SENSUS

a xylem brand

March/11/2025

Greenville Utilities Commission

PO Box 1847

Greenville, North Carolina, 27835-1847

March 11, 2025

Cleve Haddock

Greenville Utilities Commission

RE: Response to RFQ 25-10 Advanced Meter Infrastructure (AMI) Vendor Selection

Dear Cleve Haddock,

Sensus, a Xylem brand, is pleased to present the following proposal in response to Greenville Utilities Request for Qualifications for Advanced Metering Infrastructure Equipment and Systems. We have carefully reviewed Greenville Utilities Request for Proposal and understand that GUC is looking to modernize by implementing an AMI system for electric, water, and gas. Beyond automating the billing process, GUC wants a system which serves as the baseline for other grid modernization applications and incorporate innovative solutions to increase efficiency and reduce costs.

With FlexNet, you can realize all your AMI goals, from electric, water, and gas metering to outage management, analytics, and advanced applications. FlexNet was expertly built to evolve over time to meet both the current and future AMI needs of your service area.

We expect our proposed project to offer the following benefits for GUC:

- An AMI system with multi-application design: FlexNet uses primary-use, full-duplex spectrum with channels that can be dedicated to specific applications, including electric metering, gas metering, water metering, and other utility solutions like demand response, conservation voltage reduction, pressure monitoring, and Distribution Automation. This allows you to easily add applications to your system, ensures high performance for all tenant applications, and avoids conflicts between applications and multiple user groups.
- A commitment to backward compatibility: We have proven our ability to combine ongoing investment and industry-leading performance with a commitment to backward compatibility for our AMI customers. Put simply, the endpoints you deploy today will continue to be supported throughout their lifetime. Additionally, FlexNet's point-to-multipoint design enables you to upgrade virtually any endpoint in any location at any time without impacting other endpoints in the network.
- The industry's most reliable AMI network: The FlexNet AMI communication network exceeds Service Level Agreements (SLAs) for each of our more than 1,700 deployed networks in North America, over 200 of these being combination utilities, with far less network infrastructure and at a much lower cost than competitive solutions.

We are committed to helping you meet your goals to strengthen customer relationships and improve operating efficiencies through an integrated solution that supports the requirements outlined in the RFP.

Drue Merkle will be your primary point of contact for this proposal: **919.219.9427**, **drue.merkle@xylem.com**.

Thank you for your consideration, and please let us know if you need any additional information.

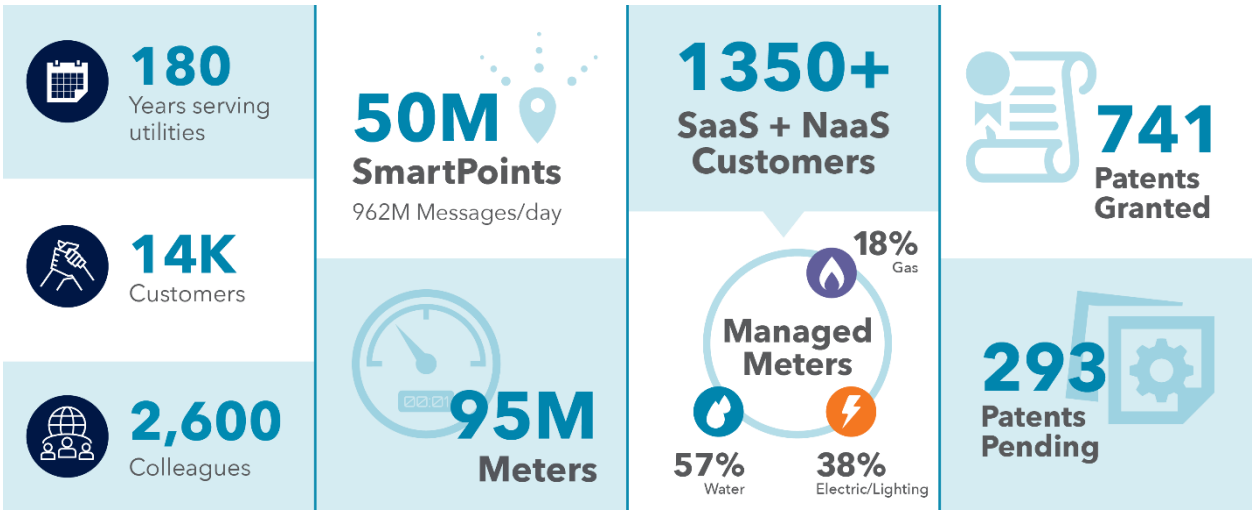
Best regards,

David Stair, Sr Director, Sales of Electric Smart Metering Solutions
Phone 256.652.0777, David.Stair@xylem.com

Table of Contents

Company Background and Relevant Experience

Sensus has been a cornerstone in the metering industry for more than 150 years. As a global market leader for smart grid products and technologies, we are committed to helping the world's public service providers reach farther with innovation in sensing and communication technologies, data analytics, and a broad portfolio of services.



SENSUS BY THE NUMBERS

The FlexNet system debuted in 2006. To date, the FlexNet system is the backbone of more than 1,700 electric, water, and gas AMI systems, supporting more than 50 million total endpoints, and including more than 200 combination networks.

Every day, the FlexNet system delivers more than 795 million messages of critical data so utilities can provide better service to electric, water, and gas end consumers. Our longstanding success is rooted in our commitment to providing an AMI solution that is designed to meet our customers' current objectives as well as their future business needs.

Sensus, headquartered in Morrisville North Carolina, is a Xylem brand (XYL (NYSE)). Xylem is headquartered in Washington, DC. In addition to providing smart metering, network technologies, and advanced infrastructure analytics solutions for electric, water, and gas utilities through Sensus, Xylem provides innovative technology solutions to solve the world's water challenges.

Relevant Project Experience

Sensus has deployed over 1700 AMI systems including 200+ multi-utility environments. Our customers have transitioned from many technologies including ERTs, AMR, PLC (Power Line Carrier), RF mesh and manual reads.

The Sensus experienced project team works directly with utility staff to develop a deployment plan that aligns with the project schedule, meets your specific AMI needs, and minimizes impact to the billing and

business processes.

Knoxville Utilities Board is a multi-utility FlexNet customer in Knoxville, TN. The Sensus project team successfully deployed FlexNet AMI to over 400,000 electric, water and gas services. The KUB and Sensus Team planned the project and coordinated with the University of Knoxville with the phased deployment. KUB replaced the ERT technology by standing up the FlexNet base stations to enable deployment of FlexNet devices throughout their service area. Having the FlexNet network deployed reduced truck rolls by not requiring specific routes to be replaced rather than individual services. The phased project started in downtown Knoxville with phase 2 being deployed from 2016 until 2020 completion. KUB leverages their FlexNet system to provide connectivity to DA devices and manage their electric distribution system.

Fayetteville Public Utilities Commission is a multi-utility FlexNet customer in Fayetteville, NC. The Sensus and PWC project team delivered FlexNet to Fayetteville, NC over a decade ago. The PWC FlexNet system includes over 90,000 electric and 105,000 water services. The PWC RNI (AMI headend application) is integrated with PWC's Oracle CS2M, CCB and PWC's OSI OMS, SCADA.

PWC initially deployed the Sensus RNI (AMI Headend application) on-premise. In 2021, the Sensus Project Team successfully upgraded the PWC RNI to a Sensus SaaS (Software as a Service) Solution running in the Sensus data centers.

PWC has expanded their Demand Response solution via CVR (Conservation Voltage Reduction) by leveraging FlexNet and adding additional "bellwether" meters to provide visibility of voltage data every 5 minutes to the integrated OSI SCADA application.

PWC's FlexNet system has aided the PWC Team to respond and provide better service during storms including Hurricane Florence:

https://www.xylem.com/en-us/support/case-studies-white-papers/sensus-technology-aids-fayetteville-pwc-in-response-to-hurricane-florence/

The cities of Cartersville and Albany, GA have transitioned from the ERT technology to FlexNet to enable a true two-way communication network to water, gas and electric services. The Sensus project team helped deliver the FlexNet network throughout their service areas and reduce truck rolls.

The Northern Virginia Electric Cooperative (NOVEC) electric utility in Manassas, VA started their AMI transition for over 185,000 ERTs in 2020. NOVEC leveraged the Sensus EasyLink Solution to read their existing ERT meters and Sensus FlexNet meters during the installation and testing of the NOVEC FlexNet network. NOVEC has also deployed thousands of load management switches for their Demand Response Solution. The Sensus' Professional Services Team provided integrations to support the LCMs and billing reads with NISC and MV90.

Project References

The Sensus FlexNet customers below have transitioned from ERTs, AMR, PLC and RF mesh with the help of the experienced Sensus Project Delivery Team.

