Cambium Networks™

SOLUTION PAPER

Wireless CCTV Backhaul

Wireless is the preferred backhaul choice for today's outdoor video-surveillance deployments. Modern IP cameras produce high-resolution, multi-stream video that quickly exceeds copper limits while trenched fiber costs are rapidly increasing. Cambium Networks' purpose-built fixed-wireless solutions solve outdoor surveillance needs—from fast Bridge-in-a-Box installs to large, self-healing citywide networks.

What you'll find inside:

- The wireless-vs-fiber/copper economics for video surveillance
- Cambium platform tour: ePMP™, cnWave™ 60 GHz with distributed mesh, and cnMaestro™ Network Management
- Spectrum tradeoffs: 5 GHz and 6 GHz vs 60 GHz
- Why purpose-built radios beat Wi-Fi mesh and consumer-grade alternatives
- LINKPlanner introduction and design-and-deployment checklist

- **Four reference deployment examples:**

Multiple cameras in a parking lot: cnWave 60 GHz in a point-to-multipoint (PMP) topology

Multiple cameras on an expansive college campus using ePMP 4500 5 GHz

Cameras on city streetlights spanning several blocks using cnWave 60 GHz in a distributed-network topology

Single camera at a construction site using Bridge-in-a-Box point-to-point (PTP)

Engage Cambium or your distribution partner for direct design help. Getting the topology right at design stage saves rework on day 2.

Why Wireless for Video Surveillance

The same AI infrastructure boom that's driving smart city investment is consuming the fiber supply chain. Wireless backhaul is increasingly the path of least resistance — and shortest timeline.

Fiber and copper networks are expensive and slow to deploy. Outdoor cable runs often become the hidden cost driver in CCTV projects. In parking lots and yards, trenching through asphalt typically costs $50–$150 per foot once you include saw-cutting, conduit, bedding, patching, and re-striping—before the fiber itself, which is also experiencing dramatic cost increases and challenging availability. Metro-scale builds can run $50,000–$200,000 per mile and require permits, lane closures, and weeks or months of disruption, not to mention geographical barriers, such as lakes and railways, that may render fiber to be infeasible. And when the camera plan changes—as it often does—fiber can't be moved. Copper is also limited: 100 m PoE range, little headroom for 4K/H.265, and higher lightning risk across open areas.

The ability to flexibly place a camera exactly where it's needed, not where the cable runs, is the defining advantage of wireless surveillance infrastructure.

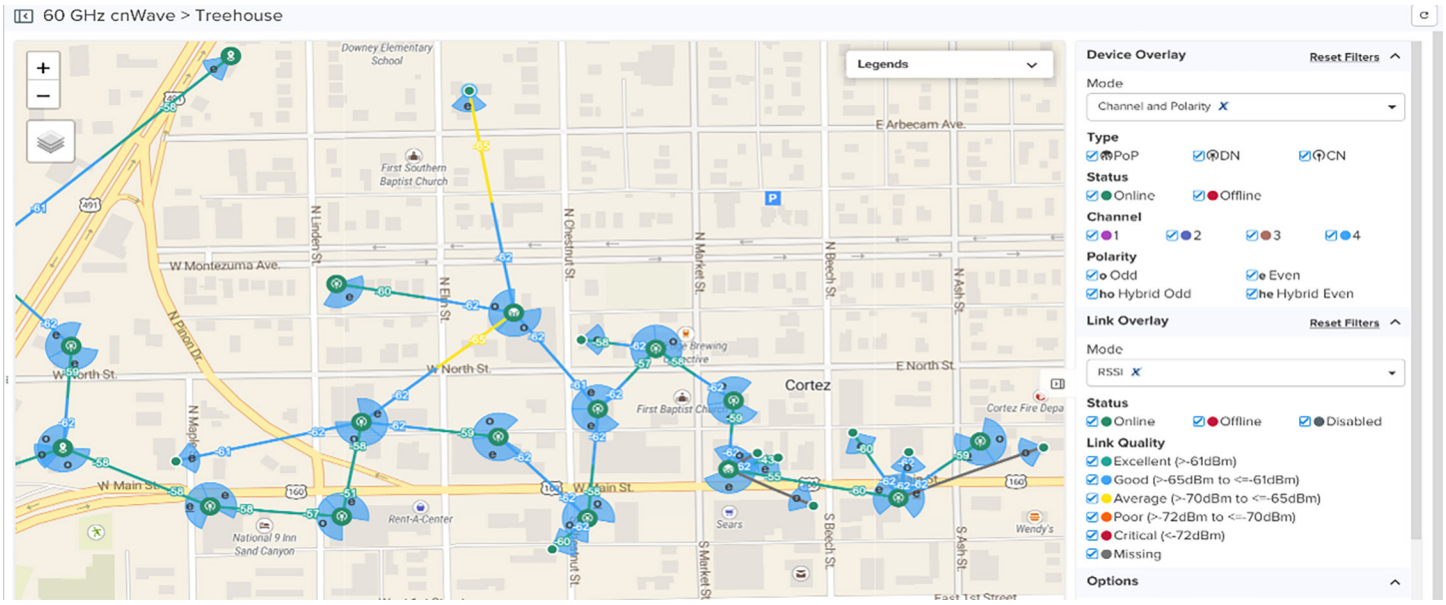
The wireless advantage. Purpose-built fixed wireless inverts the math. A two-radio link with cameras goes up in a few hours, with no trenching and no permits. For larger projects, a single cnWave 60 GHz V5000 sector aggregates 30+ camera feeds at gigabit-class throughput. An ePMP 4500 5 GHz sector reaches up to several miles for the long shots. When the deployment shifts (e.g., a temporary lot becomes permanent, a construction site moves to phase two) the radios pick up and follow it. The cnWave 60 GHz deployment in a historic district in Allentown, Pennsylvania, captured the advantages of no trenching for fiber, minimal visual impact, and fast approvals from the building commission.

