) tower gets knocked down?
11. Should multiple individuals be notified of thresholds being met throughout your network?

Data Loggers

SUTRON SATLINK 3

When to Use

Match your application and telemetry needs to the correct datalogger for you.

Geostationary satellite
The SUTRON SatLink3 is suited for geostationary transmissions. Examples include GOES satellite (which covers the US, portions of Canada and Latin America, and the Atlantic/ Pacific Oceans) and METEOSAT satellite (which covers Europe, Africa, and the Indian Ocean)

Low frequency and low-bandwidth data
When it is acceptable to have a small delay in time to receive the data, and when data size is small. In urgent situations, it is possible to add Random Transmissions to geostationary stations to transmit more frequently. You can also add an IRIDIUM® or cellular plug in module to the logger to enable near real-time transmissions and remote site access.

Supports variety of sensor types
The SatLink3 supports both complex and simple sensor types across numerous hydrology, meteorology, and solar energy applications. It supports multiple interfaces such as Analog, SDI-12, Digital, RS485 and RS232.

Expandable
Expansion cards allow for future expansion / addition of telemetry or additional of other hardware.

Competitive Comparison

See how each datalogger stands out from common competition.

Fast and easy set-up
The SatLink3 is very easy to set-up and configure when using SUTRON LinkComm software, with set-up taking as little as 5 minutes for simple applications due to the software's easy-to-use platform with pre-built templates.

Python scripting
Supports Python scripting for more complex applications, to customize measurements and transmissions, special tasks, and more. Unlike our competitors, we use Python which is an easy to learn scripting language commonly taught and widely used, for example by hydrologists when modeling.

Data redundancy
The SatLink3 has 2 internal slots to allow for dual transmission of data, to ensure no data gaps and enable two-way remote communication.

Includes advantages of the SUTRON SatLink3 Lite
Like the SatLink3 Lite, the SatLink 3 is also flexible for station needs, is energy efficient, and has an intuitive interface.

Data Loggers

SUTRON SATLINK 3 LITE

When to Use

Match your application and telemetry needs to the correct datalogger for you.

For simple applications with no need for two-way communication

When using geostationary transmissions with NO plan to grow the network or access near-real time data in the future. It is not possible to later upgrade the SatLink3 Lite to use two-way communication via IRIDIUM or cellular by using add-on's.

The SUTRON SatLink3 Lite is an ideal choice when a station will never have a need for two-way communication or near real-time data (good for research or monitoring stable conditions such as groundwater or aquifers).

The SUTRON SatLink3 is an ideal choice for stations that could become high-risk over time, or for monitoring events where faster data may eventually be required. It is a long-term investment when it comes to potentially changing needs in the next 10-15 years, if you decide to add a camera, data redundancy, remote configuration, etc. which will ultimately reduce your total cost of ownership across the station's lifetime.

Competitive Comparison

See how each datalogger stands out from common competition.

Flexible for station needs

Fully compliant with Version 1.3 of SDI-12, and has 3 or more addressable SDI-12 sensors.

Energy efficient

Optimized for battery powered stations with automatic accumulation resets and low power transmissions.

Intuitive interface

Sensor templates with local access to data. The logger also includes an automatic accumulation reset on a user schedule.

Data Loggers

SUTRON XLINK 100/500

When to Use

Match your application and telemetry needs to the correct datalogger for you.

Multiple transmission options

The SUTRON XLink is especially suitable for cellular communications but can also be used for IRIDIUM Satellite transmissions. It transmits via one telemetry method at a time.

Two-way communication

By transmitting via cell or IRIDIUM satellite, the XLink allows you to have remote access to your station to check measurements, change configurations, and more.

Stand-alone device

The XLink can be used as a stand-alone datalogger with telemetry added on later.

Supports variety of sensor types

The XLink supports both complex and simple sensor types across numerous hydrology, meteorology, and solar energy applications. It supports multiple interfaces such as Analog, SDI-12, Digital, RS485 and RS232.

Competitive Comparison

See how each datalogger stands out from common competition.