Org & Address	Commodities	Contact	Sensus Solutions Deployed
Knoxville Utilities Board, 445 S. Gay Street, Knoxville, TN 37902	E, W, G	Eric Greene, (865) 254-8518, eric.greene@kub.org	Sensus FlexNet AMI for electric, water, and gas, Distribution Automation, integrations to third-party systems (MDMS, CIS, OMS). 400,000 residential and commercial water, electric, and gas meters throughout the KUB service territory.
Fayetteville Public Utilities Commission, Fayetteville, NC	E, W	Corey Brown, (910) 263-7268, corey.brown@faypwc.com	Sensus FlexNet AMI for 90k electric, 105 water, Demand Response via CVR, DA over FlexNet with integrations to Oracle CS2M and CCB, OSI OMS, SCADA
Northern Virginia Electric Cooperative, Manassas, VA	E	Clare Bargerstock, (703) 932-2380, CBarger@novec.com	Sensus FlexNet AMI for 190k electric and 50k LCMs. NOVEC is transitioning from Itron ERTs to Sensus FlexNet. The Sensus EasyLink mobile solution is being leveraged to read existing ERTs.
City of Cartersville, 10 N. Public Square Cartersville, GA 30120	E, W, G	Dan Porta, (770) 387-5672, dporta@cityofcartsville.org	Sensus FlexNet AMI for 30k electric, water, and gas service connections
EnergyUnited, Statesville, NC	E	Ben Godsell, (704) 896-5403, ben.godsell@energyunited.com	Sensus FlexNet AMI for 140k electric and leveraging FlexNet to connect distribution automation devices including FCIs. EnergyUnited leverages FlexNet for CVR and outage management.
Wake Electric Membership Corporation (EMC), Wake Forest, NC	E	Don Bowman, (919) 863-6487, don.bowman@wemc.com	Sensus FlexNet AMI for over 55k electric services. Wake EMC leverages FlexNet for CVR and outage management.
City of Danville, 427 Patton Street, Danville, VA 24541	E, W, G	Chris Wells, Electric Meter Supervisor, (434) 857-3377, wellsc@danvilleva.gov; Jason Grey, Director of Utilities, (434) 799-5270, greyj@danvilleva.gov	Sensus FlexNet AMI for 45k electric, 21k water, and 18k gas, integrations to third-party systems (MDMS).
City of Albany, 401 Pine Ave, Albany GA 31701	E, W, G	Diane White, (229) 302-1100, dwhite@albanyga.gov	Sensus FlexNet AMI system for 36k electric, 39k water, and 18k gas meters.
Riviera Utilities, 413 East Laurel Ave, Foley AL	E, W, G	Dustin Moore, (251) 943-5001, dmoore@rivierautilities.com	Sensus FlexNet AMI system for 49k electric, 14k water, and 5k gas meters.

Case Studies

Beyond the noted references, check out Sensus' case studies; utilities providing their perspective on the Sensus solution and how it's met their needs and solved critical problems. The following link, Case Studies, will take you to a searchable page. However here are several key case studies that are in line with Greenville:

- Fayetteville PWC
- EnergyUnited

Technical Approach and Solution Design

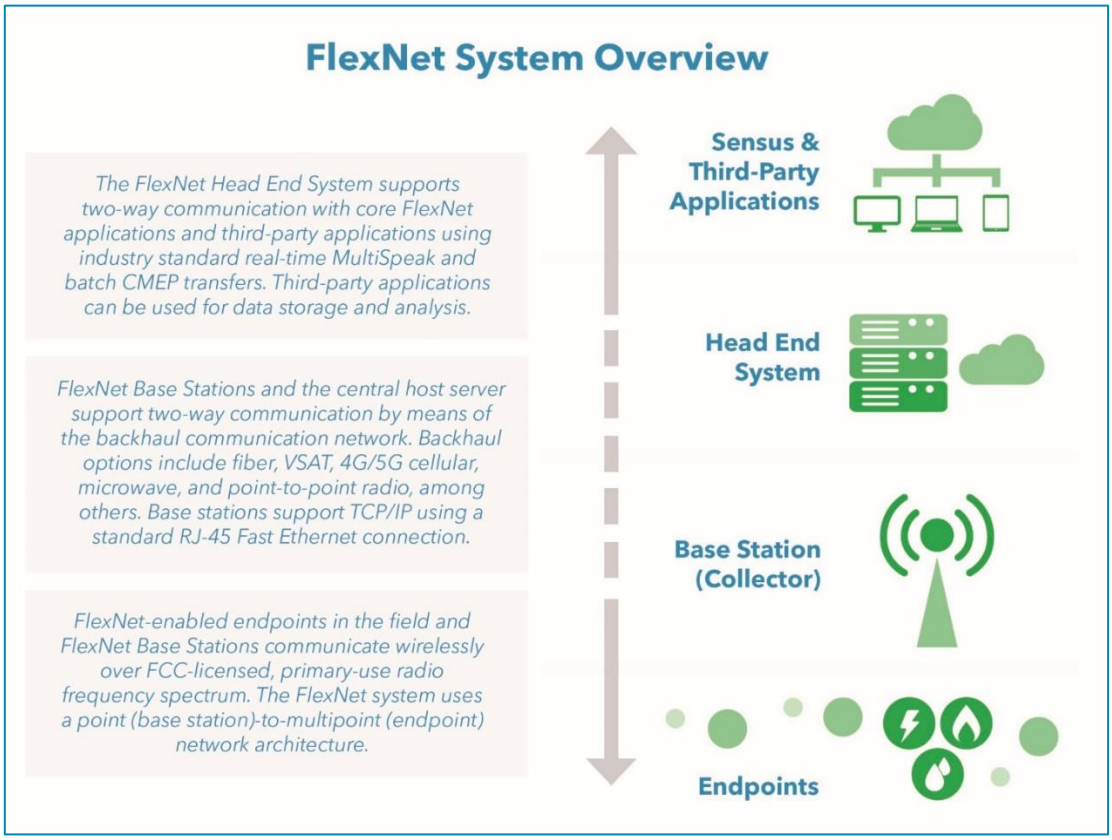
The FlexNet AMI system is a point-to-multipoint communication network where FlexNet-enabled endpoints communicate bidirectionally with all nearby network base stations. The network leverages FCC-licensed, primary-use RF spectrum to deliver the best performance in the market today. FlexNet communication is two-way from end to end, which means you can perform many actions without leaving the office, including billing reads, connects/disconnects, and more.

The FlexNet system is the industry's most comprehensive AMI network solution, providing you with market-leading solutions:

- Electric, water, and gas meter-reading
- Grid edge applications
- Superior outage and power restoration solutions
- Over-the-air connect and disconnect solutions for electric, water, and gas metering
- Smart water solutions, including pressure sensing, leak detection, district metering, and more
- Smart gas solutions, including pressure sensing, temperature, cathodic protection, and more
- Electric demand response and Distribution Automation (DA)/SCADA solutions
- Additional solutions that support third-party products and applications to meet your business and operational requirements

AMI System Design and Scalability

The FlexNet system architecture diagram illustrates how FlexNet-enabled endpoints communicate wirelessly to long-range FlexNet Base Stations via the FlexNet communication network. Base stations then pass data to the FlexNet Head End System software, which sends that data (such as billing data and outage data) to your software systems via integrations.



FLEXNET SYSTEM ARCHITECTURE

The FlexNet system is distinguished from other AMI systems in several ways:

- **Expandability**. Your FlexNet system grows as your system needs grow.
- **Performance**. The typical FlexNet system has an RIS of 99.5%, as calculated per day. Over time, typical RIS performance has proven to be even higher.
- **Efficiency**. FlexNet Base Stations easily process all incoming and outgoing messages over long distances.
- **Security**. The entire FlexNet communication network is protected by AES 256-bit encryption.
- **Backwards Compatibility**. All base stations and FlexNet-enabled endpoints are supported for the 20-year life of the FlexNet system.
- **Multi-Utility**. FlexNet does not rely on other meters to complete the network and is suitable for any mix of utility type including water, gas, and electric only territories.

Our continued investment in solutions that can be added to your FlexNet system now and in the future make the FlexNet system the most cost-effective AMI system in the market.

Multi-Utility Solution

With FlexNet, utilities can use a single infrastructure for an electric AMI system, a water AMI system, a gas AMI system, or a combination of all three. Sensus currently has over 200 combination accounts. In fact, the

base stations that Sensus is proposing in the engineered propagation study provide coverage across your entire service territory, regardless of whether you opt for a single or combined solution.

One of Sensus' key advantages for its utility customers is that, unlike other AMI solutions, we provide a superior water-only and gas-only solutions. Specifically, Sensus water endpoints and gas endpoints do not rely on electric endpoints to communicate to the FlexNet communication network, as they do in other solutions. Instead, water endpoints and gas endpoints communicate directly to FlexNet Base Stations with no hops required.

FlexNet's single network design and superior water and gas solutions enables utilities to plan upgrades without working around typical AMI system constraints. Instead, you can decide to move forward with electric meter upgrades, water meter upgrades, or a combination of both – anywhere in your system.

Finally, using a single network for a variety of solutions provides the utility with a lower overall cost of ownership for the life of the system. Put simply, the FlexNet communication network is cost-efficient, and network fixed costs are spread over a growing number of endpoints. This flexibility makes financing deployments through rigorous business case approaches more manageable, and results in higher project net present values and lower capital outlays.

No additional infrastructure is required for the FlexNet system to cover multiple service types, or to add future applications on the same network. Using FlexNet communication topography, a utility can deploy a smart metering system, and then add various smart endpoints, such as demand response endpoints, as needed – often with little to no modification to the existing network.

Refer to the references noted above in regard to examples of multi-utility deployments.

Technology Advancements

Sensus couples forward-looking, ongoing R&D investment and industry-leading performance with a commitment to backward compatibility. **Put simply, the endpoints you deploy today will continue to be supported throughout their lifetime.** Your team can rest assured knowing that your FlexNet system will never become obsolete or strand any deployed FlexNet endpoints for the life of your system. Our industry-leading, two-way wireless AMI communication network – which forms the backbone of the FlexNet system – is the key to mitigating obsolescence. The point-to-multipoint network architecture of the FlexNet system means that endpoints communicate directly with the base stations, which allows the FlexNet system to easily support different generations of products on one system. The FlexNet Head End System software allows communication with independent endpoints, enabling your team to take advantage of Sensus' ongoing innovations in technology, products, and applications – while also continuing to support the products you have already deployed in the field.