Modern IP cameras using H.265 push roughly 4–8 Mbps per 4K stream and 2–4 Mbps for 1080p. A single Cambium sector comfortably aggregates dozens of cameras with capacity to spare for VMS metadata, two-way audio, and a few outdoor Wi-Fi APs. Cambium makes the choice easy: cnWave 60 GHz for short line of sight (LOS) links and networks with many cameras or ePMP for expanded range and the ability to propagate through a few trees.

Why Cambium for Wireless CCTV

The Cambium difference. Cambium is a wireless infrastructure company built on decades of public-safety, utility, and carrier deployments. Cambium solutions are engineered to last in harsh outdoor environments.

- **Dedicated support team.** Direct technical access to subject matter experts.
- **Sales-engineering design assistance.** Link planning and BOM assistance built into the engagement (without added fees).
- **Mission-critical reliability.** Industrial-grade hardware deployed in 150+ countries, in environments from retail parking lots to citywide public-safety networks and real-time crime centers.
- **Decades-long pedigree.** Cambium is an industry-respected leader in fixed wireless PTP and PMP solutions with 10+ million radios deployed globally.
- **Management with cnMaestro.** Powerful management platform for Cambium fixed wireless, switching, fiber, firewall, and Wi-Fi devices; available both on-premises or in the cloud, with free and subscription-based options.
- **Partner program.** For system integrators, Cambium offers many resources including product training, access to special programs and promotions, and additional sales enablement/marketing tools to increase your proposal success.



cnMaestro single-pane-of-glass network management for the entire Cambium stack.

Cambium Wireless Platforms for CCTV

Cambium offers a wide portfolio of fixed wireless solutions. The following are just a couple of examples.

ePMP 4000 series. The ePMP 4000 series is Cambium's latest generation of the ePMP platform consisting of 5 GHz (ePMP 4500) and 6 GHz models (ePMP 4600). ePMP is a PMP and PTP platform, which delivers high-performance outdoor connectivity optimized for reliable operation, high throughput, interference mitigation, scalability to support more cameras, ease of deployment, manageability, and low cost.

ePMP supports high modulation rates (1024QAM for 5 GHz and 4096QAM for 6 GHz) coupled with a purpose-built, proven air interface for improved performance in multipath and high-interference environments. The platform also supports MU-MIMO with beamforming for increased sector capacity and camera density, along with asymmetric uplink/downlink channel widths and tailored uplink/downlink ratios especially important in video surveillance applications, with spectrum agility not found in competing solutions.

> **Note on 6 GHz.** The 6 GHz band, recently opened for unlicensed use under FCC AFC (Automated Frequency Coordination) rules, gives the ePMP 4600 access to 850 MHz of clean spectrum in the United States and 1,200 MHz in Canada, more than twice the 5 GHz allocation with far less legacy interference. Operating in the 6 GHz band requires the radio to check in with the AFC service once daily, ensuring it does not interfere with nearby licensed 6 GHz microwave radios. 6 GHz is the right choice when 5 GHz channels in the deployment area are highly congested. Cambium's ePMP 4600 radios are fully AFC-certified for 6 GHz operation, and all AFC software and functionality is included with the radio at no extra charge.

ePMP Access Points

Model	Band	MIMO	Antenna*	Channel Width	Maximum Modulation
ePMP 4500	5 GHz	8x8 MU-MIMO	17 dBi, 90° integrated	20/40/80 MHz	1024QAM
ePMP 4500L	5 GHz	2x2 MIMO	Connectorized	20/40/80 MHz	1024QAM
ePMP 4500C	5 GHz	8x8 MU-MIMO	Connectorized	20/40/80 MHz	1024QAM
ePMP 4600	6 GHz	4x4 MU-MIMO	Connectorized	20/40/80/160 MHz	4096QAM
ePMP 4600L	6 GHz	2x2 MIMO	Connectorized	20/40/80/160 MHz	4096QAM
ePMP Force 4518**	5 GHz	2x2 MIMO	Integrated 18 dBi 15°	20/40/80 MHz	1024QAM
ePMP Force 4616**	6 GHz	2x2 MIMO	Integrated 16 dBi 15°	20/40/80/160 MHz	1024QAM

**Cambium and third parties offer a wide range of antennas (e.g., sectors, horn style, omnidirectional) for connectorized APs.*

*** ePMP SMs, including Force 4518 and Force 4616, can be converted to AP mode with optional license key upgrade, limited to 8 SMs per AP.*

ePMP Subscriber Modules

Model*	Band	Form Factor	Antenna Gain	Channel Width	Maximum Modulation
Force 4518	5 GHz	Compact integrated panel	18 dBi	20/40/80 MHz	1024QAM
Force 4525	5 GHz	Integrated 18” dish	25 dBi	20/40/80 MHz	1024QAM
Force 425	5 GHz	Integrated 18” dish, IP67, SFP+ port	25 dBi	20/40/80 MHz	1024QAM
Force 400C	5 GHz	Connectorized, IP67, SFP+ port	External	20/40/80 MHz	1024QAM
Force 4616	6 GHz	Integrated panel	16 dBi	20/40/80/ 160 MHz	1024QAM
Force 4625	6 GHz	Integrated 18” dish	25 dBi	20/40/80/ 160 MHz	1024QAM
Force 4600C	6 GHz	Connectorized + SFP+	External	20/40/80/ 160 MHz	4096QAM

