

Video Surveillance Backhaul

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Wireless Video Surveillance

- Video surveillance doesn't end with the camera. It requires reliable and secure connectivity back to a Network Operations Center or server.
- Purpose-built outdoor wireless network solutions provide cost-effective, high-performance communications infrastructure.
- Cambium Networks video surveillance solutions empower public and private entities to support public safety, asset protection, and security initiatives.



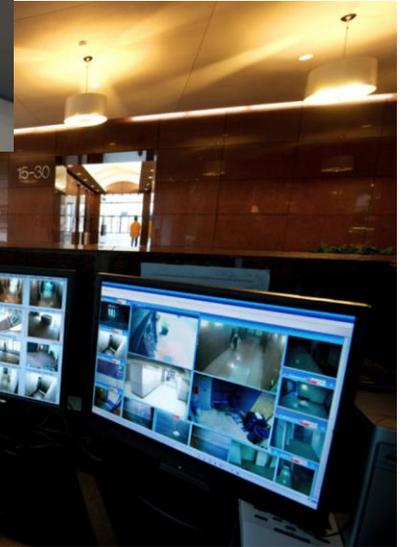
System considerations

- Requirements
 - Use case
 - Connectivity
 - Topology
 - Storage
 - Cost
 - Redundancy



Components of Video Surveillance

- Camera's
- NVR (with video analytics)
- Power
 - UPS
 - Battery backup
- Connectivity
 - Wirings (CAT 5 / 5E / 6)
 - Wireless
- Switching
 - PoE
 - Security
 - VLANs