Roadmap

Roadmap and technology investment go hand in hand; Sensus is greatly committed to continually improving our product offerings, and to that end, Sensus devotes approximately 10% of its yearly revenue to Research & Development (R&D). Much of the roadmap's perceived direction is based on utility feedback

and industry trends.

Start of Confidential Information (do not share outside of Greenville Utilities)

Electric

Sensus has the following new products and features in its electric solutions roadmap:

- Additional RF options for expansion card slot in Stratus IQ+ meter
- Ability to open service switch in the Stratus IQ+ remotely
- Grid-edge applications for the Stratus IQ+ meter
- New polyphase meter: Stratus Evolve
- 320-amp disconnect service switches for both Stratus IQ+ and Aclara I-210+c meters
- Bring to market DC metering prototypes

Gas

The current Sensus strategy for our gas AMI solutions includes:

- Increase production capacity and strengthen our supply chain.
- Leverage edge intelligence and FlexNet technology to achieve safety and advanced data insights.
- Evolve with the market: improve flexibility and carbon reduction initiatives.
- Hydrogen compatibility for Sonix IQ and R-275 meters
- Cellular communications
- SentryPoint Cathodic Protection developments – AC filtering
- Operational sustainability
- Alternate ultrasonic meter source: partnership with third-party meter supplier to integrate FlexNet board
- Energy disaggregation
- Leak detection (two phases)
- Bulk shutoff
- Remote reconnect capabilities
- Methane detection

Sensus Water Roadmap

Sensus has a number of exciting water roadmap solutions that are being worked on for our utility customers.

- Continued development for our static meter portfolio for residential and C&I meters, through more sizes, flow tube options, and meter applications.
- Support for additional sensors and enhanced alarms.
- Additional interface methods for ease of use, troubleshooting, data retrieval, and installation.
- Implement variable measurement intervals for troubleshooting, investigations, and asset life extension.
- Support for more input interfaces (sensor and meter) for additional interoperability and compatibility.
- Additional options for controls, downlinks, and high-data volume applications.
- Increase data transmission rates while maintaining industry-leading warranties.
- Continue to improve Network as a Service (NaaS) to make it easier for utilities to integrate AMI into their daily operations.

End of Confidential Information

Managing Head-end Systems

Sensus introduced its AMI solution in 2004 and has over 1700 deployments. Initially the focus was oriented toward on-premise solutions; over time utilities indicated they wanted a managed services approach. Such an approach enabled the utility to focus on their key objectives, managing a utility; and Sensus to focus on its key objectives, managing the AMI infrastructure. Sensus now manages over 1300 SaaS based solutions!

Sensus offers a wide range of managed services to help our customers achieve maximum return on investment through the reduction of personnel costs. Reducing expenditures in this area frees up utilities to focus on more strategic activities and business objectives.

Our managed services solutions are scalable and allow utilities to pay only for what they use through a per-meter, per-year, subscription-based fee, depending on the actual number of endpoints deployed during each year.

- Software as a Service (SaaS): Sensus is responsible for the day-to-day monitoring, maintenance, management, and support of the customer's software applications. Sensus owns all components of the solution that are required to run and operate the software.
- Application Managed Service (AMS): Sensus is responsible for the monitoring, maintenance, management, and support of the customer's software applications. The utility would purchase and own all hardware and software components of the solution that are required to run and operate the application.
- **FlexNet Managed Services (FMS)**: FlexNet Managed Services (FMS) provides the operational management, monitoring, and maintenance of the FlexNet infrastructure and communication network. The **utility maintains ownership rights and responsibilities for the network**, and **Sensus provides the service to manage, operate, monitor, and maintain** the FlexNet infrastructure.
- Network as a Service (NaaS): Sensus owns the base stations and, as an option, the backhaul connectivity, and provides the FlexNet infrastructure as a service. Sensus operates, manages, and maintains the FlexNet communication network and provides the network tuning and optimization efforts.

Network Infrastructure Deployment

The only way to establish a network is to fully understand not only the utilities expectations from an AMI network, but also an evaluation of the meter population, gas/water only territories, and terrain and clutter. Terrain and clutter include topography, trees, bodies of water, and population density (urban and rural). Without an evaluation, network requirements tend to be vague and likely will end up costing more than initially indicated.

Propagation Study Process

Sensus' in-house RF Engineering team performs a custom RF propagation analysis based on input from your RFP. This engineered solution considers factors such as:

- Number and type of endpoints (water, gas, electric, distribution automation (DA), SCADA, demand response (DR), etc.
- Meter data requirements and data delivery timing
- The utility's service area, including terrain and clutter
- Existing utility vertical assets (location and height)

The result is a customized FlexNet communication network that is designed to meet your needs.

The FlexNet system uses a point-to-multipoint network design which supports your utility's coverage requirements – while using the least number of network devices (called FlexNet Base Stations). The propagation study shows the proposed location of each base station, along with the RF coverage area. The base station sites are located on existing utility vertical asset locations where possible. For locations with no identified existing vertical assets, the RF Engineer identifies the optimal area for installing the base station.

To complete the RF propagation analysis, Sensus uses CRC-Predict, an industry-leading RF propagation

software that Sensus supercharges using millions of data points taken from currently deployed networks across North America.

CRC-Predict is a deterministic model based on physical optics, a form of wave theory. Its predictions are based on a detailed simulation of diffraction over terrain (including clutter) and include an estimate of local clutter attenuation. As a result, predictions of coverage gaps and interference areas are based on your utility's particular terrain and will better predict communication performance for your service area.

Traditional, empirical approaches to radio wave propagation are limited, and they cannot account for the infinite variety of landscapes. By contrast, CRC-Predict is superior, because it fits real-world measurements to curves and then applies the curves to similar geographic areas.

Integration Strategy

The Sensus Professional Services integration team engages with your team early in the AMI Project Planning Phase to define use cases and understand how you and your third-party systems will interact with the FlexNet system and its data.

A first step in determining integration requirements is to gather information on the current environment—existing systems, technical architecture, software releases, metadata, business intelligence systems, and current reporting needs.

Initial Solution Design Workshop

We recommend beginning all integration solution development with Integration and Business Process workshops, in which the Sensus team partners with you to examine integration points, data flows, and solution design. Sensus business architects and solutions architects will work with you to diagram and review the "as-is" environment and document "to-be" business processes. During the initial solution design workshop, we identify the most appropriate integration methods for each integration point.

This workshop brings together Sensus' Professional Services experts with your team's IT architects and business stakeholders. It is intended as a starting point in order to:

- Understand the context of the solution in relation to existing customer systems.
- Identify the objectives, guiding principles, and constraints that will drive the solution.
- Begin putting a complete solution together.

This process helps to ensure that, together, we clearly define all work required to integrate the FlexNet technology fully with your business processes and billing systems.

During these sessions, we develop a comprehensive architecture diagram that maps the "as-is" state of your current business processes. This serves as the foundation for identifying which processes are effective and which could benefit from FlexNet enhancements. By leveraging this collaborative approach, we ensure proposed changes are aligned with your needs and goals.

Developing a Strategic Plan

Once we've established an understanding of your as-is environment and processes, we transition to the strategic planning phase for your To-Be processes. We collaborate with you to evaluate any planned system changes and their potential impact on your AMI deployment strategy. This includes assessing how your strategy aligns with the deployment schedule.

Exploring and Defining Integration Opportunities

Our Solution Design workshops also evaluate integration opportunities as a critical component of the overall solution design. This includes identifying integration points and data flows.

During the workshop, our Professional Services team collaborates with your IT architects, vendors, and business stakeholders to:

- Understand the context of the solution in relation to your existing customer systems
- Identify the objectives and goals that will drive the solution
- Leverage your existing middleware to support integrations
- Analyze data flows across your systems, including identifying source and target systems, specific data needs, and data frequency
- Collaborate on developing the initial steps toward building a complete, integrated solution

Our structured process guarantees a comprehensive examination of your unique requirements.

Shaping Your Business Processes

Our Solution Design workshops also provide an opportunity to work with your team to shape and define your future business processes. This phase builds on the insights gained from exploring your current solution architecture and goals. We identify and address any process gaps that may arise after implementing the FlexNet technology.

Documenting the Architectural and Business Processes

Once we have defined your future state business processes and integration requirements, we document all decisions and next steps. Depending on your needs, we may use the following resources:

- **Functional Design Documents (FDDs):** These documents capture business process changes alongside any technical requirements necessary to support the solution.
- **Integration Architecture Diagrams:** These diagrams capture the flow of information throughout your future solution.
- **Business Requirements Documents (BRDs):** These documents outline the business processes you will need to implement to achieve your goals.
- **Technical Requirements Documents (TRDs):** These documents detail the technical aspects of the implementation. This includes integration points, data flows, and any necessary application changes.
- **Statement of Works (SOWs):** If technical implementations performed by our Professional Services team are required and not previously captured, SOWs capture integration requirements.

Technical Implementations

Following the completion of the workshop, the project transitions to the technical implementation phase. Our team of highly skilled Professional Services developers implements the designs that were developed during the workshops.

Our developers have implemented hundreds of technical solutions for AMI partners of all sizes – from those with meter populations numbering a few thousand to those with meter populations that number in the millions. We have integrated both direct solutions and loosely coupled solutions, including developing and implementing ESB, WebSphere, MuleSoft, BizTalk, Oracle Service Bus, and others.

MDMS Experience

A large percentage of Sensus' customers utilize an MDMS; either the MDMS Sensus provides under its Sensus Analytics platform or by working with 3rd party MDMS vendors. We offer both methodologies to enable utilities to build and define the system that is best suited for them and not something Sensus force fits them into.