**Subscriber modules (SM) offer great flexibility. SMs connect to access points (AP) as PMP endpoints. SMs also connect to other SMs for PTP scenarios.*

cnWave 60 GHz (multi-gigabit short-haul PTP, PMP, and distributed network):

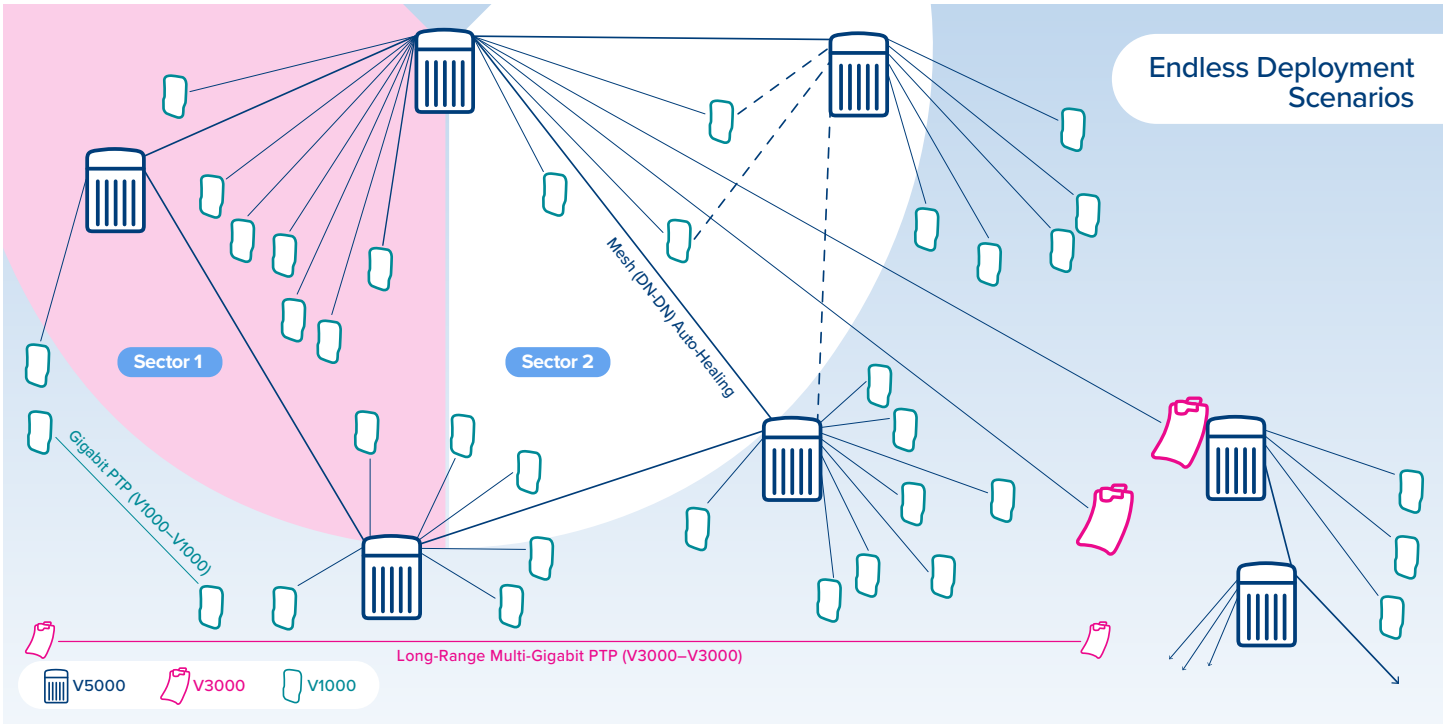
Fiber-like performance for a wide range of deployment scenarios from simple PTP to distributed networks spanning an entire city with hundreds of cameras. 60 GHz is a great option because it doesn't interfere with 5 GHz and 6 GHz Wi-Fi networks and isn't affected by them either.

Model*	Role/Antenna	Throughput	Range**	Ports and Power	Maximum Modulation
 V5000	Distribution node (DN), dual-radio 280° (2x140°)	Up to 5.4 Gbps/sector	150 m between linked V5000s	10 G PoE-in, SFP+, 1 G aux PoE-out, PoE or direct DC, ≤30 CNs, 150 m DN-to-DN	1024QAM
 V1000	Client node, small form factor	1 Gbps	≈150 m PTP	1 GE PoE-in	1024QAM
 V2000	Client node, mid-range, compact form factor	1.8 Gbps	1.0 km PTP, ≈450 m to V5000 DN	2.5 GE PoE-in + 2.5 GE aux PoE-out, PoE or direct DC	1024QAM
 V3000 small dish	Client node, integrated dish	1.8 Gbps	1.5 km PTP, ≈670 m to V5000	1 GE PoE-in, 1 GE PoE-out, SFP+, PoE or direct DC	1024QAM
 V3000 large dish	Client node, integrated dish	1.8 Gbps	2.3 km PTP, ≈720 m to V5000	1 GE PoE-in, 1 GE PoE-out, SFP+, PoE or direct DC	1024QAM

**Similar to ePMP SMs, cnWave client nodes (CN) offer great flexibility. CNs connect to distribution notes (DN) (V5000) as PMP endpoints. CNs also connect to other CNs for PTP scenarios. Optionally, DNs connect to other DNs to form resilient distributed networks.*

***Ranges quoted are MCS9 at 99.9% availability with 32 mm/hr rain. Use Cambium LINKPlanner to validate every link in your design.*

Distributed networks. cnWave supports distributed networking (often called mesh), but it's not traditional Wi-Fi mesh. V5000 distribution nodes (DN) connect to client nodes (CN) and to other DNs, forming daisy-chain and ring topologies with redundant paths and multi PoP (point of presence) designs. If a link degrades or fails (misalignment, foliage in the LOS, or power loss) traffic reroutes through the network in milliseconds. The built-in end-to-end (E2E) controller (local or cnMaestro-managed) automates discovery, link-state monitoring, and routing, so nodes require little to no manual configuration. With multiple PoPs and redundant fiber gateways, the network avoids the single-WAN failure point of a typical hub-and-spoke topology. With a cnWave distributed network, radio assets are kept closer to street level for easier expansion when the city's network grows.



