Wireless Video Architectures

Robb Henshaw
Vice President of Marketing & Channels
rhenshaw@proxim.com
Agenda

- Why Video Surveillance?
- Technical Introduction to Video Surveillance
- Wireless Architectures for Video Surveillance
- Video Surveillance Applications
- Case Studies
- Q & A
Perimeter, public monitoring solutions are becoming a key component for enterprises.

Educational, healthcare and financial institutions are beginning to rely on surveillance systems to ensure safety within their premises.

Public safety organizations depend on archived data from video monitoring systems to reduce vandalism in troubled neighborhoods.

Live traffic surveillance is increasingly being used as a tool in community protection.

Terrorist threats and public safety challenges continue to drive the need for high quality remote surveillance and timely response.
Technical Introduction to Video Surveillance
What is HDTV?

- 2 major standards for HDTV:
  - SMPTE 296M is normally called “720p”
  - SMPTE 274M is called “1080i” and “1080p”
  - 720 are used for broadcasting of HDTV (TV at home)
  - 1080 are used in Blu-ray and computer graphic

- HDTV demands higher color fidelity
- HDTV most full frame rate 25/30 or/and 50/60
- HDTV is 16:9 format

- Why is it important?
  - Critical where clear, sharp images are required
  - Guaranteed to provide a certain resolution, frame rate, and color fidelity
  - HDTV video can easily be shown on HDTV monitors or Computer screens
What is H.264 Compression?

- H.264 (MPEG-4 Part 10) for professional network video surveillance
  - H.264 replaces MPEG-4 Part 2
- H.264 is the first, global video standard shared across all industries
  - Business
    - Video surveillance, telecommunications, broadcasting...
  - Consumer
    - HD-DVD/Blu-ray, iPod, QuickTime, Flash, YouTube, XBox, PlayStation 3, mobile phones, video cameras...
- H.264 – ultimately a common video compression platform that is future-proof
H.264 compression (example savings)

- Motion JPEG
- MPEG-4 Part 2: 50% reduction
- H.264: 80% reduction

Bandwidth & storage consumption
Excellent surveillance quality that ensures image usability in challenging conditions

- Complex and constantly changing lighting
- Complex picture composition, backlighting
- Large area overview
- High level of detail needed
- Vibration
- Clear images of rapidly moving objects and persons
Features to Look for in Cameras

> **Automatic day and night functionality**
> **Auto-iris for optimal image quality**
> **High-quality transparent dome cover**
> **H.264 video compression** – great bandwidth and storage savings without compromising image quality
> **Additional features**
  > Wide dynamic range and backlight compensation
  > Electronic image stabilization
  > Progressive scan, even for PTZ cameras
  > High zoom capabilities
Equipment should offer several features to withstand tough operating conditions

> Water- and dust-proof (IP66-rated)

> Wide operating temperature range, e.g. -40 °C to 55 °C (-40 °F to 131 °F)

> Sun / weather shield for protection against direct sunlight, snow and rain

> Vandal-resistant design, hardened casings
Wireless Architectures for Video
Network Architectures

Point-to-Point

Point-to-Multipoint (Star)

Mesh
## Pros/Cons of Wi-Fi Mesh Architectures

### Wi-Fi Mesh

<table>
<thead>
<tr>
<th><strong>Pro’s</strong></th>
<th><strong>Con’s</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishes connections dynamically/automatically</td>
<td>Dynamic bottlenecks</td>
</tr>
<tr>
<td>Adds a degree of fault tolerance</td>
<td>Difficult to control</td>
</tr>
<tr>
<td>Easy deployment for standard municipal WiFi networks</td>
<td>Increased latency</td>
</tr>
<tr>
<td>Simplified sparing</td>
<td>Shared capacity</td>
</tr>
<tr>
<td>Repeater function for avoiding obstacles</td>
<td>Requires higher signal-to-noise ratio (SNR) due to use of omni-directional antennas</td>
</tr>
</tbody>
</table>
## Pros/Cons of Point-to-Point Architectures

![Point-to-Point Diagram](image)

### Table: Pros and Cons of Point-to-Point Architectures

<table>
<thead>
<tr>
<th>Pro’s</th>
<th>Con’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated access</td>
<td>Higher cost per end point</td>
</tr>
<tr>
<td>Increased reception and transmission levels</td>
<td>Sometimes more difficult to align</td>
</tr>
<tr>
<td>Less vulnerable to interference</td>
<td>Excess/under-utilized capacity</td>
</tr>
<tr>
<td>Lower latency than most shared mediums</td>
<td>Increased head-end equipment</td>
</tr>
<tr>
<td>Simplified troubleshooting</td>
<td></td>
</tr>
</tbody>
</table>
Pros/Cons of Point-to-Multipoint Architectures

Point-to-Multipoint (Star)

<table>
<thead>
<tr>
<th>Pro’s</th>
<th>Con’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost effective</td>
<td>Wider antennas increase exposure</td>
</tr>
<tr>
<td>Efficient means of sharing capacity</td>
<td>BSUs can provide a single point of failure for multiple SUs</td>
</tr>
<tr>
<td>Decreased head-end footprint</td>
<td>Requires more attention to throughput planning</td>
</tr>
<tr>
<td>Simplified alignment</td>
<td></td>
</tr>
</tbody>
</table>
OFDM and MIMO Improves NLOS Capabilities

Line-of-Sight (LOS)