Sensus Analytics Overview

Utilities know that collecting the right information from meters and sensors is the best way to optimize a system and make the most of every investment. But the data itself does not tell the whole story. The process of sorting through this data – the analytics – reveals relevant, actionable insights to help improve everything from operations to customer service.

Some utilities need an MDM for simple but accurate data collection, management, and reporting. Sensus Analytics is a bundle of applications that provides core meter data management performance, enabling daily utility operations like billing and meter and sensor monitoring. The solution also provides alarm management capabilities, allowing utilities to go beyond billing applications and gain insight on system performance and health.

3rd party MDM Systems

More detail is provided in the "Integration Strategy" chapter; but Sensus has performed integrations to more than 500 MDMS deployments. Our integration points enable us to integrate to any MDMS system; some popular systems with have worked with include **Oracle**, SEDC, Siemens, NISC, Harris, and Itron.

Sensus has performed more than 20 integrations with Oracle software solutions!

Project Management and Implementation Strategy

Sensus ensures that every AMI implementation is unique to each utility's business requirements and addresses those specific needs. Sensus will partner with you to create a detailed transition plan for any modified processes or new procedures stemming from the installation of the system to be fully incorporated.

Our Deployment Services team uses standard and company-proven project management practices to ensure all activities and work related to the project are complete and finalized – **on time and on-budget**. Following installation, Sensus will work with you to verify and gain formal acceptance and hand-off of project deliverables, including any contractual obligations and required documentation.

The objectives of the AMI deployment plan are to establish an approach and process that enables utility staff to achieve project goals:

- Successfully install a fixed-base RF network over the target AMI service area.
- Process meter exchanges with highest possible efficiency and accuracy.
- Perform meter exchanges at the rate anticipated in the AMI business case.
- Maintain integrity of ongoing metering and billing process at all times.
- Minimize labor and logistics costs.
- Minimize project risk.

Sensus' experienced project team works directly with utility staff and installation vendors to develop a deployment plan that aligns with the project schedule, meets your specific AMI needs, and minimizes impact to the billing and business processes.

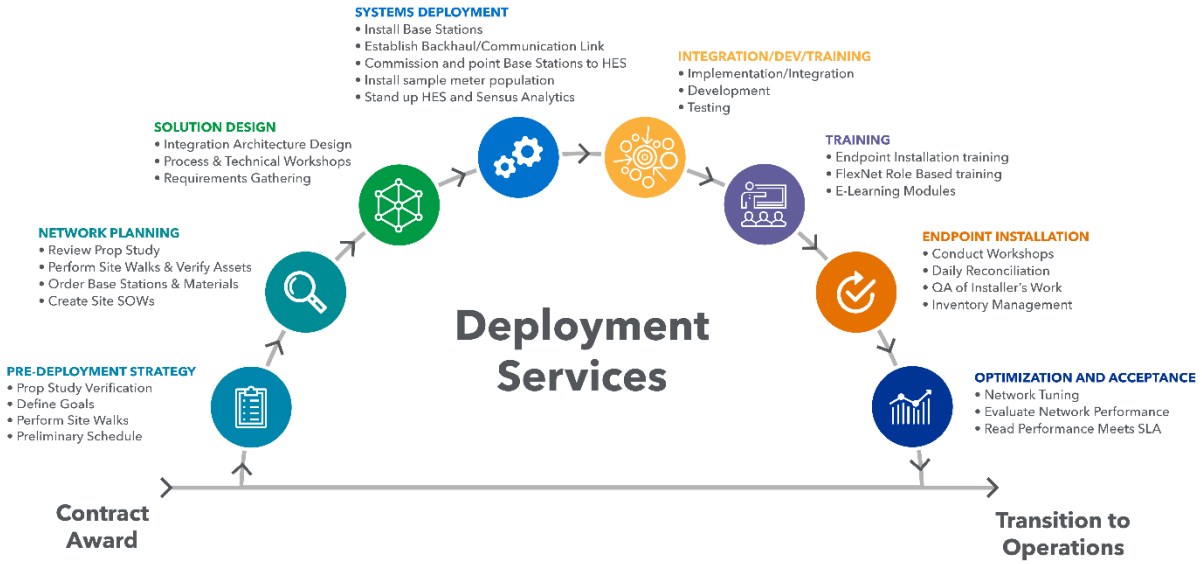
Approach

Sensus has developed a Global Delivery Model that governs our approach to all project deployments. This eight-step methodology has been refined by more than 1,700 FlexNet deployments. Key Performance Indicators (KPIs) are utilized to obtain performance metrics on each aspect of the system deployment. Statistical analysis is employed to ensure that all significant trends are identified as early as possible to permit corrective actions to be employed with minimal delay.

The project team employs a Smartsheet solution that tracks progress through mutually agreed to metrics, as displayed through collaborative dashboards. This shared process will include Project Plans, Change Control Logs, and Action Registers that track day-to-day project deliverables.

Sensus' approach to implementation and integration go hand in hand. Our embedded project teams partner closely with the utility's resources to establish and fine-tune the implementation plan during the first phase of the project. Even training of utility's personnel in the FlexNet system is a holistic process, which begins when we meet with utility team members to observe and analyze daily business processes.

The FlexNet communication network deployment allows for maximum flexibility with the point-to-multipoint technology. At the utility's direction, FlexNet Base Stations can be deployed regionally or locally, allowing maximum flexibility during meter deployment. As legacy systems reach end-of-life, new AMI customers should have the ability to address troubled areas within their existing system. Sensus has worked with many new AMI customers to migrate legacy systems that have reached end-of-life.



Phased Rollout Plan

As noted above, the point to multipoint FlexNet communication network enables numerous strategies for a rollout plan. Should a utility prefer to rollout regionally or rollout across the entire territory is entirely up to them. A very localized rollout plan can keep short term costs to a minimum by purchasing only what is needed; however, it will result in higher installation services as the installation crew needs to continually return to install infrastructure verses doing it all in a single period.

Most of our customers opt for a full network deployment as there is a hidden benefit. For utilities with aging / failing meters, a full network installation allows the failed meter to be immediately replaced with a Sensus meter vs having to purchase and temporarily install a meter associated with the older solution only to replace it in a year or two.

Recommendations for a Successful Project

Based on industry best practices and proven experience, Sensus recommends that every utility take the following steps to enhance the overall project, minimize risk, improve quality, and reduce costs:

- Assign a full-time project team to work alongside the Sensus project team for the duration of the project. In our experience, this minimizes the time it takes to make critical decisions during the deployment phase and provides a great learning opportunity for utility staff. Working collaboratively throughout the project prepares utility staff to take over system operation at project closeout.
- Employ a change management process within your business to ensure that all employees are on board with using the new technology being implemented.
- Evaluate your existing business processes prior to attending the Sensus business workshops so you are prepared to make decisions about how you want to operate your business with the new technology and feature set of the FlexNet system.
- Leverage existing FlexNet communication network infrastructure to save time and money.

Data Security and Compliance Strategy

Sensus is committed to information security and ensuring that your data is safe and protected. We have developed information security policies specific to our organization and products, addressing network, system, and application security. Customer feedback, regulatory requirements, industry standards, and emerging and evolving threats all shape the strategy we use to incorporate security within our products. Sensus obtains customer feedback through the Sensus Partner and Advisor Network (SPAN), which meets regularly to discuss security-related issues with our customers. Regulatory requirements for privacy and data protection regulations are monitored in the countries where we operate to make sure that our products stay compliant. We also maintain close ties to the major standards bodies in the AMI infrastructure space (ISO, NIST, FIPS, AMI-SEC) to ensure constant monitoring of existing and evolving standards. Additionally, we keep a pulse on emerging threats by monitoring feeds from various sources and threat intelligence providers.

Security Framework and Protocols

Sensus framework consist of conforming to a wide array of security industry standards

- NIST (IR 7628)
- ANSI
- AES 256-bit encryption
- SGIP
- AMI-SEC
- FIPS
- IETF
- ISA
- ISCJWG
- NSF
- ISO 27001 (SaaS)
- ISO 27017 (SaaS)

- SOC 2 Type II (SaaS)

