

Application Note

Public Safety



Benefits of the SkyPilot Synchronous Mesh Network Solution:

- Use of licensed spectrum and robust security provisions protect the privacy and integrity of all traffic traversing the wireless mesh network
- Sophisticated spectral and traffic management provide deterministic Quality of Service (QoS) for real-time voice and video communications
- Mesh-wide traffic coordination via directional antennas provides industry-leading performance and scalability
- Extended range and NLOS capabilities combine to improve reliability and lower costs of deploying a community-wide wireless network
- Integral single or dual access points (2.4 and/or 4.9 GHz) offer both public access and public safety support in one, multi-use network



Public safety agencies face a number of communications challenges today. Existing radios provide voice-only communications and frequently become crowded with traffic during an emergency. The commercial voice communications infrastructure (both wireline and cellular) suffers similar problems, or worse, during a widespread disaster. Narrowband data communications, in the licensed 700 MHz spectrum and in commercial 3G cellular networks, lack the throughput needed to support sophisticated applications, such as live video feeds and real-time multi-agency, multimedia collaboration. And broadband data communications in the unlicensed Wi-Fi spectrum is often unsuitable for the mission-critical nature of public safety communications.

To help overcome these and other limitations, the U.S. Federal Communications Commission (FCC) allocated radio frequency (RF) spectrum in the 4.940-4.990 GHz band for exclusive use in public safety applications. The FCC's goal is to enable the interoperability of both intra- and inter-agency broadband wireless communications for local and state police, fire and EMS, National Guard and federal agencies, and even private entities that regularly have a role in public safety, such as hospitals, utilities and railroads.

Community-wide Wireless Broadband Communications

Municipalities around the world have found that wireless mesh networks are the most practical and cost-effective way to provide broadband communications on a community-wide basis. The wireless mesh is a self-forming, self-healing network that installs quickly and easily, and requires minimal ongoing management. And because the mesh topology forms redundant wireless paths, the network is able to traverse obstacles, readily scale into new territory and deliver mission-critical reliability.

These community-wide mesh networks are capable of supporting public safety communications needs in three ways: fixed wireless jurisdictional networks, incident response with fixed and mobile hotspots, and wireless video surveillance. Examples of advanced multimedia communications made possible with broadband wireless networking include online multi-agency collaboration and whiteboarding, around-the-clock video monitoring and surveillance, real-time video feeds from an incident scene, instant multimedia messaging, and Voice over IP (VoIP).

With the ubiquitous and contiguous coverage of a community-wide wireless mesh network, special wireless mobility routers can provide roaming connectivity at high speeds. The ruggedized mobility router mounts in virtually any moving vehicle or vessel: a squad car, fire truck, ambulance, boat and mobile command center. (Note that FCC regulations prohibit the use of the 4.9 GHz spectrum in aircraft without special

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licensing, and certain restrictions apply in areas where the U.S. Navy conducts operations near the 4.9 GHz frequency.)

Together these broadband multimedia communication capabilities enhance routine communications and improve situational awareness during incident response.

Third-generation Mesh Networking from SkyPilot

SkyPilot's third-generation Synchronous Mesh Network solution advances the state-of-the-art in mesh technology on two major fronts with an 8-way directional antenna array and mesh-wide traffic synchronization. This innovative SyncMesh™ architecture makes SkyPilot the industry leader in both performance and scalability.

By synchronizing directional antennas, nodes throughout the mesh topology are able to transmit and receive traffic simultaneously, dramatically improving overall throughput and making performance deterministic for superior Quality of Service (QoS) in demanding real-time

applications, including VoIP and video surveillance. Additional features like traffic filtering, shaping and prioritization further enhance QoS, and allow different levels of service to be offered to multiple applications or user types.

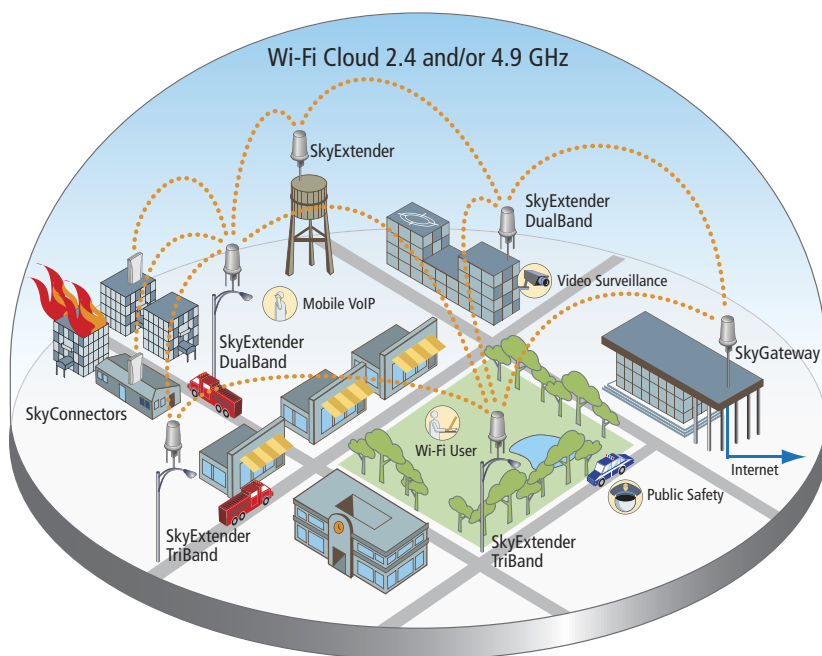
Because directional antennas create point-to-point links with neighboring nodes, transmissions occur at much higher power levels than are permitted with omnidirectional antennas. Higher power levels afford several key advantages, including lower error rates based on an improved signal-to-noise ratio, better penetration through obstructions that attenuate signals, and superior range that allows longer distances between nodes (up to 10 miles or 16 kilometers). Lower node density results in more cost-effective deployments throughout large geographies, while the improved range more easily links those locations that are well beyond the reach of other wireless systems.

SkyPilot nodes integrate mesh backhaul with Wi-Fi and public safety access in a single, rugged unit that dramati-

cally reduces installation and operation complexity. Each node includes one or two omnidirectional access points operating at 2.4 GHz (unlicensed Wi-Fi) and/or 4.9 GHz, allowing the dual-band hotspot to provide secure dedicated bandwidth for both public access and public safety applications. RF interference with the integral access point(s) is eliminated by using unlicensed 5 GHz spectrum for the mesh backhaul. Their rugged design even allows SkyPilot nodes to be mounted in mobile command centers to provide on-scene, ad-hoc communications.

Security is vitally important in public safety applications, especially when deployed in a mixed-use municipal network. SkyPilot offers a full suite of built-in security provisions, including access controls, authentication and traffic encryption, which together protect both the privacy and integrity of all traffic. For an additional layer of security, Virtual LANs (VLANs) can devote exclusive security policies to each application, such as private intra-agency communications.

SkyPilot's robust third-generation architecture is the secure, scalable and affordable choice in wireless broadband communications for public safety applications. To learn more about the many advantages of the SkyPilot Synchronous Mesh Network solution, please visit SkyPilot on the Web at www.skypilot.com.



Leading the Mesh Revolution

SkyPilot Networks, Inc.
2055 Laurelwood Road
Santa Clara, California 95054
Telephone: +1-408-764-8000
sales@skypilot.com

www.skypilot.com