Building and expanding a distributed network.

PTP Bridge-in-a-Box

ePMP SMs (Force 4525, 4518, 4616, 4625, 425, 400C, 4600C) and cnWave 60 GHz CNs (V1000, V2000, V3000) deploy easily as dedicated PTP links. Cambium pre-pairs/pre-configures several of these models in Bridge-in-a-Box kits* for quick plug-and-play deployment. Just mount them, point them at each other, and you have a high-speed wireless bridge.

60 GHz · 1 Gbps · 150 m
V1000 Bridge-in-a-Box

60 GHz · 2 Gbps · 1 km · PoE-out
V2000 Bridge-in-a-Box

5 GHz · 1 Gbps · 3 km
ePMP 5 GHz 1 Gb Bridge-in-a-Box

**For higher-end requirements, Cambium offers an expanded selection of PTP radios including licensed-band options. Contact a Cambium sales representative for guidance on licensed-band and alternate license free solutions.*

Features That Matter for Surveillance

Wireless CCTV is a demanding workload with 24/7 multi-stream uploads with strict jitter and packet-loss budgets. The Cambium portfolio includes several engineered features that make the difference between a network that works and one that drops frames under load.

ePMP FEATURE HIGHLIGHTS:

- **Quality of Service (QoS)/per-subscriber rate limiting.** Per-CPE QoS profiles enforce minimum and maximum bitrates per subscriber. Camera streams get reserved capacity even when the sector is busy.
- **Air fairness.** Sector airtime is allocated fairly across SMs regardless of their modulation rate, so distant or slow SMs cannot starve high-modulation cameras of airtime.
- **ATPC (Automatic Transmit Power Control).** Each radio dynamically adjusts transmit power to maintain target signal-to-noise ratio (SNR), improving coexistence with adjacent sectors, reducing self-interference, and extending RF component life.
- **ePTP mode.** For dedicated point-to-point backhaul (camera-to-NVR [Network Video Recorder]-to-WAN, building-to-building), ePMP radios can run in ePTP mode for low consistent latency and dynamic load balancing of uplink and downlink traffic.

cnWAVE FEATURE HIGHLIGHTS:

- **Gigabit performance.** Fiber-like speeds with sub-millisecond latency, well-suited for high-camera-count aggregation and multi-stream video.
- **Electronic beamforming antennas.** The dual-radio V5000 sector and V-series CNs use electronic beamforming for quick alignment.
- **Flexible powering options.** V5000, V3000, and V2000 accept multiple power paths:
  - **PoE-in.** Standard PoE injector at the network end powers the radio. Useful for indoor/closet aggregation points.
  - **Direct DC.** Accept direct DC input. Useful when the radio shares power with a streetlight luminaire's AC/DC supply or with a solar/battery enclosure.
  - **PoE-out (aux).** V5000 (1 G aux), V3000 (1 G), and V2000 (2.5 GE), all include a PoE-out port that powers a paired IP camera or Wi-Fi AP without a separate injector. One PoE drop, two devices powered, one trip up the lift truck.

POWERFUL MANAGEMENT PLATFORM WITH CNMAESTRO

Single-pane-of-glass management with cnMaestro enables network-wide management, device onboarding, zero-touch provisioning, monitoring, alerts, maps, auto-upgrades and much more. cnMaestro X (subscription version) provides advanced network visualizations, AI-driven Assurance analytics, MSP multi-tenancy support, API, extended storage, enhanced reporting, and other enhancements compared to the free Essentials version. cnMaestro is available via cloud or on-premises.

SUPPORT AND SERVICES

Cambium offers 24x7 support options with design, deployment, monitoring, and troubleshooting services by industry experts.

Choosing the Right Spectrum for Video Surveillance

5 GHz vs 6 GHz vs 60 GHz

Attribute	5 GHz (ePMP)	6 GHz (ePMP)	60 GHz (cnWave)
Range, typical PMP	Up to 8 km (5 mi)	Up to 5 km (3 mi)	Up to 2 km (1.2 mi) but less than 500 m (0.3 mi) for most applications
Per-sector throughput	Up to 1 Gbps	Up to 2 Gbps	Up to 3.8 Gbps
Channel widths	20/40/80 MHz	20/40/80/160 MHz	Wide (≈2 GHz)
Line-of-sight requirement (LOS)	LOS/partial-LOS tolerant	LOS/partial-LOS tolerant	Strict LOS
Weather and foliage	Robust through rain and light foliage	Robust through rain and light foliage	Sensitive to heavy rain and foliage
Channel licensing	Unlicensed	Unlicensed (AFC coordination can limit some available channels)	Unlicensed
Co-channel interference	Shared with Wi-Fi and legacy radios	Far less legacy interference	Effectively interference-free in most scenarios
PMP/mesh/PTP	PMP and PTP	PMP and PTP	PMP, PTP, distributed mesh + multi-PoP
Sweet-spot deployment	Campus, district, longer hops, trees	Congested 5 GHz sites, capacity-heavy links	Dense camera clusters, short LOS

In summary use 60 GHz for projects involving short LOS links and broad distributed high-availability networks; ePMP for longer links and near-LOS. Some deployment situations don't fit cleanly into one box; many real-world surveillance networks use both.