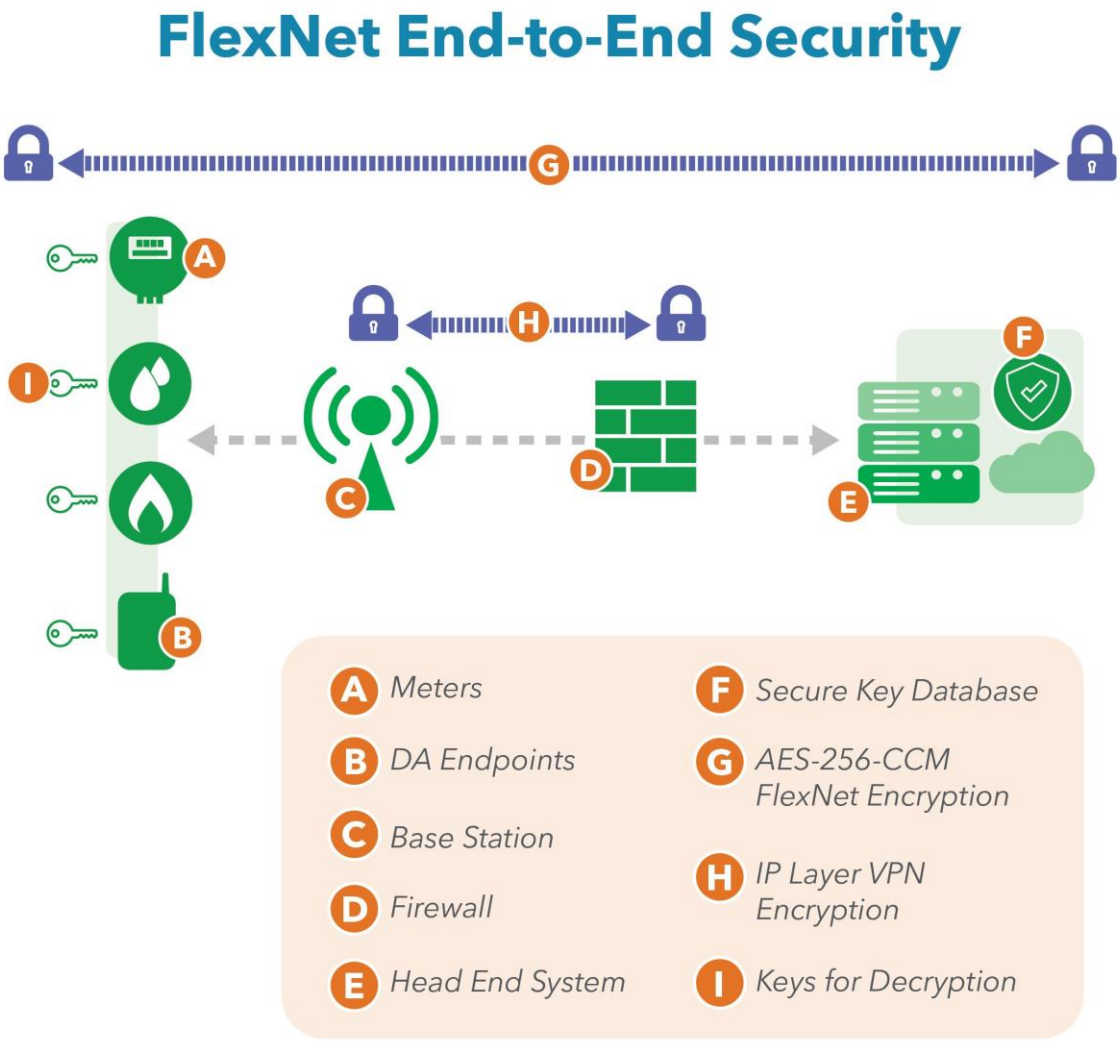
Encryption

Sensus' approach to encryption balances the need for security as well as business goals. This approach is evidenced by how encryption works within our products. For example, encryption and decryption of meter data and commands occur at the edges of the FlexNet network in the meter and head end. This approach avoids the need for routes and gateway devices within the network from performing additional encryption of the meter data and commands.

Network access points are considered pass-through devices along the encryption path. Encryption does not significantly increase the size of the packets on the network to avoid adding additional overhead to the network.

Encryption can be employed to protect the communications in both directions. On the head end, meters can be configured using their unique FlexNet ID to require the use of AES 256 cryptography to protect all communications.

Encryption on the meter occurs on the FlexNet SmartPoint communication module. Once a meter receives a communication from the head end system, it retrieves the unique key from local storage, uses it to decrypt the command, validates that the command came from the head end system, and then processes the command. Should anything fail in this process, the meter will not complete or acknowledge the command. This is then recorded in the head end system. This encrypted communication protects all messages transported across the FlexNet network from eavesdropping, man-in-the-middle, injection, and spoofing attacks.



ENCRYPTED FLOW OF FLEXNET MESSAGES

Specifically, FlexNet employs AES 256-bit encryption with Cipher Block Chaining (CCM) mode and employs AES 256-bit encryption with Cipher Block Chaining Message Authentication Code (CBC-MAC) mode, ensuring both authentication and confidentiality during data transfer.

Additionally, the system supports other secure functions, such as ECDSA-signed firmware, signed critical commands, and ECDH ephemeral AES key generation.

Access Control

The FlexNet Head End System software uses Role-Based Access Control (RBAC) to its interfaces to validate access, ensure separation of duties, and restrict access to critical functions. This provides a granular level of access control for the various roles required by complex organizations.

By default, when software is managed by Sensus, user management is performed using Red Hat Directory

Services. For a fee, the head end system software can be integrated to the utility's existing LDAP or Active Directory system.

When the software is owned and operated by the utility, the default user management services are performed by an embedded LDAP system, with the option for configuration to the utility's existing LDAP or Active Directory system.

User Permissions

User permissions define what actions each user is able to perform. Permissions are not only related to read and write functions, but also access to features and actions available within the system.

User Roles

User roles are a convenient way to provide a new user with the appropriate permissions, as many users are comprised of the same type and have the same permissions. The utility can define common user roles, and then can quickly determine what user type a new user is when adding them to the system. If permission changes are made at the user role level, any user with that user role will get the new set of user permissions without the administrator having to edit every single account.

The system has a default set of predefined user roles for out-of-the-box convenience. The utility can create and edit unlimited roles with granular permissions, depending on its access control needs.

Action Log/Audit Trail

The head end system software keeps a log of all user actions, the resulting status of the action, and a timestamp of all actions. Timestamps are recorded as HH:MM:SS (hour:minute:second). The log cannot be edited or removed by any user of the system. The purpose of the log is to provide audit information should there be a review of actions applied to an endpoint or actions performed by an individual. Only users with appropriate permissions can access audit logs.

Authentication

The FlexNet system has several authentication safeguards in place to ensure that only authorized individuals are accessing your data. All remote user access requires a unique username and password combination, which is protected by a TLS 1.2+ encrypted session. The FlexNet Head End System software provides strong authentication using LDAP or LDAPS (LDAP over TLS) to a local LDAP authentication store. The ability to integrate into an organization's existing LDAP/Active Directory (AD) authentication store is also an option. This provides a robust authentication solution for a broad range of deployment options.

In addition to user authentication, FlexNet-enabled endpoints frequently offer an encryption option. This provides for a strong cryptographic authentication of the endpoint device and the FlexNet Head End System. The FlexNet system has been improved to support asymmetric cryptography (using private keys) and certificates are used to perform this authentication. Currently, electric meters and the Sonix IQ gas meter support this capability. Earlier versions leverage pre-shared, secret keys to cryptographically authenticate the parties.

User Accounts

It is recommended that each user has a unique user account. Having unique accounts is more secure than using shared accounts and enables the utility to better track user actions. The system can be set up so that if a user is already logged in, and they log in again, the initial login is terminated.

Any number of users can concurrently access the head end system software. In addition, all critical functions within the system are logged and can be exported to a third-party alerting and reporting system to integrate with the utility's existing workflow.

Password Policy

As the utility, you are able to configure the password policy to meet your organization's security requirements. Password length, complexity, history checking, expiration, lockout, and lockout duration are all configurable.

In addition, when integrating with Active Directory, the password policy of Active Directory is enforced.

To measure compliance with the password policy, audit records are retained locally on the head end system, and can be forwarded to a remote logging server via syslog.

Additional Authentication/Password Details

Session Timeout - The user session timeout is configurable within the FlexNet software.

Password Creation - At the time of installation, the user is prompted to enter new system passwords that must comply with the password policy to ensure that unique and random passwords are created. When users change their passwords, the same policy is enforced to make sure the new passwords also meet the policy requirements.

Password Expiration - All Sensus systems and applications are configured to enforce password and passphrase requirements, where technically feasible. This includes the ability to set passwords to expire every 45 days, or any frequency the utility desires.

Sensus systems allows users to be notified of pending password expiration. The number of days is configurable by the utility.

Password Display and Transmission - All password fields are masked within the system and stored with a salted hash. Passwords are never displayed or transmitted in plain text.

Password Storage - All passwords within the Sensus solution are encrypted using strong algorithms and keys or stored using a salted one-way hash.

This is provided by standard technologies such as LDAP and Red Hat Directory.

Compromised and Forgotten Passwords - Sensus provides a built-in LDAP server for local authentication of users. For administration of this local LDAP, Sensus provides a series of web pages within the GUI interface for the FlexNet End System software to add and remove users, reset passwords, and manage permissions

and roles. Through the integration of these products, administration can be achieved through the native tools for these authentication stores.

Sensus has a documented incident response standard, and the compromised password is documented as an incident. If a password is lost, then the user is authenticated before being given a new password that must immediately be changed.

Login Attempts Viewable - The system does not notify the user, upon successful login, of the date and time of the last login, and the number of unsuccessful login attempts since the last successful login. However, successful and unsuccessful login attempts are logged, and they can be viewed by a user with administrative access.

Multi-Factor Authentication

Sensus recommends Multi-Factor Authentication (MFA) to all customers to add an extra layer of security. The FlexNet Head End System's implementation of MFA features a TOTP (Time-based One-Time Password) based solution, allowing tokens from a mobile device as an additional authentication step. MFA can be enabled at a user level.

Single Sign-On (SSO)

Sensus supports Single Sign-On (SSO) to the FlexNet Head End System software through Keycloak and Auth0.

Intrusion Detection

Sensus uses widely recognized commercial vendors and software for antivirus and malware, firewalls, and intrusion detection and prevention. Alerts are sent to the on-call administrators during on and off hours. Managers review the logs to validate that all alerts have been documented and acted upon. Should an incident occur, we deploy a documented incident response plan.

We recommend that licensed deployments use network-based intrusion detection/prevention for detection and prevention of network-based attacks against the FlexNet Head End System, similar to what we provide for our SaaS customers. This technology, along with the segmentation and separation of components, allows for isolation of critical components (such as database and key store) behind multiple layers of defense.

In addition to the network-based controls, we recommend the use of host-based intrusion detection and prevention. Along with antivirus and anti-spyware software, this often provides for a layered defense-in-depth solution within a single software application.