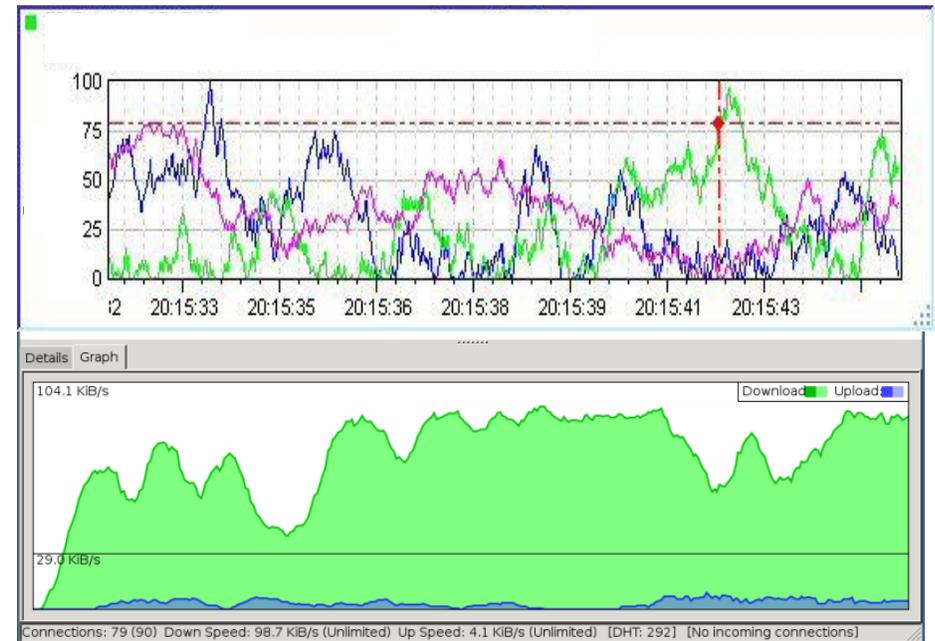
Camera feeds

Data rates for camera's

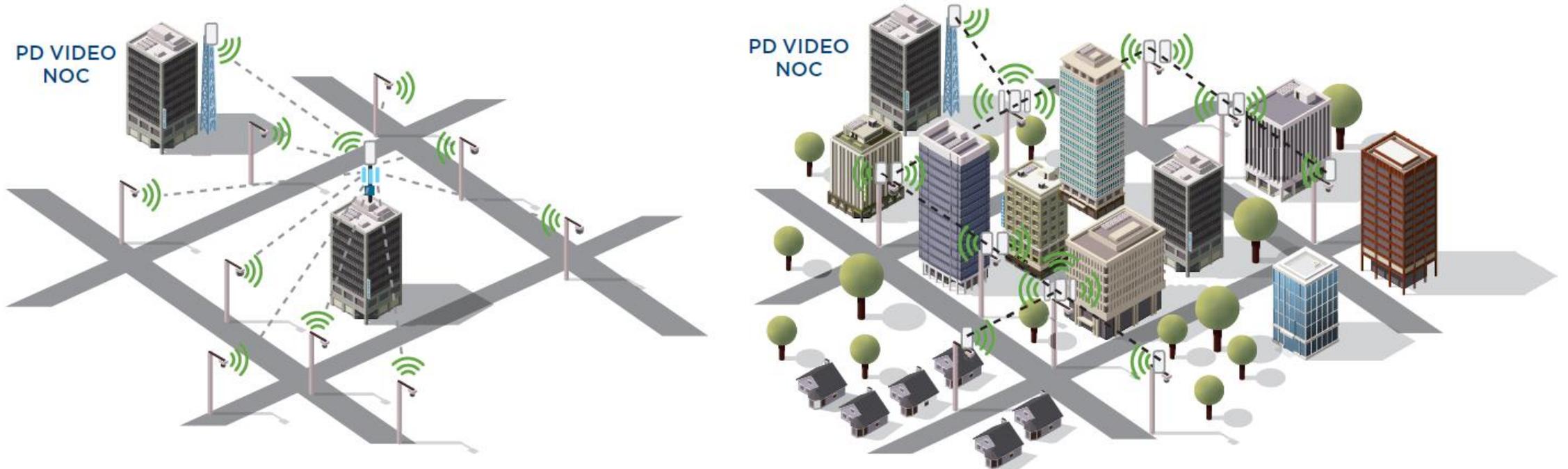
Resolution	Pixels	Frame Rate	Bitrate (Kb/s)
1.0 MP*	1280x720 (720p)	7fps**	900 to 1800
		15fps	1600 to 3100
		30fps	3100 to 6200
1.3 MP	1280x960	7fps	1200 to 2400
		15fps	2100 to 4100
		30fps	4100 to 8200
2.0 MP	1920x1080 (1080p)	7fps	1500 to 3000
		15fps	2600 to 5200
		30fps	5200 to 10,300
3.0 MP	2048x1536	7fps	2400 to 4400
		15fps	4100 to 7700
		30fps	8200 to 15,400
5.0 MP	2560x1920	7fps	3500 to 5700
		15fps	6100 to 10,100
		30fps	12,100 to 16,400

* MP- Megapixel

** fps- Frames per second



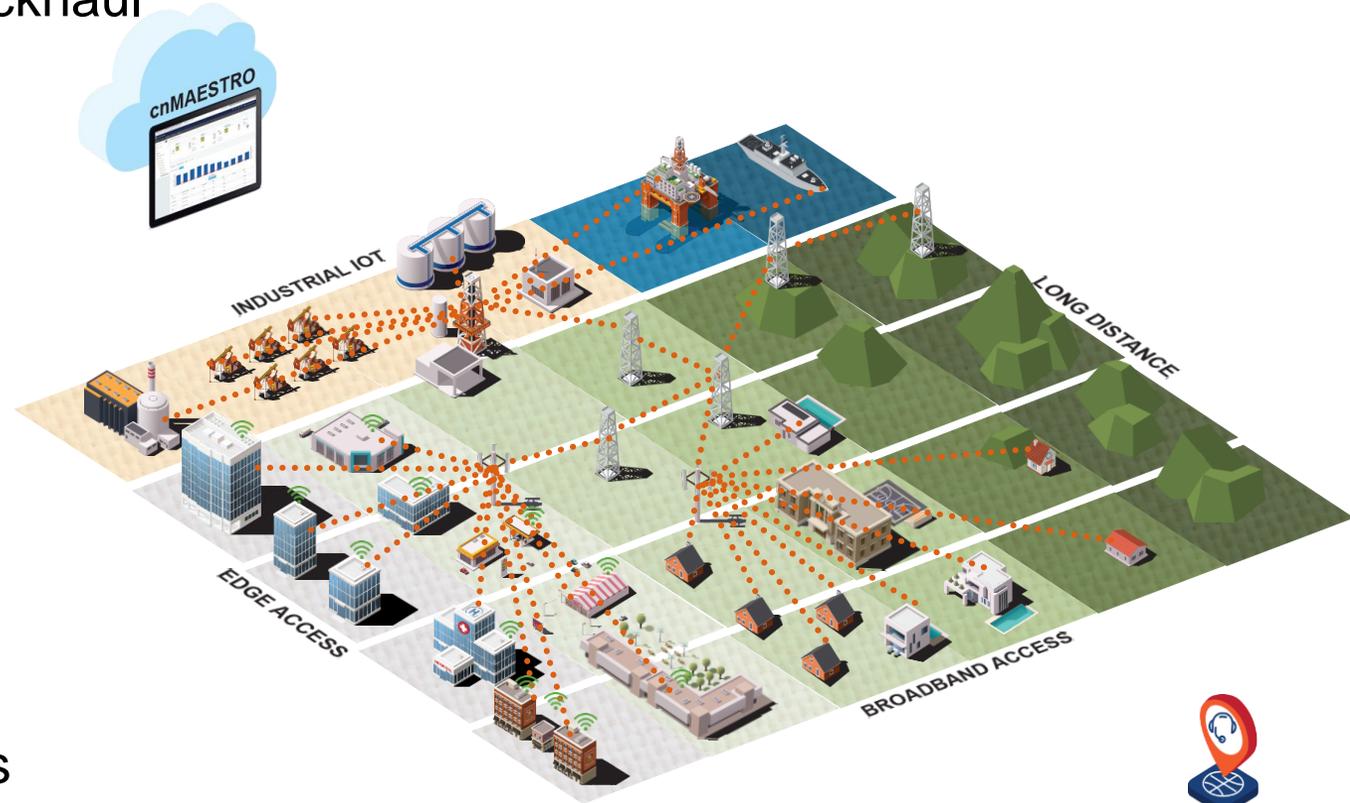
Wireless Connectivity



- Wireless broadband is a proven solution
 - High Performance
 - Scalable and Secure
 - Fast Installation
 - Flexible Architecture
 - Easy Planning and Management
 - Reliable

