



BridgeWave
COMMUNICATIONS

Wireless Backhauling for Video Surveillance Applications

What do nuclear power plants, military bases, ports and harbors, the Lincoln Memorial and the U.S. Senate have in common?

These are sensitive government facilities that have embraced video surveillance systems to enhance the physical security of their perimeter.

Video surveillance systems are commonly used by government agencies for:

- Traffic monitoring
- Deterring, detecting and investigating crime
- Security monitoring of federal facilities
- Tactical surveillance and reconnaissance missions

Over the last decade, the use of electronic video surveillance systems has gone through a surge driven by improvements in technology. Additionally, users are looking to improve functionality and decrease costs of video surveillance systems. Video imaging networks are based on new-age, high resolution IP digital cameras that require ample capacity, driving an increase in the need to provide safe and secure backhaul mechanisms for these bandwidth-intensive applications. As a result, the Department of Homeland Security, as well as other federal, state and local government agencies, have considered advanced wireless solutions as backup or as an alternative to fiber. Point-to-point gigabit wireless bridges efficiently support the performance and management of video surveillance systems and enable seamless and secure connectivity.

BridgeWave provides a superior solution for backhauling high bandwidth IP-based video traffic for sensitive video imaging applications. BridgeWave's point-to-point wireless links provide fiber-equivalent connections by transmitting data over highly secure 60 GHz & 80 GHz radio frequencies at gigabit Ethernet and Fast Ethernet speeds.

BridgeWave supports the following government-wide acquisition contracts: GSA, SEWP IV, ECS III, US Communities, IMOD, PTO and FTS 2000.

BridgeWave's secure, high-speed radios are currently deployed by the U.S. Army, Air Force, Navy, Federal Courts, Patent and Trade Office, Department of Commerce, FAA and NASA.



Wireless Solutions for Federal Applications

REAL TIME CAMERA CONTROL

In order to ensure controlled, legal passage between countries, most international borders are protected by physical separation barriers or are guarded by patrolling civil or military agencies. A commonly used supplemental measure is video surveillance cameras. These expensive high resolution cameras are capable of detecting and tracking movement for a range of up to a few miles. The data from several such cameras aggregate to produce highly-intensive bandwidth traffic. For cost as well as ease of deployment considerations, fixed wireless links are an ideal backbone solution for camera control systems. Wireless connectivity can serve as an alternative to fiber or as a redundant networking path to ensure seamless connectivity.

BridgeWave's low-latency gigabit Ethernet wireless links can be easily and quickly installed to support video surveillance systems for border patrol activities. High capacity real-time video images can be backhauled from the watch-points to the monitoring stations where such video images are monitored, analyzed and recorded.

END TO END PORTABLE SOLUTIONS

Unmanned Aerial Vehicles (UAVs), used for securing parks, national monuments, harbor

patrol, monitoring aqueducts and pipelines have emerged as the latest trend in video surveillance technology. Taking a central role in the battlefield, UAVs are also replacing humans in tedious, dangerous surveillance and reconnaissance missions.

The UAVs gather data using various types of surveillance equipment (radar sensors, video cameras and imaging systems) and broadcast live, full-motion videos. Once these UAVs land, the bandwidth-intensive video recordings need to be quickly downloaded so that the UAVs can be launched for additional missions. BridgeWave's gigabit Ethernet wireless links provide a superior solution that

can support these critical civil and military UAV surveillance missions. The wireless links provide quick connectivity and can be used to backhaul video images from the hanger to the monitoring station, where they are viewed, analyzed and stored. When UAVs are deployed on temporary missions, for example to trace hurricanes, for fire remote sensing or to the battlefield, there is a need to design and implement an end-to-end portable network that could be installed on one site and transferred to another location on-demand. BridgeWave's wireless bridges are easy to deploy and can provide live traffic imaging for sensitive intelligence, surveillance and reconnaissance missions within days.



For more information about BridgeWave's federal solutions, please visit: www.bridgewave.com/solutions/federal.cfm



Advantages of BridgeWave's Wireless Solutions

SUPERIOR PERFORMANCE

Typically, video surveillance systems will integrate advanced digital cameras and a backbone of high capacity wireless links in a back-to-back, ring or mesh topology. The new classes of digital IP cameras provide greater flexibility in connecting to standard networks and enable long-distance transmission and storage of compressed real-time full-rate video images. These advanced digital cameras, which are usually equipped with pan-tilt-zoom capability for enhanced security, require higher bandwidth.