Python scripting

The SUTRON XLink 500 supports Python scripting for more complex applications, to customize measurements and transmissions, special tasks, and more. Unlike our competitors, we use Python which is an easy to learn scripting language commonly taught and widely used, for example by hydrologists when modeling.

Plug and play modems

Detectable modems for cellular and IRIDIUM transmissions to easily switch as needed. OTT HydroMet also offers data plans for cellular and IRIDIUM options, to simplify the process to begin receiving data.

Data Loggers

SUTRON XPERT FAMILY (XLITE 9210, XPERT)

When to Use

Match your application and telemetry needs to the correct datalogger for you.

Complex stations with multiple transmission methods

The Xpert family is best for stations with multiple components, such as 3+ telemetry methods, alarming, locks, and voice calls. It can handle complex stations with many sensors and parameters being measured.

Competitive Comparison

See how each datalogger stands out from common competition.

Flexible to handle several transmissions at once

Transmit and process data via 4 different telemetry methods at the same time such as cellular, satellite, radio line-of-sight, and direct Ethernet connection. These loggers can also have a virtually unlimited number of separate IO expansions.

Easy to interact with

Has a user-friendly interface with a built-in touch screen, so no other devices are needed on site. This also makes it easy to configure and to import complex measurements.

Expandable through modules

These dataloggers can have added capabilities through modules, to customize precisely what components are needed.

Data Loggers

OTT netDL 500/1000

When to Use

Match your application and telemetry needs to the correct datalogger for you.

IP transmissions

When transmitting via IP connection, through cellular or ethernet. Recommended as a global option. Also supports geostationary satellites and allows for dual communication for redundant and secure data.

Competitive Comparison

See how each datalogger stands out from common competition.

Low power

Extreme low power in stand-by mode, ideal for solar powered applications.

Easy network management

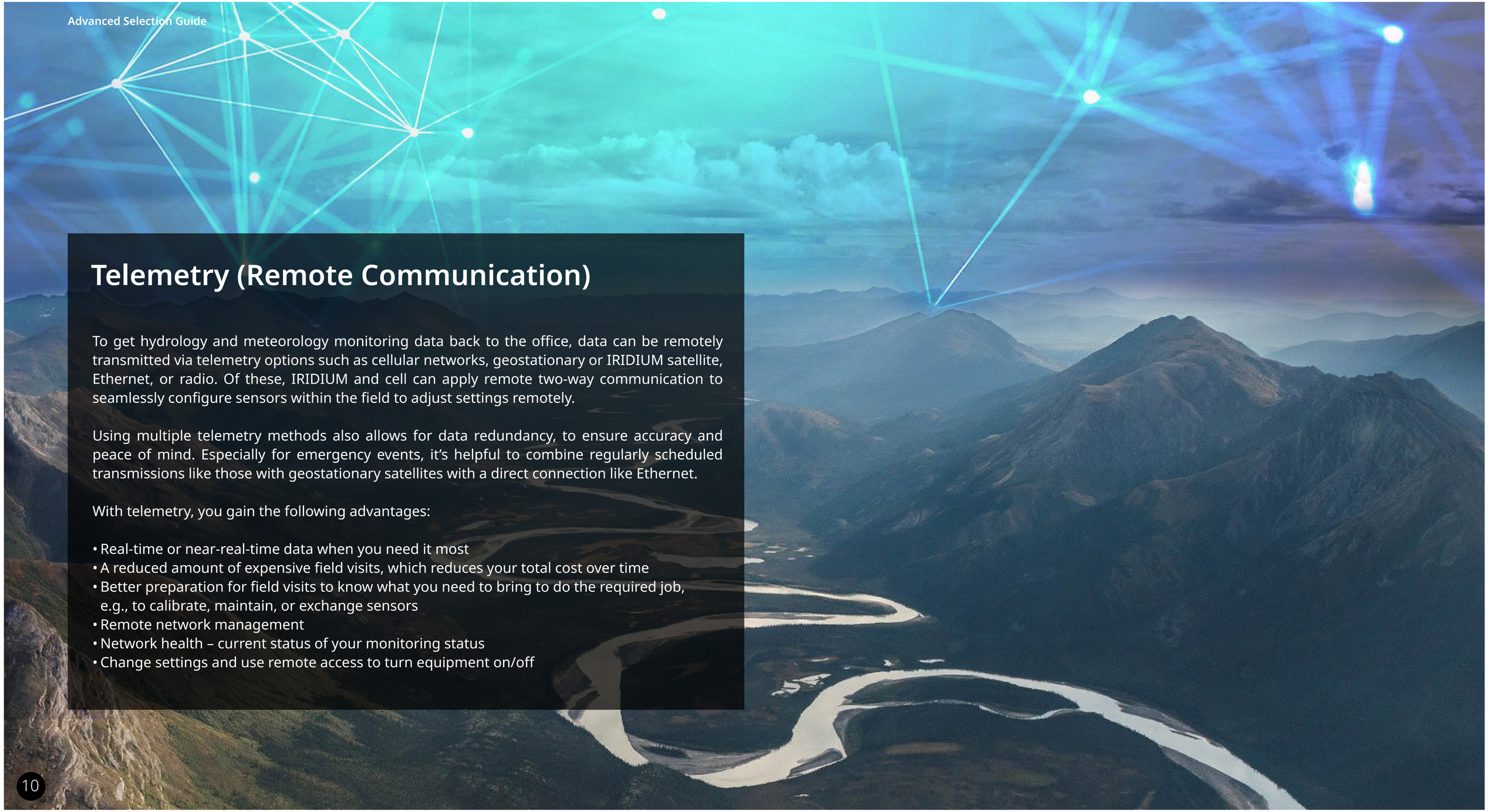
Supports command handling to update firmware or configuration changes on all netDL in the user's network simultaneously, remotely from a server via an IP connection.