A “Wireless Fabric” of Connectivity

- Long Range Point-to-Point Broadband Backhaul
 - Licensed Microwave
 - Unlicensed Backhaul
- Point-to-Multipoint Broadband Distribution
 - Licensed 3 GHz
 - Defined Use 4.9 GHz
 - Unlicensed 2.4 & 5 GHz
- Enterprise Wi-Fi 802.11ac Edge Access
 - Indoor
 - Outdoor
- Industrial IoT narrowband SCADA wireless backhaul
 - Licensed frequency
 - Unlicensed frequency
- Cloud-based end-to-end management



GLOBAL SUPPORT

Applications

- Round-the-clock surveillance of high crime areas.
- Real-time video feeds into patrol cars or fire vehicles to provide mission-critical information to first responders.
- Extensive, 24-hour outdoor monitoring of locations ranging from port facilities to airports to supply depots to nuclear power plants.
- Traffic surveillance solutions ranging from identifying traffic violators to providing early warnings of tie-ups due to accidents or weather.
- Comprehensive monitoring of off-the-beaten-path locations on corporate, educational and medical campuses.



Benefits

- **High Performance** – A wireless IP-based network provides high-speed, low latency upstream connectivity for consistently clear video with downstream control for pan/tilt/zoom capabilities required for video security.
- **Scalable and Secure** – Advanced, scalable scheduling mechanism supports up to 238 subscribers without degrading overall system performance. With 128- and 256-bit AES encryption, L2 and L3 firewall rules, different user-level support, and https/SSH support, Cambium solutions provide enhanced security to keep your communications safe
- **Fast Installation** – Wireless technology means there is no need for time consuming and expensive trenching or right-of-way issues that cause inconvenience and delay. Single camera solutions can be installed in a matter of hours.
- **Flexible Architecture** – Cambium PMP and PTP solutions provide flexible design options, with products supporting hub and spoke or linear architecture to support all types of deployment scenarios.
- **Easy Planning and Management** – Free LINKPlanner software removes guesswork from planning and provides a comprehensive model of RF and system performance. cnMaestro provides a bird's eye view of the entire end-to-end communications network and offers detailed fault and alarm management.



Proven Solutions

- Wide-Area Point-to-Multipoint for video surveillance and backhaul
 - Video surveillance for physical security
- High capacity long range Point-to-Point backhaul
 - Licensed microwave and unlicensed backhaul
- Single pane of glass network management
 - Bird's eye view of field network
 - Rapid on-boarding and provisioning of new nodes
 - End-to-end performance and fault management
 - Centralized password management and firmware updates



Key Technologies:

- **Beam forming and beam steering** – isolates the signal from ambient noise to maximize throughput
- **Frequency Re-Use** – maximizes the use of available frequency across thousands of users
- **Intelligent Filtering** – automatically suppresses noise in adjacent channels to improve signal quality
- **Multi-User MIMO** – groups multiple subscriber modules (SM's) for simultaneous communication to groups of SM's in both downlink and uplink directions for unparalleled sector throughput and scalability

Proven Solution: City of Budapest, Hungary

City officials were seeking to improve the analog video surveillance system installed a decade ago. VideoData installed and handed over the solution to the city in 90 days.

Erzsébetvárosi térfigyelő rendszer



Proven Solution: City of Tampa

The Hillsborough County Sheriff's Office (HCSO) in Tampa, FL, had installed video surveillance cameras years ago. As cameras were added to the network, the existing system was unable to provide the performance required. HCSO migrated to Cambium, which provided the high throughput, low latency connectivity they needed.



Proven Solution: City of Green Bay – City-wide Video Surveillance Network

- The city of Green Bay needed a wireless solution for their city-wide video surveillance network and selected Cambium Networks for its scalability and security features. Cambium allowed the city to cost effectively expand coverage to the entire Green Bay area and enabled the police to expedite response times and increase situational awareness and productivity without staffing increases.

“I’ve worked with a lot of technologies,” says Jason Pedersen, Broadband Sales Engineer, Baycom. “With its advanced encryption and high rate of interference tolerance, the Cambium Networks solution is more secure, more stable, easily expandable, and has the greatest capabilities.”





Cambium NetworksTM