Why Purpose-Built Distributed Networks Beat Traditional Meshes

The integrator field is full of simplistic Wi-Fi mesh proposals and a steady stream of fixed wireless vendors promising similar outcomes. Most of those approaches have meaningful tradeoffs that are not obvious until the deployment is live.

For example, **Wi-Fi mesh is the wrong tool for video backhaul.** Mesh Wi-Fi works well for casual coverage (guest browsing, basic IoT), but the duty cycle of a 24/7 multi-camera surveillance feed exposes its limits quickly:

- **Bandwidth halves per hop.** Every Wi-Fi mesh hop typically halves the available throughput. With 2 hops, you lose 75%; with 3 hops, you lose 87%. Camera aggregation collapses fast, but with Cambium's 60 GHz solution, the architecture doesn't lose capacity at each hop and additional latency per hop is less than a millisecond.
- **Shared medium contention.** Mesh nodes contend on the same channel for both client traffic and inter-node backhaul. With added cameras, the channel saturates. Cambium's 60 GHz solution uses synchronized transmissions eliminating this hidden node-contention issue.
- **Mesh density limits.** Once a segment reaches 8–12 cameras, frame loss and dropped streams become more likely. Cambium's 60 GHz solution has proven scalability to thousands of nodes in a single deployment and expandability with multi-PoP architecture not available on other platforms.

Cambium solutions are designed for harsh outdoor environments, both physical and RF. For critical security networks, the application calls for dedicated PMP, PTP, and distributed infrastructure from the start.

Common Wireless CCTV Scenarios

1. COMMERCIAL PROPERTY/PARKING-LOT SURVEILLANCE (CNWAVE 60 GHZ)

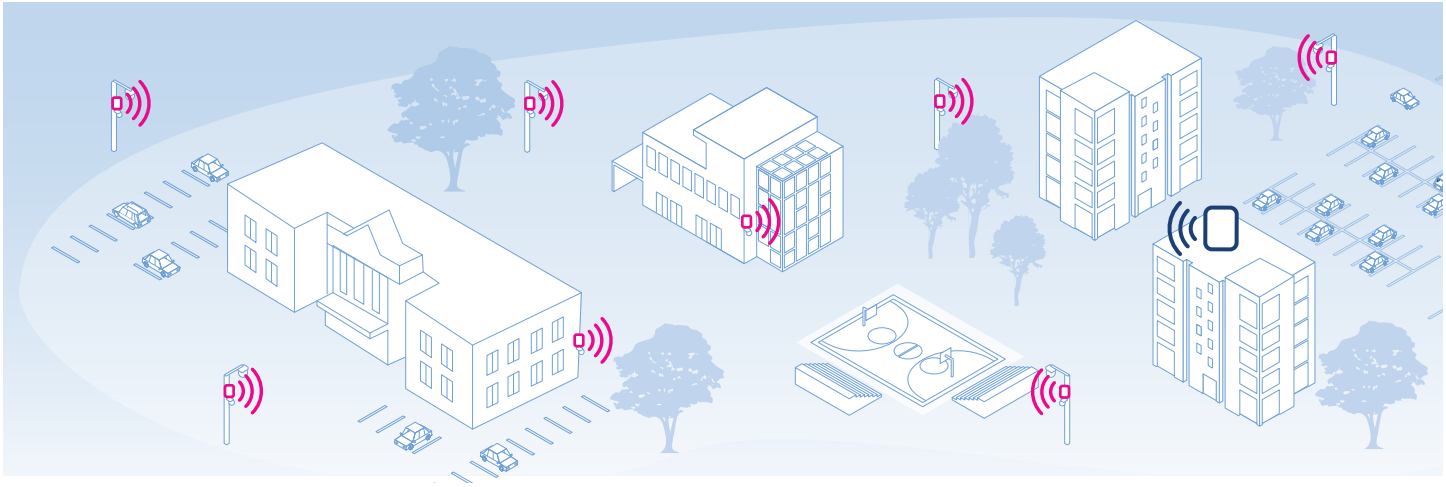
Rooftop V5000 sector with PMP coverage to 4 streetlight-mounted V2000 plus camera pairs.

A retail strip mall, distribution center, or office park needs a few pole-mounted cameras covering its parking lot, which is several hundred yards across, with a single head-end building hosting the NVR and fiber WAN. Trenching from the building to each pole means ripping up asphalt, pulling permits, and weeks of disruption. A 60 GHz wireless link from a rooftop sector to a small radio on each pole can be deployed quickly.

Recommended equipment. Head-end: 1 cnWave V5000 DN mounted on a rooftop mast. Per pole: 1 cnWave V2000 CN plus 1 IP camera.

Topology and outcome. V5000 sector with up to 280° azimuth coverage of the lot. Each V2000 paired with an IP camera within ≈400 m. This illustrates a PMP deployment with a single sector where all video aggregates back to the V5000. The V5000 sends data back to the NVR via the fiber WAN. Result: 2–30 pole-mounted cameras streaming H.265 4K with capacity to spare, and the same install crew can extend the network without a return permit cycle.

