

Application Note

Automatic Meter Reading



Benefits of the SkyPilot Synchronous Mesh Network Solution:

- **Directional antennas and mesh-wide traffic coordination provide industry-leading performance and scalability**
- **The extended range and non-line-of-sight capabilities combine to lower costs and simplify the deployment**
- **Utilization of multiple RF bands (2.4, 4.9 and 5 GHz) enables support for multiple, concurrent applications**
- **Built-in security provisions protect the privacy and integrity of all traffic traversing the mesh network**
- **Sophisticated traffic control accommodates real-time applications, including VoIP, video surveillance and SCADA**



As technology continues to improve in price/performance, the number of municipal utilities implementing automatic meter reading (AMR) systems continues to grow. Today, most AMR deployments are “walk-by” or “drive-by” systems. A battery-operated transmitter in each meter sends a radio frequency (RF) signal that is read by a special receiver either carried by hand or mounted in a vehicle. These solutions require a much smaller staff of meter readers, who merely need to walk or drive by the many meters in any neighborhood. The result is more accurate readings taken in far less time—all without any need to enter anyone’s property. Although this form of AMR is an enormous improvement over manual meter reading, continued high labor and vehicle costs are driving the industry to an even better solution.

Fully-automatic meter reading can eliminate entirely the need for anyone to walk or drive by any meters—ever again—with special receivers deployed to automatically and continuously read all meters in their vicinity. Among the many advantages are the ability to monitor daily demand, implement conservation programs, create usage profiles by time of day, and detect potentially hazardous conditions, such as leaks or outages. But there is still one drawback with these AMR deployments: the costly network backhaul required by leased lines or cellular services from a local telephone company, or Power Line Carrier (PLC) solutions from the local power company.

Leveraging Wireless Mesh for AMR

Advances in wireless mesh networking now make fully-automatic meter reading practical and affordable for virtually any water, gas or electric utility. A wireless mesh is a self-forming, self-healing network that requires minimal management, and no separate wiring or costly backhaul services. The mesh topology automatically creates multiple wireless paths, allowing the network to readily overcome obstacles and interference, easily expand into new territory, and deliver mission-critical reliability. For these reasons, a wireless mesh network is ideal for AMR applications.

The configuration essentially works as follows. A radio transmitter in each meter, sometimes called a meter interface unit, sends its reading to a nearby gateway receiver. Each gateway receiver serves an entire neighborhood “cluster” of meters. The many gateway receivers connect via either standard Ethernet ports or Wi-Fi communications to a community-wide wireless mesh network. The mesh then routes the traffic to utility’s datacenter, where a special server ultimately passes all the readings along to the customer billing system. The increased accuracy of the meter readings alone often cost-justifies the entire investment.

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Third-generation Mesh Networking from SkyPilot

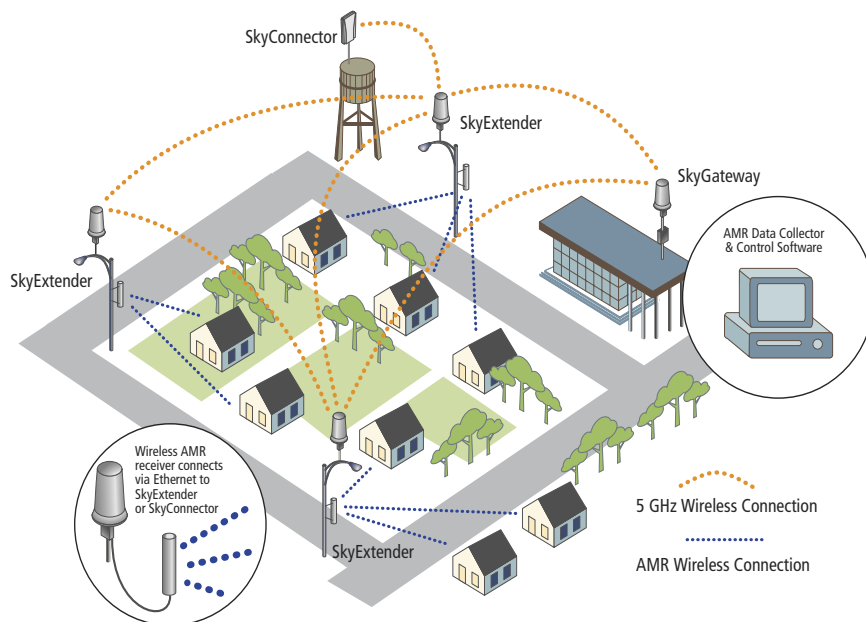
SkyPilot advanced the state-of-the-art in wireless mesh networking technology with the introduction of its Synchronous Mesh Network solution. SkyPilot's third-generation, multi-radio (2.4, 4.9 and 5GHz) mesh access and backhaul solution maximizes the many benefits of using a wireless mesh network for fully-automatic meter reading.

The SkyPilot mesh network is fully capable of satisfying various additional community-wide networking needs. For utility companies, the mesh can provide voice and data communications for field workers, video monitoring of infrastructure, and Supervisory Control and Data Acquisition, or SCADA. SCADA can be used for real-time monitoring and control of the utility's entire infrastructure, including valves, pumps, storage tanks, lift stations, and all

communications for police, fire and Emergency Management Services (EMS) personnel.

For such multi-use municipal wireless networks, SkyPilot offers a full suite of built-in security provisions, including access controls, authentication and traffic encryption, to protect both the privacy and integrity of all traffic as it enters, traverses and exits the SkyPilot mesh network. For an additional layer of security, if desired, the SkyPilot solution allows for the creation of Virtual LANs (VLANs) devoted exclusively to each separate application. Traffic filtering, shaping and prioritization features—even enable the SkyPilot solution to accommodate demanding real-time applications, including SCADA, video surveillance and voice over IP (VoIP).

To learn more about third-generation wireless mesh networking with the SkyPilot Synchronous Mesh Network solution, please visit SkyPilot on the Web at www.skypilot.com.



The sophisticated SyncMesh™ architecture, with its use of directional antennas with mesh-wide traffic synchronization, gives the SkyPilot solution its industry-leading scalability, enabling AMR applications to reach cost-effectively throughout large geographies. Superior non-line-of-sight (NLOS) coverage allows the SkyPilot mesh to operate dependably in even the most challenging urban or rural environment. Where required, the extended range of the SkyPilot solution (up to 10 miles or 6.5 kilometers) enables placement of gateway receivers at a considerable distance from the mesh backhaul network.

other remote plant and equipment. Other types of meters could be read automatically, including those for parking, traffic, bridge tolls, etc. Broadband Internet access could be offered to residents and businesses at data rates up to 6 Mbps. Wi-Fi HotSpots or HotZones could be deployed throughout the community to provide field communications for government workers, along with public Internet access for residents and visitors alike. The same community-wide mesh network could even support public safety applications ranging from video surveillance to interoperable incident response commu-



Leading the Mesh Revolution

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