Axellio SensorXpress

Scalable, Simultaneous RF Data Recording and Distribution at More Than 100 Gbps

Intelligence, surveillance, and reconnaissance (ISR) sensors are being stretched to collect more data to provide superior situational awareness and intelligence preparation of the battlefield. As the instantaneous bandwidth of next-generation receivers continues to expand, the amount of collected Radio Frequency (RF) data has grown to levels these systems cannot reliably store, distribute, and analyze. Axellio®, building on its 20 years of experience in high-speed, high-volume storage systems, has created SensorXpress®, a software-based RF data recording and distribution solution that is capable of simultaneously ingesting, storing, and distributing RF data at speeds of up to hundreds of Gigabits per second (Gbps). Processing various time-based data formats, including raw I/Q or VITA49, SensorXpress is spectrum-agnostic, allowing for the recording and distribution of any frequency. Therefore, SensorXpress maximizes the capabilities and extends the useful life of your existing RF infrastructure.

Challenge: SIGINT, ELINT & EW Operations are High-Cost and High-Demand

Operations involved with collecting RF are tasked with more objectives, collecting wider bandwidths in increasingly dense signal environments, contending with our adversaries' evolving Anti-Access/Area Denial (A2/AD) tactics, and requiring longer time-on-target missions. This creates an exponential volume and velocity of RF data, often exceeding 100 Gbps of continuous data rates. Capturing and analyzing at these speeds can result in the loss of valuable data due to:

1. Insufficient storage performance to keep up with capturing high data rates.
2. Overloading signal processing applications analyzing the data in real-time.

Today's approach typically limits the bandwidth or time collected to match either the storage or analysis capabilities and often requires offline analysis, delaying critical insights. As a result, essential or rogue signals can be missed, and vital information could be lost forever. However, adding a more sophisticated processing infrastructure, especially at the tactical edge can be expensive and complex. Scaling analysis in cloud environments is often not feasible as the mission's network connectivity is too slow or not reliable enough.

Critical missions require enterprise-like performance but in smaller size, weight, and power (SWaP) form factors to meet the need for dependable signal collection and storage as well as timely analysis anywhere.

SensorXpress – High-Speed Data Storage and On Demand Distribution

Instead of limiting RF collection to match storage or analysis capabilities, Axellio developed a high-speed, high-intake solution to capture, store, and distribute RF data in an extremely small footprint. SensorXpress connects directly with the collection platform or sensor through high-speed interfaces to ingest and store the RF data at speeds exceeding 100 Gbps lossless, for hours or even days. Unlike today's available storage systems, Axellio's patented storage architecture allows for the simultaneous distribution of multiple RF data streams to analysis applications directly from disk at speeds exceeding 100 Gbps. All without impacting either read or write performance.

Primary Use Cases

SensorXpress data recording and distribution capabilities provide two distinct use models:

1. High-Speed RF Data Storage from Collectors

Providing an extreme high-speed RF data storage solution supporting many time-series formats, including raw I/Q or VITA49 formats from RF collectors – all with an incredibly small SWaP form factor.

2. On-demand Distribution to Analysis Applications

Simultaneous RF data storage and distribution to any number of analysis applications via multiple, independent analysis streams – allowing for real-time or selective on-demand analysis.

Unique Capabilities for Any Mission

With spectrum collection across space, air, sea, ground, and in tactical environments, SensorXpress was created to provide the unique capabilities to meet any mission requirement or environment:

Extend time-on-target at the widest instantaneous bandwidth possible:

- Collect data from any time series-based sources - including RF data, audio, video, and more.

No-loss capture of all data for high-quality results from multiple sensors at over 100 Gbps:

- No-loss capture at any speed – a scalable solution that allows the capture of hundreds of Gbps, sustained for simultaneous data ingest, storage, and distribution.

Controlled and repeatable signal data distribution to multiple analysis applications for real-time analysis at over 100 Gbps:

- Replay and re-analyze – as the data is stored, analysts can perform repeated in-depth analysis and validate implementations against the data via standard APIs.
- Multiple data extraction streams are individually configured - for speed and content to any analysis application.

High-speed and high-volume storage of RF data:

- Expandable storage, from hours to months – local or external, utilizing commercial-off-the-shelf (COTS) NVMe SSD drives with an onboard storage capacity of almost a petabyte in just a single 1U server.
- Long-term, off-box archive - to extend storage capacity at a reduced cost.
- Data at rest encryption - to secure the stored data.

High-density SWaP form factors suitable for any mission:

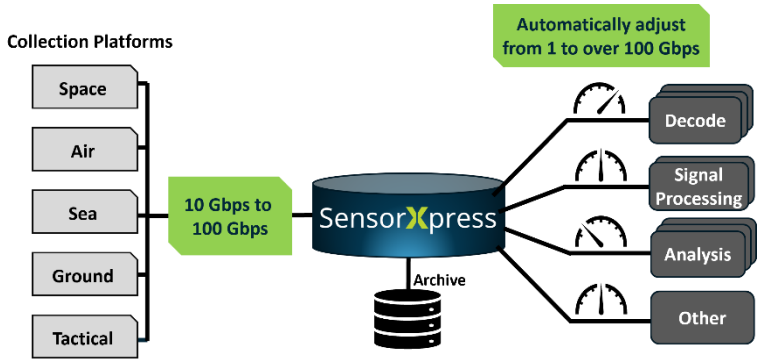
- Flexible form factors – from mobile operations to static data center deployments, depending on ingest rate and storage needs, all delivered on COTS hardware.
- Dense footprint – can be offered in many form factors.
- Custom tactical configurations – to meet your specific mission needs.

Intelligent RF Data Storage and Distribution

Axellio developed a unique approach in SensorXpress to reliably control the stream of RF data and store it at speeds not seen in the industry today. This allows you to maximize the capabilities and extend the useful life of your existing collections and analysis infrastructure by:

- Recording longer at wider bandwidths from more sensors.
- Distributing at rates your analysis applications can safely consume.
- Recording and distributing simultaneously and continuously without looping.

Instead of feeding the collected signals from hardware sensors and receivers directly into the signal analysis, decode, or processing systems, Axellio can buffer the data between the sensor and RF analysis tools by capturing and storing the RF data. Simultaneously, SensorXpress can distribute the RF data at controlled rates and contents specific to each analysis system, avoiding system overload.



Unlike today's top-end wideband recorders, SensorXpress can stream data simultaneously on disk and off disk at over 100 Gbps, allowing for a consumption of a larger volume of RF data from multiple sensors. SensorXpress also stores data at a much higher density without quality loss. Being sensor, analysis tool, and spectrum agnostic allows you to extend the useful life of your existing collections and analysis infrastructure while maximizing its capabilities.

SensorXpress provides a flexible architecture with speed at its core, allowing Axellio to quickly add new capabilities to meet any use case that utilizes time-series data.

About Axellio

Axellio provides extreme high-performance, scalable, compact, economical, and simultaneous time-series data ingest, storage, and distribution solutions for the defense and intelligence community at speeds exceeding 100 Gbps. Axellio's PacketXpress® platform focuses on network traffic packet capture, distribution, and analysis for cybersecurity monitoring and forensic analysis, and is operationally deployed with the US Army worldwide. For intelligence, surveillance, and reconnaissance applications (ISR), Axellio's SensorXpress offers ingestion and storage of RF data from sensors and distributes it to analysis applications simultaneously at rates exceeding 100 Gbps.

Contact Us

Find out how SensorXpress can make a difference for your application:

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