2. COLLEGE CAMPUS (EPMP 4500 5 GHZ)



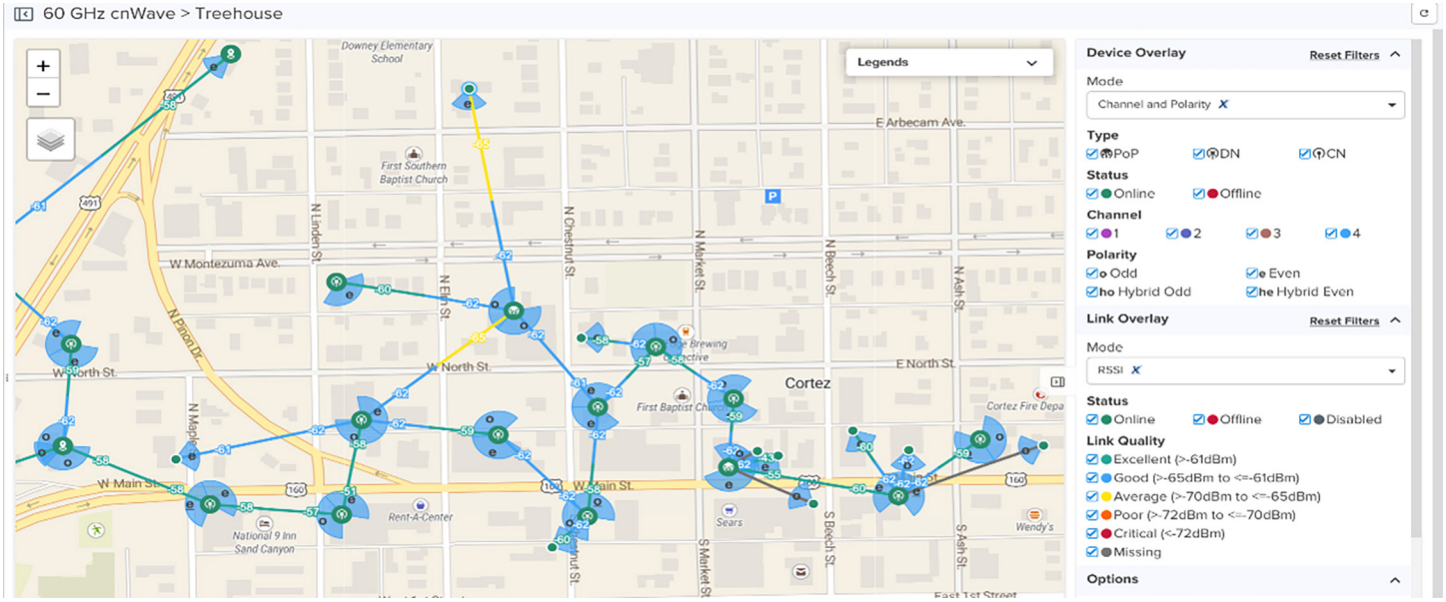
ePMP 4500 sector head-end with multiple remote camera sites on lamp posts and outbuildings.

A multi-building campus (e.g., university, K–12 district, or large hospital or corporation) needs camera coverage at distances from a few hundred meters out to roughly half a mile, across a mix of pole-mounted and building-mounted sites, sometimes through partial foliage. 5 GHz penetrates light foliage and tolerates partial LOS, so a single ePMP sector on a tall campus building covers a wide section of the campus.

Recommended equipment. Head-end: 1 ePMP 4500 5 GHz AP. Per remote: 1 Force 4518 mid-gain SM or 1 Force 4525 SM for longer-range sites. ONVIF IP camera at each remote. Tip: Use Cambium cnMatrix™ Ethernet Switches at the head-end and at each major aggregation point. Cambium switches are fully manageable in cnMaestro.

Topology and outcome. ePMP 4500 AP on a tall rooftop with ≈90° azimuth coverage of the campus. Dozens of Force 4518 SMs can be spread across poles and outbuilding rooftops, each paired with a camera. NLOS-tolerant links pass cleanly through tree canopies and minor obstructions. Longer links can be achieved by substituting flat panel Force 4518 with the high-gain Force 4525 dish SM. Adding new sites within the sector is quick once the head-end sector exists.

3. MUNICIPAL/MULTI-POP DISTRIBUTED NETWORK (CNWAVE 60 GHZ)



cnWave 60 GHz distributed mesh with multiple V5000 DNs, 2 fiber PoPs, self-healing rings, and PMP spurs.

A downtown district/city-block municipal area needs distributed surveillance covering blocks, intersections, parks, and key building entrances. A single head-end won't reach everything, and any single-point failure (a fiber cut, a building outage) does not take the network down.