Secure data transmission

Encrypted transmissions when using an IP connection.

SUTRON SatLink3 vs SUTRON SatLink3 Lite

Feature	SatLink 3	SatLink 3 Lite
Uses geostationary/meteorological satellites for transmitting data.	✓	✓
Connectivity via SDI-12 sensors and a dedicated Tipping Bucket and Modbus Slave.	✓	✓
Compatible with SUTRON LinkComm software to configure stations and view/process data.	✓	✓
Can support additional telemetry methods Cellular or IRIDIUM satellite via plug in modules, which allow for near real-time data transmission.	✓	X
Can support data redundancy as well as two-way communication (remote site access and configuration) via plug in modules.	✓	X
Capable of future upgrades or expansions on telemetry or measurement types for long-term, ever changing monitoring needs.	✓	X
Supports customization through Python scripting.	✓	X
Supports multiple analog and digital channels, Modbus Master and Slave interfaces.	✓	X



Telemetry (Remote Communication)

To get hydrology and meteorology monitoring data back to the office, data can be remotely transmitted via telemetry options such as cellular networks, geostationary or IRIDIUM satellite, Ethernet, or radio. Of these, IRIDIUM and cell can apply remote two-way communication to seamlessly configure sensors within the field to adjust settings remotely.

Using multiple telemetry methods also allows for data redundancy, to ensure accuracy and peace of mind. Especially for emergency events, it's helpful to combine regularly scheduled transmissions like those with geostationary satellites with a direct connection like Ethernet.

With telemetry, you gain the following advantages:

- Real-time or near-real-time data when you need it most
- A reduced amount of expensive field visits, which reduces your total cost over time
- Better preparation for field visits to know what you need to bring to do the required job, e.g., to calibrate, maintain, or exchange sensors
- Remote network management
- Network health – current status of your monitoring status
- Change settings and use remote access to turn equipment on/off