Near Line-of-Sight (nLOS)

Non Line-of-Sight (NLOS)

LOS refers to both visual line-of-sight and clear radio line-of-sight (Fresnel Zone). In nLOS locations, there is clear visual line-of-sight but the radio line-of-sight is blocked. In NLOS locations, both visual and radio lines-of-sight are blocked.
Advantages of Wireless

- Quick to deploy: Often in hours and days
- Affordable: 20-70% less expensive than wired options
- Flexibility: Can be deployed anywhere
- High capacity
- Mobility at vehicular speeds
- Reliability: 99.995% availability
- Outdoor and indoor
Security and Surveillance Applications

- Asset and Community Protection by monitoring
  - buildings and parking lots
  - public entry/exits
  - sensitive areas: ATMs and etc
  - cafeteria, halls, and library
  - high traffic areas: highways, bridges, tunnels, and dams
  - public areas: parks and walkways

- Securing buildings and sensitive areas
  > runways
  > waterways

- Reducing crime and violence in troubled areas

- Perimeter security for military, restricted areas
Border Patrol Tower

MP.11 HS Base Station connected to video surveillance cameras and mobile subscriber units in vehicles to aid in enhancing border security

Video Surveillance

MP.11 HS Subscriber Units linked to video cameras to wirelessly transmit real-time video feeds back to command center

Products

MP.11 HS Base Stations / Subscriber Units (1.8, 2.4, 5.1 – 6.08 GHz)

- 245054-BSUR
- 245054-SUR
- 245054-SUA

MP.11 HS Mobile Base Stations / Subscriber Units (1.8, 2.4, 5.1 – 6.08 GHz)

- 245054-BSU-S
- 245054-SU-S
HQ Base Camp
MP.11 HS Base Station communicating with UAVs using FastConnect and HDWireless technology through military-grade encrypted wireless links (AES-256)

Mobile Deployments
Tsunami Mini Subscriber Units, the size of a deck of cards, can be embedded into mobile vehicles

Products
Base Station / Subscriber Unit - MP.11 HS (1.8, 2.4, 5.1 – 6.08 GHz)
-245054-BSUR
-245054-SUR
-245054-SUA

Mobile Embedded Base Station / Subscriber Unit - MP.11 HS (2.4, 5.1 – 6.08 GHz)
-Tsunami Mini -BSU
-Tsunami Mini-SU
Video Surveillance Case Studies
Security and Surveillance Case Study
Turkey – City of Bodrum

Challenge
- With a peak tourist population of over 1.5 million people, Turkey’s port city of Bodrum needed a video surveillance network to help ensure the security of both residents and tourists
  - Monitor the highly-trafficked port

Products
- A city-wide wireless video surveillance network connecting over 70 cameras
  - Tsunami MP.16 3500 licensed band WiMAX
  - 67 Tsunami MP.16 Subscriber stations
  - 37 Tsunami MP.16 Base stations

Applications Enabled
- WiMAX radios enabled the network to be deployed in a matter of months.
  - The city of Bodrum saved an estimated $60,000 per month on leased line costs.
  - Safety for residents, tourists and traffic in and out of the port
Case Study: Umatilla County, OR  
Public Safety & Video Surveillance

**Application**
- Countywide Wireless Network, US Chemical Weapons Depot and 9 cities in the 700 sq mile area utilize the network

**Solution**
- Tsunami MP.11 5054
- Tsunami.GX (PtP)
- ORiNOCO® Wi-Fi access points (Mesh)
- Axis PTZ Cameras

**Why Proxim and Axis**
- Improved team logistics; 65% reduction in paperwork
- More efficient traffic stops
- Real time traffic monitoring
- Eliminated 4000 radio calls per month
Case Study: Port Video Surveillance and Traffic Management

Application

• Real time monitoring and surveillance of the docking harbor at the port of Santa Lucia in Saint Raphael located between Cannes and Saint Tropez in France to ensure asset protection and manage entry and exit of boats

Solution

• Tsunami MP.11 5054-R Platform
• Axis Cameras - PTZ

Why Proxim and Axis

• Quick and Easy Installation
• Complete coverage of the port area
• Tsunami MP.11 provided throughputs higher than 10 Mbps
Proxim Wireless
Introduction to Proxim

- Wireless backhaul
- Broadband wireless access
- Enterprise WLAN

End-to-End Wireless Solutions
End-to-End Wireless Product Portfolio

**Backhaul / PtP**
- QB-8100 Series
- Tsunami.G X and Lynx.GX
- Gigalink

**Access / PtMP**
- MP-8100 Series
- Tsunami MP.11 Indoor
- Tsunami MP.11 5012
- Tsunami MP.11 Outdoor

**WLAN/Wi-Fi MESH**
- ORiNOCO AP-8000
- ORiNOCO AP-4000/700
- Outdoor Access Points
- ORiNOCO 802.11 a/b/g/n Client Cards

**ProximVision Unified Network Management**
Where to Go for More Info

- **Product Information:**

- **Case Studies:**

- **Channel Partner Programs:**

- **A&E Programs:**
  > [http://engineers.proxim.com](http://engineers.proxim.com)
To reach a Proxim sales representative, please call +1.408.383.7600, email us at sales@proxim.com, partnerprogram@proxim.com or go to our website http://www.proxim.com/about/contact/ for more information.

Robb Henshaw
rhenshaw@proxim.com