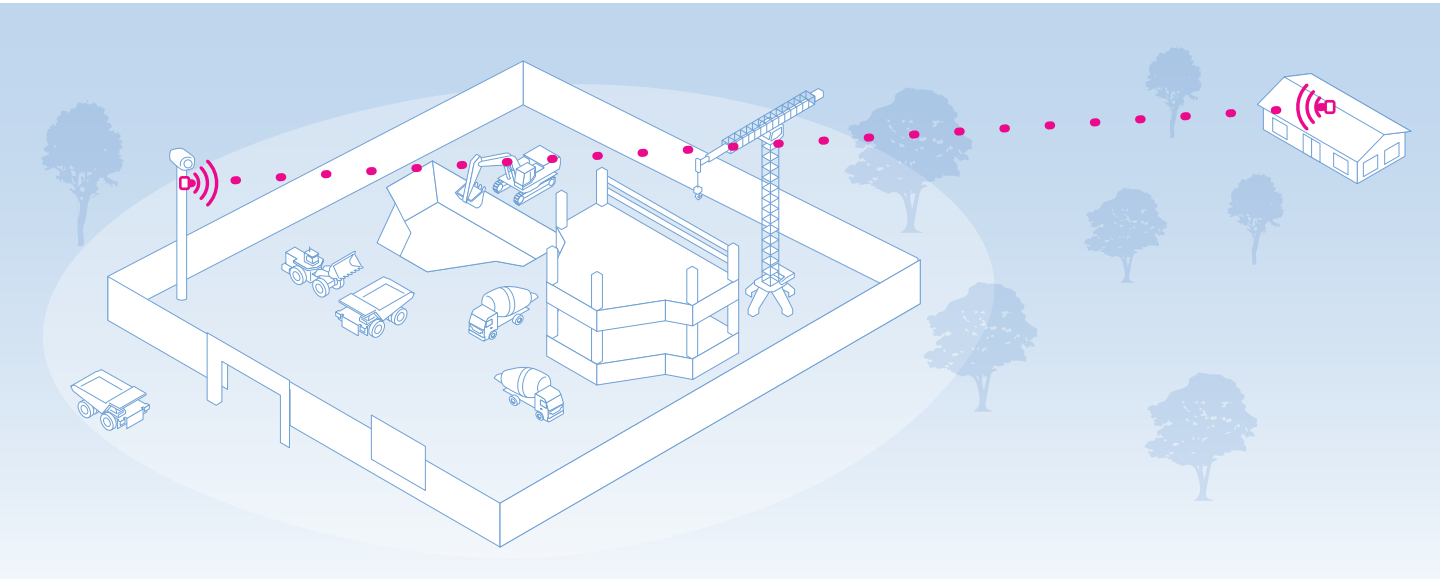
Recommended equipment. Multiple cnWave 60 GHz V5000 DNs arranged in daisy-chain fashion with redundant path rings wherever possible. cnWave supports multiple fiber PoP architecture, which is sometimes necessary for large sprawling networks. Cameras can be powered up directly from the POE-out port on V5000, V3000, and V2000 models.

Topology and outcome. V5000 mesh trunk with 60 GHz inter-node links forming a self-healing ring. Result: a self-healing camera network covering several city blocks. Fiber outage at one PoP doesn't take video offline; traffic auto-reroutes to the other PoP in less than a second. Expanding the network is a simple matter of adding new radios to extend coverage.

Field install of V5000 DN mounted at a downtown intersection.

V5000 installation on city-owned infrastructure.

4. SINGLE CAMERA AT INDUSTRIAL YARD/CONSTRUCTION SITE (BRIDGE-IN-A-BOX)



Bridge-in-a-Box PTP link from a main building to a remote site offers quick install with no trenching and is redeployable.

A storage yard, container terminal, logistics center, retail center, or active construction site needs a camera covering a remote area of the site. Or a remote outbuilding (boat ramp, machine shop, perimeter office) needs a network drop without trenching cost. Bridge-in-a-Box ships pre-paired, requiring minimal configuration.

Recommended equipment. Pick the kit by distance and LOS requirements: 60 GHz Bridge-in-a-Box 1Gb (V1000-based) for short LOS up to 150 m;. 60 GHz Bridge-in-a-Box 2Gb (V2000-based) for medium LOS up to 1 km, with PoE-out for direct camera feed; or 5 GHz ePMP Bridge-in-a-Box (Force 4518-based) for longer or NLOS scenarios up to 8 km.

Topology and outcome. One radio at the main building (NVR / WAN side) and one at the camera end. Cameras simply plug into the PoE-out on the remote Bridge-in-a-Box, resulting in quick setup. When the job is complete, you can take Bridge-in-a-Box with you to the next site.

Field install of Bridge-in-a-Box for camera installation.

Design and Deployment Considerations

Before finalizing the BOM, validate the design against these requirements:

- **Bandwidth budgeting per camera**. Per-stream bitrate scales with resolution, frame rate, and codec. Use these as planning numbers, then add roughly 25% headroom for VMS metadata, audio, and protocol overhead.

Camera Resolution/Frame Rate	H.264	H.265
1080p @ 30 fps	4–6 Mbps	2–4 Mbps
4 MP @ 30 fps	6–10 Mbps	3–5 Mbps
4K (8 MP) @ 30 fps	12–16 Mbps	6–8 Mbps
4K @ 60 fps	18–24 Mbps	10–14 Mbps

- **Sector capacity planning.** Determine realistic concurrent camera counts per Cambium sector. Real numbers depend on duty cycle, RF environment, channel width, LOS, and other factors.

Sector	Aggregate Throughput*
ePMP 4500 5 GHz or 6 GHz	Up to 1 Gbps
cnWave 60 GHz V5000	Up to 3.8 Gbps