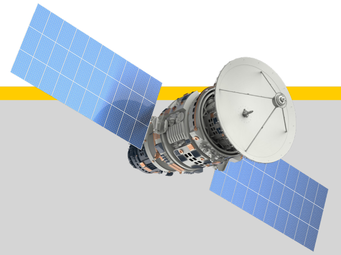
Telemetry

CELLULAR NETWORK

Recommended Data Loggers	Application	When to Use	Advantages
SUTRON XLink 100/500 **OTT netDL** **SUTRON Xpert family (Xpert and XLITE)** **SUTRON SatLink3**	**Good for wide variety of applications from dams to urban flood warning to nutrient monitoring.**	**Locations with a strong cell signal (or ethernet connection, for the OTT netDL 500/1000).** **Remote locations with cell service.** **Scheduled and alarm transmissions.**	**Remote site access (reduces total cost of ownership).** **Very flexible IP transmissions, and high bandwidth can transmit measured data as well as meta data.** **Data transmissions to multiple servers (redundant) with different IP protocols e.g. FTP, HTTP or HTTPS.** **User defined transmission intervals, from large to small intervals, with ability to adjust in alarm states.** **Camera IP transmissions (supported by OTT netDL and SUTRON XPert).**

Telemetry

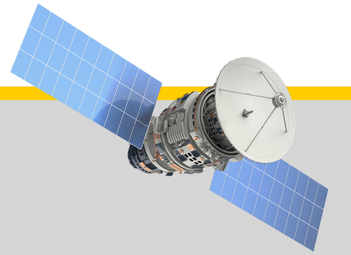
IRIDIUM® SATELLITE



Recommended Data Loggers	Application	When to Use	Advantages
SUTRON XLink 100/500 SUTRON SatLink3 SUTRON Xpert family (Xpert and XLITE)	Ideal for dense data sets with many parameters. Ideal for alarms/Alert messaging. Event monitoring i.e. flood warning, hurricanes. Time sensitive monitoring.	Locations with a clear view of the sky. Remote locations. Alarming (messages via email and TCP/IP).	Remote site access (reduces total cost of ownership). Extremely reliable during major events. Full global coverage. Handles large amounts of data.

Telemetry

GEOSTATIONARY SATELLITE



Recommended Data Loggers	Application	When to Use	Advantages
SUTRON SatLink 3 **SUTRON SatLink 3 Lite** **SUTRON Xpert family (Xpert and XLITE)** **OTT netDL**	**Ideal for non-time sensitive monitoring, i.e: Weather forecasting, climate data, severe storm tracking, coastal monitoring, research.** **Long term continuous monitoring.** **Water level, both surface and ground, and groundwater/aquifer monitoring.**	**Locations with a clear view of the sky.** **When small time delay for data is acceptable.**	**Low annual cost and in some areas like the US, free of charge for most government and local organizations. A channel needs to be assigned in order to access a time slot.** **Reliable and stable even during disasters.** **Location based coverage.** **Overall low power.**

Which Datalogger and Telemetry Method Should You Choose?

What do you need

1

Stable, reliable, low-bandwidth data

OR

Time sensitive, high-bandwidth data

2

Possibility that two-way communication will become necessary in several years?

Telemetry: Geostationary Satellite

YES

Datalogger: SUTRON SatLink3

NO

Datalogger: SUTRON SatLink3 Lite

2

Need for extremely reliable, global coverage?

YES

Telemetry: IRIDIUM® Satellite

Datalogger: SUTRON XLink 100/500

NO

3

Need for high-bandwidth in locations with strong cell signal?

YES

Telemetry: Cellular network

4

Complex stations with 3+ telemetry methods needed simultaneously?

