NTN Data Logger

The E-IOT NTN Data Logger platform is designed to extend remote monitoring beyond the reach of conventional mobile networks. Combining Nordic nRF9151-based hardware, Zephyr-based application development and optional NeoMesh connectivity, it provides a foundation for collecting sensor data and delivering compact reports through terrestrial cellular or supported satellite IoT services.

Products shown

- nRF9151 PPSB sensor board — a compact platform for standalone sensing, data logging and wide-area communication.
- nRF9151-based NeoMesh gateway board — combines a NeoCortec mesh module with an nRF9151 communication platform to connect distributed wireless sensors to a remote service.
- Quarterwave's Quarter-Star Satellite Antenna for LEO satellites
- Satellite-connected monitoring concept — the background illustrates remote sensors, a field gateway and cloud-based data access.

Product features and operation

Extending connectivity beyond terrestrial networks

Remote monitoring is often needed where Wi-Fi, Ethernet and mobile network coverage are unavailable. Agricultural land, isolated infrastructure and environmental monitoring sites can all present this challenge.

Non-Terrestrial Network connectivity provides a potential communication path through satellites. The nRF9151 supports terrestrial LTE-M and NB-IoT as well as NB-IoT NTN operation with suitable modem firmware. Actual satellite connectivity requires a compatible service, subscription, antenna configuration and supported geographical coverage.

The E-IOT platform provides a development path towards these applications, with deployment capabilities determined by the installed firmware and the selected network service.

Standalone data logger or shared sensor gateway

The hardware supports two complementary application concepts.

As a standalone data logger, the PPSB board can collect measurements from its fitted or connected sensors and prepare reports for transmission.

As a NeoMesh gateway, the platform can collect readings from multiple wireless sensor nodes distributed across a site. These nodes communicate locally through the mesh network, while the gateway provides the wide-area connection.

Sharing one uplink across several sensors can reduce the number of satellite-enabled devices and subscriptions required for a monitoring installation.

Local data collection and scheduled reporting

The data-logging application can be configured to separate measurement intervals from transmission intervals. Sensors may be sampled frequently while selected readings or summaries are transmitted less often.

A store-and-forward implementation can retain measurements locally during communication interruptions and send them when a connection becomes available. Storage capacity, retention time, and retry behavior depend on the hardware resources and application firmware.

This approach is particularly useful for monitoring tasks where maintaining a measurement history matters more than receiving every reading immediately.

Compact messages for remote monitoring

The intended communication model focuses on small sensor reports, status updates and selected events. Typical payloads can contain a device identifier, measurement values, timestamps and diagnostic information.

Combining several readings into a scheduled report can help manage communication overhead and energy consumption. Reporting frequency should reflect the application's needs, the available power supply and the selected service's data allowance.

Alarm delivery also depends on network availability and the reporting strategy; remote installations should account for possible transmission delays.

Zephyr-based application development

The platform's Zephyr-based software approach provides a foundation for implementing sensor acquisition, local processing, data storage and communication management.

Application-specific firmware can coordinate measurement cycles, prepare outgoing payloads, handle connection attempts and place supported hardware into lower-power states between tasks.

This flexibility allows the same hardware concept to be adapted to different monitoring requirements while retaining a common software architecture.

Power and installation considerations

For battery-powered or solar-assisted installations, energy planning must include sensing, processing, network registration, transmission and unsuccessful connection attempts.

Antenna selection and placement are equally important. Satellite operation requires an installation appropriate to the chosen service, with suitable sky visibility. Enclosure design, mounting position and surrounding obstructions therefore form part of the deployment assessment.

Integration with the E-IOT ecosystem

The intended cloud integration brings remote measurements into the same E-IOT environment used by terrestrial cellular and NeoMesh-connected installations.

Once the communication path and cloud interface are configured, received data can support historical charts, equipment status views and threshold-based notifications. This allows remote sites to become part of a wider monitoring system.

Typical applications

- Environmental monitoring in areas with limited mobile coverage.
- Remote soil, water-level and agricultural measurements.
- Shared uplinks for distributed NeoMesh sensor networks.
- Monitoring of isolated infrastructure and field equipment.
- Periodic equipment status and diagnostic reporting.
- Evaluation of hybrid terrestrial and satellite IoT connectivity.