**Ideal conditions*

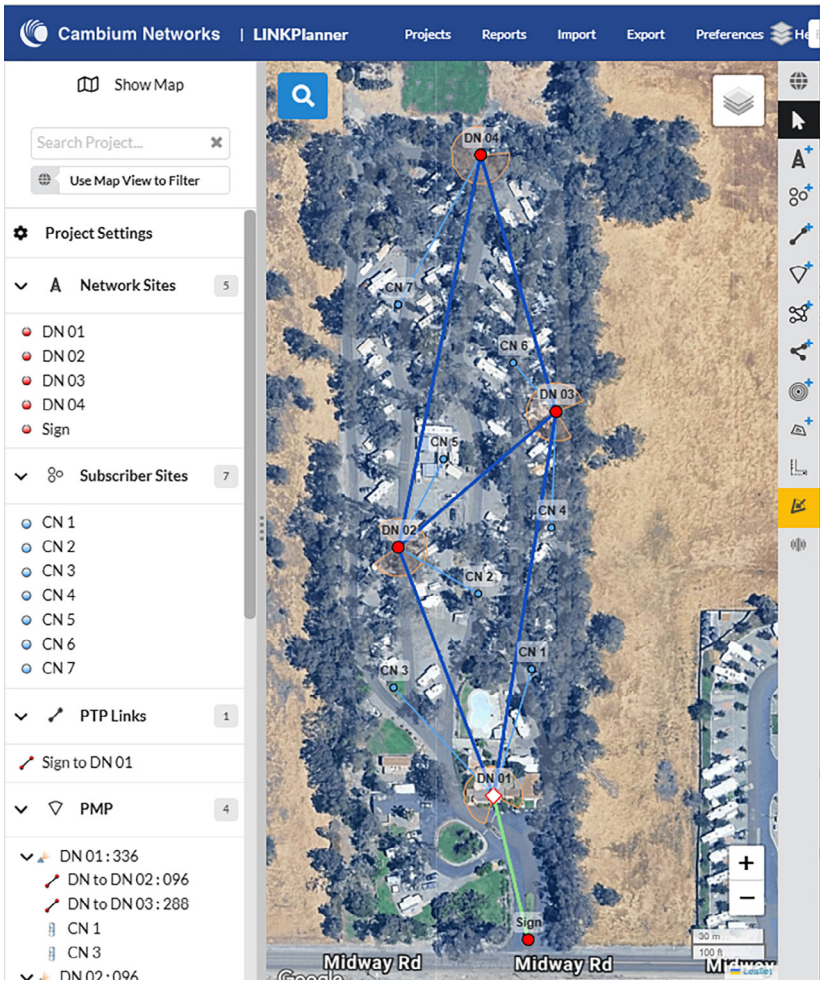
- **Path, power, and policy:**
  - **Path planning.** Confirm clear LOS and consider range limitations for 60 GHz; confirm near LOS for short 5 GHz/6 GHz links and Fresnel zone clearance and appropriate radio/antenna selections for longer links. Use Cambium LINKPlanner for RF designs, performance predictions, and BOM creation. LINKPlanner automatically adds weather margin in heavy-rain regions and foliage margin where appropriate
  - **Power and switching.** Match PoE class to the camera. Power radios via direct DC or from PoE injectors or switches at the head-end; verify cable runs are within standard PoE distance. Use cnWave POE-out ports for powering cameras whenever possible. Use proper surge protection and grounding for all outdoor radios and cameras. See Cambium deployment guides for surge and grounding guidance at **cambiumnetworks.com/support/**.
  - **VMS / ONVIF compatibility.** Cambium radios are network-transparent; ONVIF Profile S/T cameras and major VMS integrate without special drivers.
  - **Network security.** Isolate camera traffic on its own VLAN. Enable AES encryption on radio links. Manage cnMaestro access with role-based access control.

LINKPlanner: Powerful RF Planning/Network Design Tool

- **LINKPlanner** is Cambium's no-charge, user-friendly software tool designed to plan, model, and optimize wireless network links (PMP, PTP, and distributed mesh) before deployment. It allows users to simulate performance, ensuring high reliability and cost-effectiveness using geographic data, antenna heights, and equipment specifications. Free access at **lp.cambiumnetworks.com**.

  Cambium Regional Technical Managers (RTM) can support path planning with higher-resolution LiDAR data available internally (but not shown in the public LINKPlanner tool). For sites with dense trees, mixed building heights, or other meaningful obstructions, this added detail gives a clearer view of what the link will face in the field. Engage Cambium on projects where the path is not straightforward, and the team can help produce a validated LINKPlanner design with the LiDAR overlay.

RECOMMENDATION: run LINKPlanner yourself for every link in the project, then share the project with your Cambium RTM for an expert evaluation and LiDAR-validated review when needed.



LINKPlanner network design example.

Deployment Takeaways

Cambium Networks provides wireless solutions for a wide range of CCTV backhaul requirements, from rapidly deployed PTP links to large-scale distributed municipal networks. The deployment examples in this solution paper represent common starting points, but final designs should always be validated through site surveys, capacity planning, LINKPlanner analysis, and budget review.

NEXT STEPS:

- **Engage Cambium or distribution partner early.** Cambium / distributor sales and technical teams can assist with RF planning, LINKPlanner validation, design review, and BOM guidance throughout the project.
- **Validate links before procurement.** Use LINKPlanner to confirm path viability, throughput, and fade margin before ordering equipment. Free access at **lp.cambiumnetworks.com**.
- **Start with a pilot deployment.** Bridge-in-a-Box kits provide a straightforward way to validate installation practices, alignment, configuration, and optimization before scaling further.
- **Standardize management with cnMaestro.** A single platform for managing fixed wireless, switching, and Wi-Fi infrastructure. Learn more at **cambiumnetworks.com/products/software/**.
- **Leverage ConnectedPartner resources.** Cambium Partners have access to the technical training, sales tools, configurators, pricing resources, and more. To learn more about or apply for the ConnectedPartner program, visit **cambiumnetworks.com/cambium-partner-program/**.

About Cambium Networks

Cambium Networks enables service providers, enterprises, industrial organizations, and governments to deliver exceptional digital experiences and device connectivity with compelling economics. Our ONE Network platform simplifies management of Cambium Networks' wired and wireless broadband and network edge technologies. Our customers can focus more resources on managing their business rather than the network. We make connectivity that just works.

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