YES

Datalogger: SUTRON XPert or XLITE

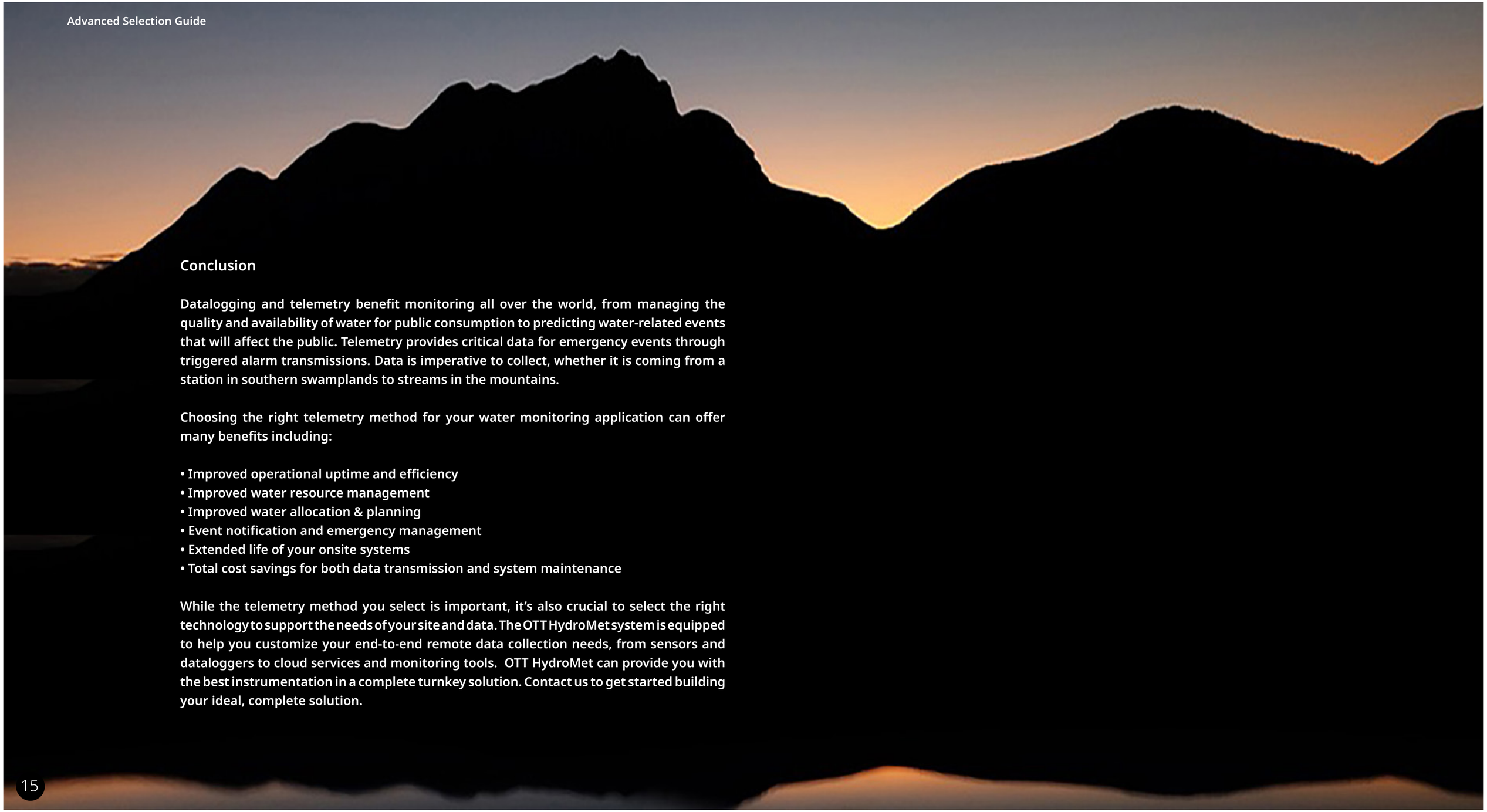
NO

Datalogger: SUTRON XLink 100/500

OR

NO

Datalogger: OTT netDL



Conclusion

Datalogging and telemetry benefit monitoring all over the world, from managing the quality and availability of water for public consumption to predicting water-related events that will affect the public. Telemetry provides critical data for emergency events through triggered alarm transmissions. Data is imperative to collect, whether it is coming from a station in southern swamplands to streams in the mountains.

Choosing the right telemetry method for your water monitoring application can offer many benefits including:

- Improved operational uptime and efficiency
- Improved water resource management
- Improved water allocation & planning
- Event notification and emergency management
- Extended life of your onsite systems
- Total cost savings for both data transmission and system maintenance

While the telemetry method you select is important, it's also crucial to select the right technology to support the needs of your site and data. The OTT HydroMet system is equipped to help you customize your end-to-end remote data collection needs, from sensors and dataloggers to cloud services and monitoring tools. OTT HydroMet can provide you with the best instrumentation in a complete turnkey solution. Contact us to get started building your ideal, complete solution.

Insights for Experts

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