We qualify common antivirus platforms to incorporate them into our existing deployments. In addition, we have worked to incorporate other third-party security software into our deployments to provide host integrity over the operating system and application.

Future-Ready Security Capabilities

Sensus is committed to providing leadership through our security vision and is committed to security in all our products. Sensus annually devotes R&D resources to provide the highest level of security for our customers.

Sensus maintains a dedicated team of security professionals in the engineering group whose focus is to develop and deploy security in Sensus solutions. This team interacts with security resources in all Sensus departments to ensure that as new products or features are designed, developed, tested, and deployed, security is built into our solutions.

Sensus' commitment to security is further demonstrated by the level of resources devoted during the rollout of our existing security features, in addition to any new projects. Sensus has the technology and personnel necessary to assist in the advancement of security for the smart grid.

Sensus regularly seeks input through the following modes:

Customer Feedback

The Sensus Partner and Advisor Network (SPAN) meets regularly in order to discuss security-related issues with our customers. It provides a forum for two-way communication of security issues and new areas for us to address or consider. In addition, SPAN provides a communication path for security updates in our current products and security roadmap items.

Regulatory Requirements

We monitor privacy and data protection regulations (e.g. GDPR, CCPA) in the countries where we operate to make sure that our products stay compliant with all applicable regulations.

Industry Standards

We maintain close ties to the major standards bodies in the AMI infrastructure space (ISO, NIST, FIPS, AMI-SEC) to ensure constant monitoring of existing and evolving standards.

Emerging Threats

We monitor feeds from various sources and threat intelligence providers to keep track of the emerging and evolving threat landscape.

Training and Knowledge Transfer Plan

The Sensus Customer First philosophy is evident in our approach to training. Ensuring a seamless transition to the FlexNet system is our top priority for utilities during the training process. Our Education and Training Services team designed its curriculum to transfer knowledge as efficiently as possible to personnel so that utilities can better serve their customers from day one.

We offer a three-phased training plan that supports you during every stage of the deployment and throughout the life of the system. We have honed this approach with the experience gained from more than 1,700 deployments. After system acceptance, easily accessible online resources provide ongoing support to your staff. We also offer follow-on training to keep your team knowledgeable and up to date.

Initial Training Program Structure

This document describes Sensus' prescribed training plan to educate its utility customers' FlexNet communication network users. It describes the training sessions and workshops suggested across the various functional areas that are typically associated with monitoring and maintaining a FlexNet solution: FlexNet Administrators, FlexNet Operators, field/meter personnel, and customer service personnel. The plan also specifies the type of training (such as classroom, field, workshop, or hands-on), the duration of each training session, and the recommended participants.

Sensus and the utility will be responsible for general FlexNet training and support as described in the following sections.

Sensus' General Training Responsibilities

- Sensus will provide, as applicable, accompanying training guides and materials with its training sessions.
- Sensus will make available all online eLearning solutions immediately following project kickoff.
- Sensus will provide Introductory Series training session(s) (duration: 4 hours).
- Sensus will provide FlexNet Administrator training session(s) (duration: ½ day).
- Sensus will provide FlexNet Operator training session(s) (duration: 1 day).
- Sensus will provide Field Installer/Meter Technician training session(s) (duration: 4 hours).
- Sensus will distribute a training evaluation form at the conclusion of each training session, and will review student responses with the customer to identify any additional training needs.
- Sensus and the customer will work together to resolve any mutually agreed-upon training gaps or deficiencies throughout the training schedule.

Customer's General Training Responsibilities

- The customer will provide appropriate classroom training facilities for all onsite training outlined in this training plan.
- The customer will provide necessary computer and internet access for remote learning events outlined in this training plan.
- The customer's Project Manager will work with Sensus to schedule appropriate personnel for training.
- The customer's Project Manager will ensure that training participants have met the recommended prerequisites prior to the training sessions.
- The customer's Project Manager will be responsible for ensuring that the appropriate personnel attend the training sessions, and that customer personnel acknowledge the training has been provided by completing a Sensus training evaluation form at the conclusion of the training.

Sensus FlexNet Training Materials

Sensus' online education and training materials include class and module goals and learning objective summaries for water, gas, and electric learning events and tutorials. They also include eLearning modules, solution tutorials and demos, and digital practice videos. They may be accessed any time at the Sensus Education and Training website, without login, immediately after project kickoff and prior to instructor-led training. This information is located at the following link: www.sensus-training.com.

All classroom presentations, job aides, checklists, and inspection forms may be accessed any time from the Education and Training library located in Sensus' support portal, MySensus. A login password from Sensus is

required for access. This portal is located at the following link: https://myportal.sensus.com/.

Training Session Schedule

The Sensus training schedule is based upon and arranged according to the phases of a standard deployment: pre-deployment and deployment. Post-deployment training is available in the form of online resources, with additional value-add training sessions upon request.

Within those phases are training blocks. Blocks comprise critical information that customers need at those specific times in the deployment process to be successful. With focus on field technicians, FlexNet Administrators and Operators, and customer service personnel, the following outline provides a tentative schedule and training event summary for the education and training needed to successfully deploy, monitor, and maintain the FlexNet communication network.

Training Block I – Introduction and Overview

Performed within the first 21 days of project kickoff, this half-day classroom training session provides top-level overviews of the FlexNet communication network for all of the customer's relevant personnel. It introduces the customer's staff to the components that comprise FlexNet, reviews the roles and associated responsibilities typically required to monitor and maintain it, as well as the applications used in this process.

Day 1

Sensus FlexNet Communication Network Introduction Training (4 hours)

- Participants: Management, supervisors, and all FlexNet supporting staff.
- Introduces customer management, supervision, and support staff to the FlexNet Advanced Metering Infrastructure (AMI) solution.
- Potential topics include:
    - Introduction to FlexNet
    - FlexNet Roles and Responsibilities
    - Sensus Launch Pad Applications
    - Regional Network Interface (RNI)
    - Device Manager
- Location: TBD.

Training Block II – Meter and Field Installation (Train the Trainer)

Performed prior to installation of the first meter, this 1 day of education and training familiarizes deployment leadership with meters and handhelds, software tools, and initial deployment strategies to

ensure the highest level of deployment efficiency and communication success while deploying the customer's meters.

More FieldLogic information is located at the following link: www.sensus-training.com.

Day 1

FieldLogic Hub Training (1 hour)

- Participants: Management, meter shop supervisors, FieldLogic administrator, and meter deployment supervisors.
    - Optional: meter/SmartPoint installation personnel.
- Introduces attendees to the FieldLogic solution and its administrative tool, FieldLogic Hub.
- The following topics will be covered:
    - Introduction to FieldLogic
    - Installing FieldLogic Hub and running the First-time Setup Wizard
    - Use of Device Configurations
    - Use of Product Configurations
    - Configuring the Application Behavior tab
    - Configuring Firmware upgrades
    - Saving configuration bundles to the field devices
- Location: TBD.

Field Device Setup (1 hour)

- Participants: Management, Meter Shop supervision and support staff, and all meter/SmartPoint installation personnel.
- Introduces attendees to the FieldLogic solution reviews preparation of the customer's handheld field devices for field use.
- The following topics will be covered:
    - Introduction to FieldLogic
    - Installing FieldLogic Tools
    - Configuring the device's barcode scanner
    - Configuring the device's Communication Device
    - Configuring GPS
- Location: TBD.

FieldLogic Tools (3 hours)

- Participants: Management, meter shop supervisors, and all meter/SmartPoint installation personnel.
- Introduces attendees to the FieldLogic Connect tool used to install, configure, and troubleshoot meters and SmartPoints. Each topic will be reviewed by an instructor, demonstrated live, and then each participant will have the opportunity to perform the action(s) covered.
- The following topics will be covered:
    - Introduction to FieldLogic Tools
    - Installing a new SmartPoint
    - Updating an existing SmartPoint
    - Troubleshooting a SmartPoint and meter
    - SmartPoint and meter operations
    - Replacing or removing a meter or SmartPoint
- Location: TBD.

Meter/SmartPoint Deployment Strategy Workshop (1 hour)

- Participants: Management, meter shop supervisors, and all meter/SmartPoint installation personnel.
- Introduces attendees to the approach and methodology that should be used to ensure an efficient and quality-focused meter/SmartPoint deployment.
- The following topics will be covered:
    - System deployment summary and overview
    - Deploying meters/SmartPoints strategically
    - Validating communications between a meter/SmartPoint and its base station
    - Monitoring and overseeing deployment
    - Troubleshooting meter/SmartPoint issues
- Location: TBD

Initial SmartPoint Installation Training (3 hours)

- Participants: Management, meter shop supervision and support staff, and all meter/SmartPoint installation personnel.
- Hands-on field session focusing on validation that attendees can perform the tasks and processes covered in the previous education and training sessions.
- Participants will go to the field and properly install meters/SmartPoint, demonstrating the following:
    - Becoming familiar with handheld device nomenclature
    - Configuring various handheld devices

- Describing what a CommandLink is and how to use it for the pair process
- Demonstrating how to do basic functions, such as:
  - Connecting to a SmartPoint
  - Activating a SmartPoint
  - Configuring a SmartPoint
  - Viewing meter details
  - Deactivating a SmartPoint
  - Validating meter/SmartPoint-to-base station communications
- Location: TBD.

Training Block III – Role-Based Training

This 2-day training block will provide the education, guidance, and tasks that should be implemented to properly monitor and maintain a FlexNet solution. Intended recipients include the customer's management, supervisors, and assigned personnel who will carry out FlexNet Administrator and Operator functions.