BridgeWave's high performance, high speed wireless links facilitate high frame rate of up to 30 FPS for simultaneous video streams. BridgeWave's low-latency bridges seamlessly backhaul traffic from the cameras. In addition to maintaining high-quality resolution that's

required for video surveillance networks, these links enable routing and aggregating quality images to the monitoring station where they are analyzed and stored.

FIBER REDUNDANCY

BridgeWave's wireless bridges serve as a redundant networking route to ensure seamless connectivity of sensitive data and to minimize downtime and damage to productivity. High resiliency and reliability of broadband applications is a key element for critical federal networks. BridgeWave's field-proven high capacity wireless links are a dependable alternative to fiber when fiber paths are inaccessible or cost-prohibitive.

SUPERIOR SECURITY

The narrow beam widths of BridgeWave's wireless links provide superior interference

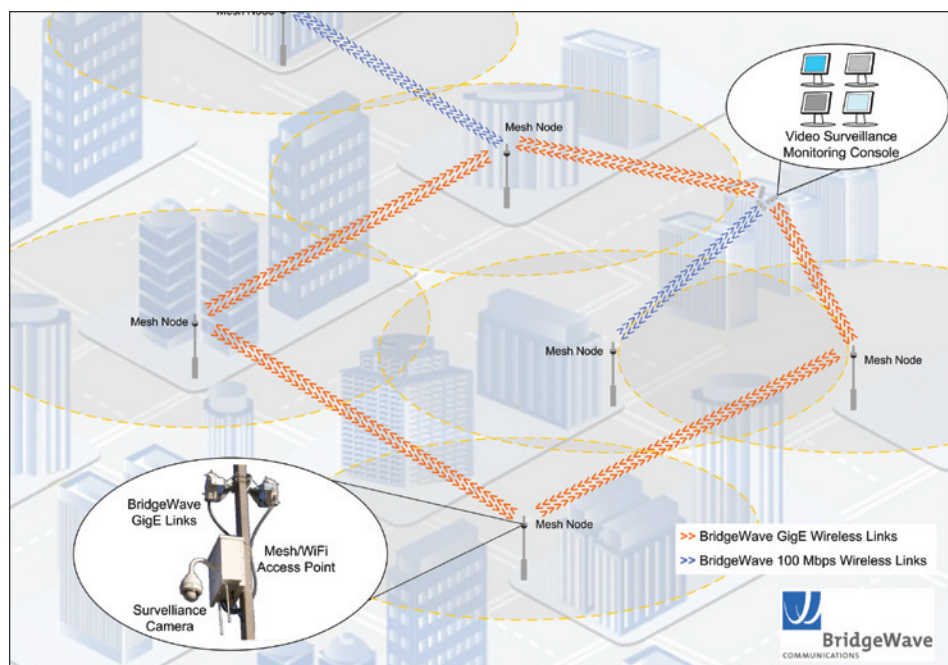
immunity and enhanced data security at the upper millimeter-wave spectrum. Signal interception or jamming becomes virtually impossible. Beyond the inherent physical layer of security, BridgeWave's FIPS-certified internal 256-bit AES data encryption, the strongest encryption standard commercially available, is offered as an additional layer of security.

SCALABILITY & PORTABILITY

BridgeWave's compact links are an ideal solution for scalable, expandable video surveillance networks. Providing full GigE bandwidth, BridgeWave's 'future-proof' wireless links can easily accommodate existing high capacity requirements and meet future needs for backhauling increased bandwidth from additional remote camera locations.

TIME-EFFICIENCY AND COST SAVING

One of the distinct advantages of wireless solutions is that they significantly reduce cost and deployment time. In dense metropolitan areas or in a variety of harsh terrains, time associated with laying fiber could extend to months, where wireless can be deployed within a matter of days. Additionally, wireless solutions are less susceptible to natural disasters or sabotage, and require minimal maintenance, resulting in lower downtime and costs compared to fiber.