Day 1

FlexNet Administrator Training (8 hours)

- Participants: Management, supervisors, and any customer personnel assigned the responsibility to carry out any/all FlexNet Administrator-related tasks pertaining to monitoring and maintaining the FlexNet communication network.
- Introduces attendees to the daily actions and as-needed tasks required to monitor and maintain the FlexNet communication network. FlexNet Administrators will be provided a process checklist to help accomplish those actions and as-needed tasks, as well as intuitive and easy-to-understand student guides that should be used as desktop references after the instructor has gone. Finally, Administrators will be shown where to reference current online Administrator-related education materials for future use.
- More Administrator information is located at the following link: www.sensus-training.com.
- Location: TBD.

Day 2

FlexNet Operator Training (8 hours)

- Participants: Management, supervisors, and any customer personnel assigned to the responsibility of carrying out FlexNet Operator-related tasks pertaining to monitoring and maintaining the FlexNet communication network.
- Introduces attendees to the daily actions and as-needed tasks required to monitor and maintain the FlexNet communication network. FlexNet Operators will be provided a process checklist to help accomplish those actions and as-needed tasks, as well as intuitive and easily-understood student guides that should be used as desktop references during system operation. Finally, Operators learn where to reference current online Operator-related education materials for future use.
- More Operator information is located at the following link: www.sensus-training.com.
- Location: TBD.

Knowledge Transfer and Documentation

We deliver a multi-phased approach to educate our FlexNet customers as they learn the system implementation and deployment processes.

We begin by familiarizing users with the FlexNet system through a series of introductory education modules. The introductory series is followed by meter and field training with a formal focus on the recommended scheduled tasks required to monitor and maintain the FlexNet system. This training is delivered through an instructor-led curriculum.

Our training website (https://www.sensus-training.com) contains our training and education catalog and course descriptions. Our training solution includes clear goals and objectives, uses modularized instruction that is user role-based, and is presented effectively to ensure maximum knowledge retention.

Goals and Objectives

We believe that quality education begins with a clear and properly defined learning goal. The goal of a learning event provides you with the proper context of what the learning experience is designed to address.

Different than goals, learning objectives define and state what the learner should be able to do, recall, describe, or identify as a result of taking a particular module of instruction. Well-defined learning objectives help prepare a learner by informing them of what to focus on during the education event.

User Role-Based

We organize our Core Education and Training around primary utility roles and respective responsibilities. The material focuses on monitoring and maintaining the FlexNet communication network, with such roles as FlexNet Administrator and Operator.

Modularized Instruction

Education is organized further into reasonably sized modules of professional content that address one or more specific goals. This modularization allows our role-based and task-based curricula to stand alone, and to be separated and re-combined to create a tailored learning experience appropriate for your needs.

Effective Presentation

Combining goals and learning objectives, we can present the material in a visually engaging way. Additionally, our instructors are certified in instructional techniques to help them communicate their technical knowledge in ways that focus the attention of the learner.

Training Location and Requirements

Education and training on the FlexNet system occurs on location at the utility. We provide online resources to refresh and enhance the utility users' knowledge base after the initial training has been delivered. However, the fundamental core education for new customers takes place primarily in a classroom setting on your premises.

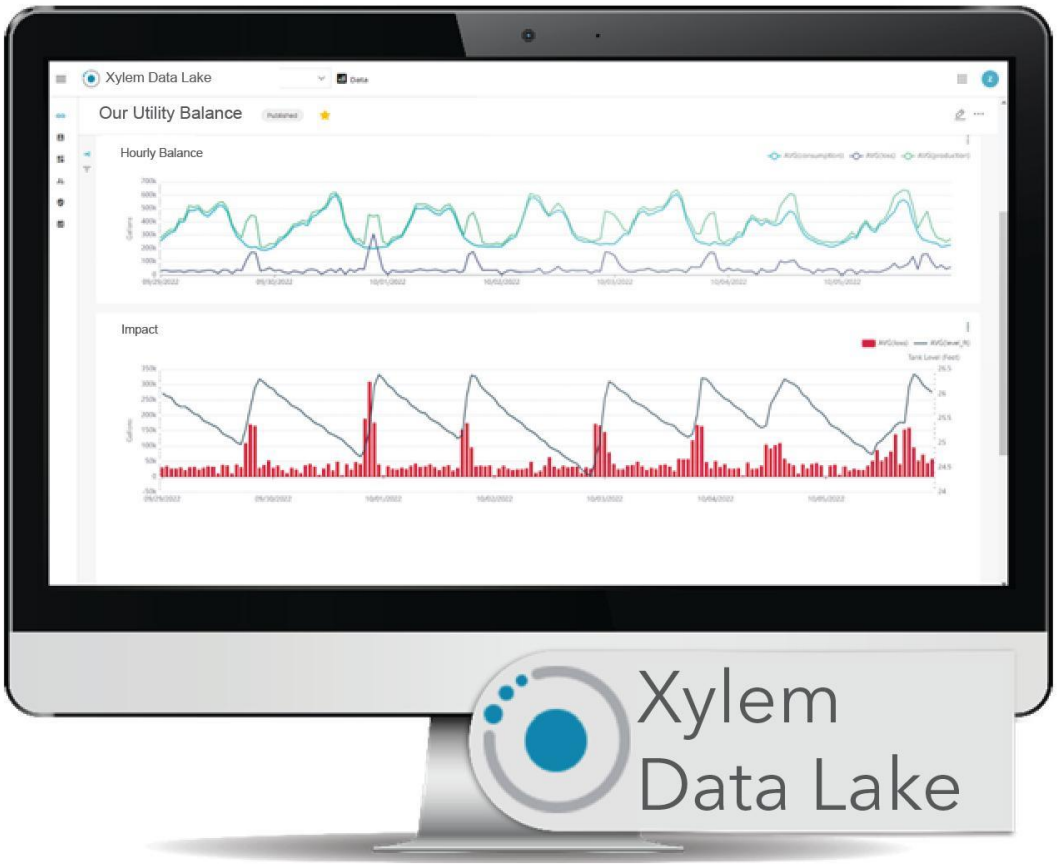
Facility requirements for this course include classroom space at the utility or a third-party location with space to accommodate all desired participants. Instructors will also need a blank wall or projection screen, access to your meter shop, and installation site access, as appropriate.

The course requires a video display for PowerPoint presentations. For the hands-on portion of training, the FlexNet field tools used for installation are also needed.

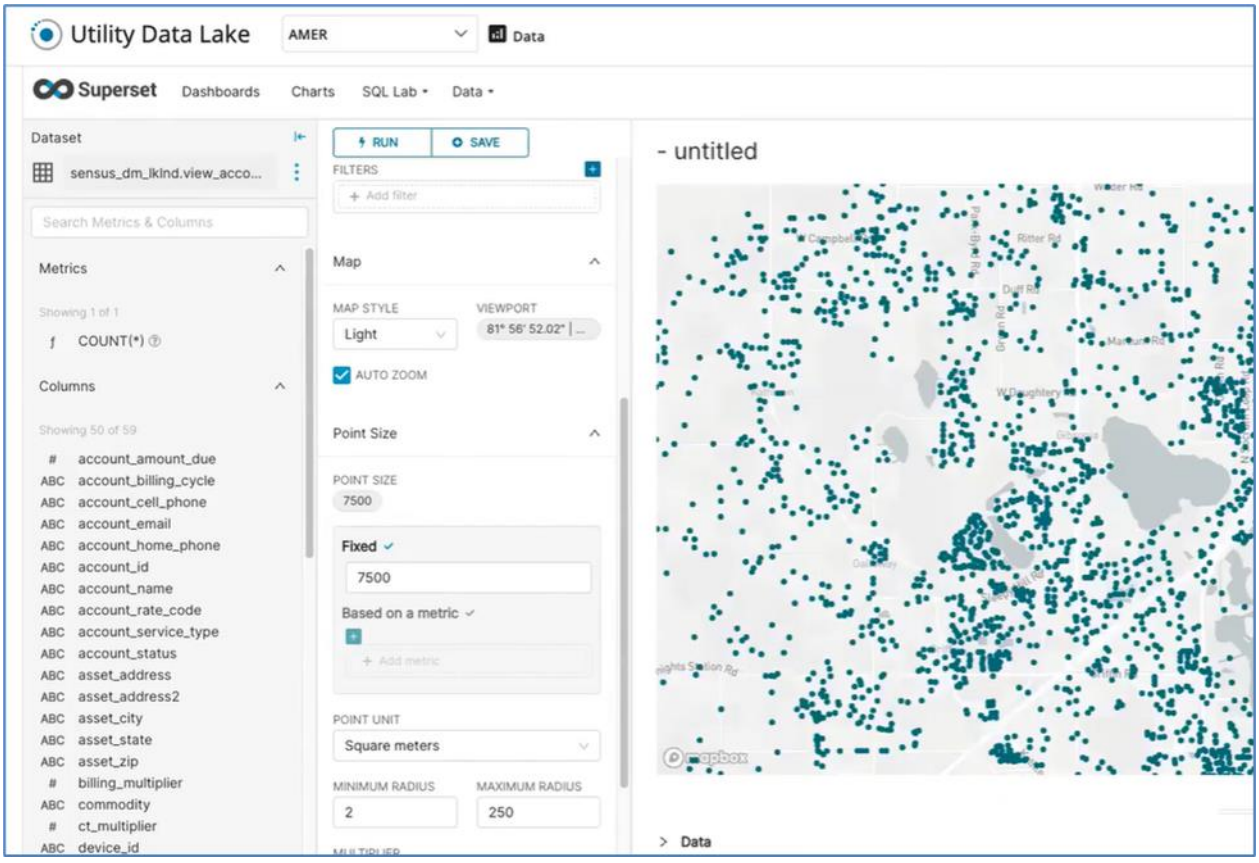
Data Analytics and Predictive Capability

Envisioning an explosive growth of analytics within the utility space, Sensus transformed its data model from a locked down data store to a highly available data lake. The Xylem Data Lake (XDL) provides flexible access to millions of data points to deliver business insights and analytical capabilities. XDL stores FlexNet data received from all your devices and sources in a centralized and secure repository. XDL makes data available for a range of activities, such as reporting, analysis, dashboards, alerts or exporting to other applications.

By default, the XDL includes an integrated, web-based business intelligence tool (Apache Superset) to run queries, create custom reports, and develop visual dashboards and charts. The database schema is documented in the XDL Reference Manual. XDL also supports Angular, Typescript, JavaScript, HTML, and SCSS for styling.



Custom reports, queries, and scripts can be saved in XDL and shared across your team. Reports can be scheduled or actioned on a threshold value. Utility staff can build dashboards from scratch or copy and modify existing ones.



Custom XDL Configuration

Alternatively (at an additional cost), a site-to-site VPN can be stood up to provide a direct connection to a local SQL client, or to your own Business Intelligence (BI) tools, such as Microsoft Power BI or SAP Crystal Reports.

With the support of the Sensus Professional Services team, data stored in the XDL can be ingested into other databases and applications, such as customer portals or work order management systems, as read-only data. Regularly pulling data from the XDL is a great way to keep GIS data up-to-date via Python scripts or Model Builder.

Data Management and Analytics Approach

Sensus offers solutions and analytics that are prebuilt, will perform custom solutions for utilities, and enables utilities to build their own solutions and analytics!

Sensus Managed Analytics

Sensus is continuing to expand its value to its customers; in addition to a multi-utility network, we offer applications that meet utility needs. The following is a general list of supported solutions:

- Device Access for gas, water, and electric
- Billing access gas, water, and electric
- Meter insight gas, water, and electric

- Alarm insight gas, water, and electric
- Acoustic monitoring for water
- Pressure profile for gas and water
- Xylem water Solutions
- CVR for electric
- DA for gas, water, and electric
- DR for electric
- Distribution Energy resources for electric
- phase detection for electric
- Load Insight for electric
- Voltage Insight for Electric
- Daily Reads for Gas

Utility Analytics

Sensus encourages utilities to build their own components on top of the FlexNet platform bus providing the data and the interfaces for utilities to generate their own reports, dashboards, analytics, and applications.

To spur utility involvement, Sensus created the SPAN Business Intelligence subcommittee; the subcommittee is a great resource for sharing and collaborating with other utilities. Additionally, our Professional Services team is available for consultation and development services.

What is SPAN

Sensus created the Sensus Partner Advisory Network (SPAN) in 2008. SPAN is a customer-led organization arranged to empower Sensus customers to communicate and share successes and challenges, as well as to have a voice in the development and expansion of the Sensus products. SPAN provides Sensus with extremely valuable feedback regarding our hardware, software, and services.

Currently, more than 1,000 members participate in SPAN, with multiple participants from each utility involved with various SPAN activities. Membership is open to any current Sensus customer, and participation continues to grow.

Various user meetings are held throughout the year, and SPAN conducts its annual business meeting during the annual Xylem Reach Conference. Additionally, the various SPAN subcommittees hold periodic teleconference meetings, typically monthly or bimonthly, that are run by utility subcommittee leads and customer subcommittee members.

Participation with these subcommittees is open to all SPAN member utilities. These subcommittees, with support of the SPAN executive team, work with Sensus personnel to drive new ideas and prioritize user input in the Sensus product development lifecycle.

Another opportunity for SPAN groups to meet and collaborate is the annual Xylem Reach Conference, which unites utility thought leaders and industry experts to share best practices, learn from their peers, and leverage smart solutions from Sensus and other Xylem brands. At Reach, attendees can:

- **Connect**: collaborate, network, and share information with their peers.
- **Learn:** discover new and existing products while learning best practices for how to get the most out of their technology deployments.
- **Grow:** gain insights into new applications that can help extend the value of their investments in the FlexNet communication network and other technologies.

Sensus Custom Analytics

For utilities that would like custom analytics though would prefer someone else to design, write, and manage, the Sensus Professional Services team can do just that! Sensus' team of Solution Architects, Business Architects, Integration Analysts, Software Engineers, Project Coordinators, and Test Analysts have completed many successful custom analytics and own the Sensus analytics defined above.

Future Technology Adaptability

As described above; the XDL is the foundation for analytical and predictive methods going forward. Given the massive data store capabilities, Sensus is already starting to implement AI and machine Learning within it. A few roadmap items to note:

- Releasing an AI chat bot this year that is to aid out customers, partners, and internal teams answer questions faster.
- Will then expand AI chat to aid in report generation and SQL writing
- Following with anomaly detection and predictive Machine Learning.

Required Forms and Adherence

The following documents, as requested, are attached:

- Attach RFQ Acknowledgement and Signature form
- Attach signed E-Verify form
- Sample Insurance Certificate – We could not find the "Insurance Acknowledgement Statement" in the RFQ material. To show compliance to carrying insurance, we have attached a sample Certificate of Liability Insurance.

RFQ No.: 25-10, Advanced Metering Infrastructure (AMI) Vendor Selection

The undersigned having carefully examined the location of the proposed work, the local conditions of the place where the work is to be done, the Invitation1, the General Conditions, the Specifications and all of the documents for this project, proposes to enter into a contract with Greenville Utilities Commission in Greenville North Carolina perform the work listed in this RFQ, including all of its component parts, and to furnish any and all required labor, materials, equipment, insurance, bonding, taxes, transportation and services required for this project in strict conformity with the plans and specifications prepared, including any Addenda, within the time specified.

Addendum Acknowledgement:

The following addendum (addenda) is (are) acknowledged in this RFQ: 25-10-q-a.pdf

Acknowledgement and Signature:

1. No Proposal is valid unless signed in ink by the person authorized to make the proposal.
2. I have carefully read, understand and agree to the terms and conditions on all pages of this RFQ. The undersigned agrees to furnish the services stipulated in this RFQ.

Respondent's Name and Title:

Company Name: Sensus USA Inc.

Address: 637 Davis Drive Morrisville, NC 27560

Telephone:(919)219-9427 Fax:

Email:drue.merkle@xylem.com Cell Number:(919) 219-9427

Contractor License # (if applicable): Expiration Date:

Federal Tax Identification Number: 51-0338883

Authorized Signature: Drue Merkle Date: 3/10/2025

Decline RFQ:

We do **not** wish to submit a RFQ on this Project. Please state your reason below. Please also indicate if you would like to remain on our Supplier list.

Reason:
Company: Address:
Name: Signature: Date:

E-Verify Form

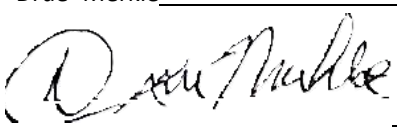
Letter of Compliance to E-Verify for Greenville Utilities Commission. Please complete the form below.

1. I have submitted a bid for contract or desire to enter into a contract with the Greenville Utilities Commission;
2. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that I am aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
3. _X_ After hiring an employee to work in the United States I verify the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or
4. _____ I employ less than twenty-five (25) employees in the State of North Carolina.
5. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that to the best of my knowledge and subcontractors employed as a part of this bid and/or contract, are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
6. _X_ After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or
7. _____ Employ less than twenty-five (25) employees in the State of North Carolina.

Specify subcontractor:_____

Sensus USA Inc._____(Company Name)

By: Drue Merkle_____(Typed Name)



_____(Authorized Signatory)

Director of Sales_____(Title)

3/10/2025_____(Date)

It is certified that this proposal is made in good faith and without collusion or connection with any other person bidding on the same above listed items. It is also certified that this proposal is made in good faith and without collusion or connection with any GUC employee(s).

Certified check or cash for N/A or bid bond for N/A attached.

Firm Name: Sensus USA Inc. Phone: (919) 219-9427

Address: 637 Davis Drive City

Morrisville State NC Zip Code 27560 Fax

(E-mail drue.merkle@xylem.com

Authorized Official Drue Merkle Title Director of Sales

Typed Name

Drue Merkle

Date 3/10/2025

Your Proposal should be received no later than March 11, 2025, 2:00PM (EST)

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 05/25/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER MARSH USA, LLC. 1166 Avenue of the Americas New York, NY 10036 CN108453421-SENS-GAW-23-24	**CONTACT NAME:** **PHONE (A/C, No, Ext):** **FAX (A/C, No):** **E-MAIL ADDRESS:**
INSURED Sensus USA Inc. 1 International Drive Rye Brook, NY 10573	**INSURER(S) AFFORDING COVERAGE** — **NAIC #** **INSURER A :** AIU Insurance Co. — 19399 **INSURER B :** National Union Fire Ins. Co. — 19445 **INSURER C :** **INSURER D :** **INSURER E :** **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** NYC-011962179-01 **REVISION NUMBER:** 1

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC OTHER:			GL 9941282	10/31/2023	10/31/2024	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG SIR: $1,000,000	$ 1,000,000 $ 1,000,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
B A	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			7620278 (AOS) 7620279 (MA)	10/31/2023 10/31/2023	10/31/2024 10/31/2024	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 3,000,000 $ $ $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
A A A	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		049154515 (AOS) 049154514 (WI) 049154513 (CA)	10/31/2023 10/31/2023 10/31/2023	10/31/2024 10/31/2024 10/31/2024	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 2,000,000 $ 2,000,000 $ 2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

Sensus USA Inc.
1 International Drive
Rye Brook, NY 10573

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
of Marsh USA LLC