Products-At-A-Glance

60 GHz



	FE60U	GE60	AR60/AR60X
Data Rate	100 Mbps full-duplex	1000 Mbps full-duplex	Full-time 1000 Mbps Full-time 100 Mbps 1000/100 Mbps AdaptRate
Latency	<220µSec	<40µSec	<40µSec (GE mode) <220µSec (FE mode)
Link Budget @ 10 ⁻¹² BER	160.5 dB	149.5 dB	149.5 dB (GE mode) 160.5 dB (FE mode)
RF Interface	58.1/62.9 GHz (FDD), digitally modulated (BFSK) with forward error correction RS(204,188)		
Antennas	Integrated 10" (25cm), H or V, 40 dBi, 1.4° beam (FE60, GE60, AR60) External 24" (60cm), H or V, 46 dBi, 0.6° beam (AR60X)		
Ethernet Interfaces	1000Base-SX with LC connectors, up to 270m 62.5/125µm MMF or 50/125 µm MMF 1000Base-Tx with RJ45 connector, up to 100m CAT5 cable (two surge suppressors required) Maximum Ethernet frame length: 1632 bytes		
Management	Web-based HTML embedded management agent: setup, security, status, Statistics; Secure Management Access, RADIUS; Syslog support SNMP support: MIB-II and BridgeWave enterprise MIB		
Power	100-240 VAC input/+24 VDC output, indoor 0 - 40°C power supply, 45 watts max consumption (outdoor rated power supply option available). Max cable length: 650 ft (200m) with 12AWG, 400 ft (125m) with 14AWG, (24VDC surge suppressor required)		
Size & Weight (radio + antenna)	FE60U, GE60, AR60: 12" w x 12" h x 6" d (30cm x 30cm x 15cm); 22 lbs (10kg) AR60X: 24" w x 24" h x 20" d (62 cm x 62cm x 50cm); 38.5 lbs (17.5kg)		
Environmental	Operating Temperature: -30°C to +55°C (-22°F to +122°F) Operating Altitude: 14,764 ft (4,500 m) maximum		

80 GHz



	FE80U/FE80XU	GE80/GE80X	AR80/AR80X
Data Rate	100 Mbps full-duplex	1000 Mbps full-duplex	Full-time 1000 Mbps Full-time 100 Mbps 1000/100 Mbps AdaptRate
Latency	<220µSec	<40µSec	<40µSec (GE mode) <220µSec (FE mode)
Link Budget @ 10 ⁻¹² BER	177 dB (FE80U) 191 dB (FE80XU)	166 dB (GE80) 180 dB (GE80X)	166 dB/180 dB (GE mode) 177 dB/191 dB (FE mode)
RF Interface	72.5/82.5 GHz (FDD), digitally modulated (BFSK) with forward error correction RS(204,188)		
Antennas	External 12" (30cm), H or V, 43 dBi, 0.8° beam (FE80U, GE80, AR80) External 24" (60cm), H or V, 50 dBi, 0.4° beam (FE80XU, GE80X, AR80X)		
Ethernet Interfaces	1000Base-SX with LC connectors, up to 270m 62.5/125µm MMF or 50/125 µm MMF; 1000Base-Tx with RJ45 connector, up to 100m CAT5 cable (two surge suppressors required); maximum Ethernet frame length: 1632 bytes		
Management	Web-based HTML embedded management agent: setup, security, status, statistics; Secure Management Access, RADIUS; Syslog support SNMP support: MIB-II and BridgeWave enterprise MIB		
Power	100-240 VAC input/+24 VDC output; indoor 0 - 40°C power supply, 45 watts max consumption; (outdoor rated power supply option available). Max cable length: 650 ft (200m) with 12AWG, 400 ft (125m) with 14AWG, (24VDC surge suppressor required)		
Size & Weight (radio + antenna)	FE80U, GE80, AR80: 20" w x 14" h x 10" d (50cm x 36cm x 25cm); 22 lbs (10kg) FE80XU, GE80X, AR80X: 24" w x 24" h x 20" d (62 cm x 62cm x 50cm); 38.5 lbs (17.5kg)		
Environmental	Operating Temperature: -30°C to +55°C (-22°F to +122°F) Operating Altitude: 14,764 ft (4,500 m) maximum		

About BridgeWave Communications

Founded in 1999, BridgeWave Communications is the leading supplier of outdoor Gigabit wireless connectivity solutions. The company's exclusive AdaptRate™ and AdaptPath™ technologies combined with its advanced Forward Error Correction capability deliver the highest availability at the longest distances for full-rate gigabit links. BridgeWave's point-to-point, wireless solutions are widely deployed in mainstream enterprise and service provider network applications and are poised to play a key role in the migration to 4G mobile network backhaul. With the largest installed base of GigE radios worldwide, BridgeWave delivers the highest levels of product quality and reliability.



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