

City of Milpitas Public Safety Broadband Data Communications



Bill Marion
Information Services Director
Sept 2005



City Milpitas Background



- Geographic - 13.5 square miles
- Population
 - - 65,000 residents
 - - 100,000 daytime
- Police Department - 130 employees, 95 sworn officers
- 30 patrol vehicles
- Fire Department - 79 employees
- 20 primary response vehicles

City Milpitas Background



- Fiber Optic network connecting
 - Police Building
 - Police Substation
 - 4 Fire Stations
 - Other City Facilities
- DS3 Wireless link to Radio Repeater Site
- Data911 Mobile Computers in Vehicles
 - Police since 2002
 - Fire live Feb 2005

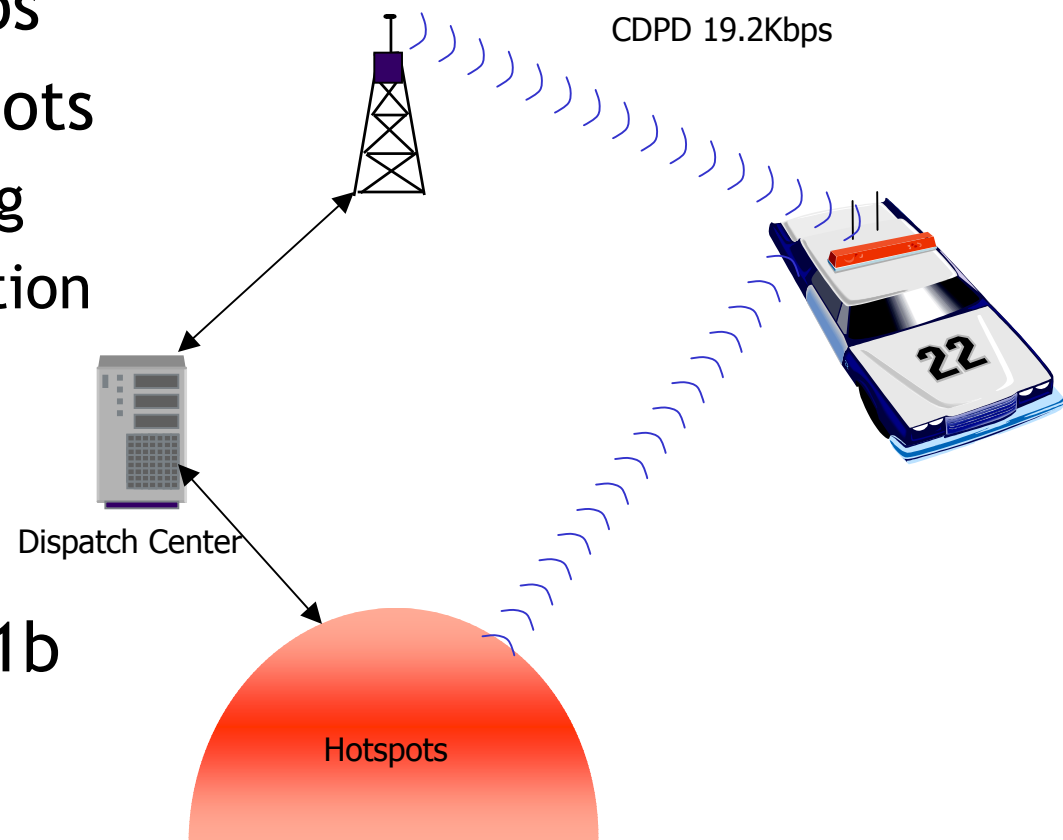
City Milpitas Background



- Previous Wireless Environment

- CDPD 19.2 kbps
- 802.11b Hotspots
 - Police Building
 - Police Substation
 - Sports Center
 - City Hall

- Limited 802.11b coverage area



Requirements



- Higher Bandwidth needed for applications such as:
 - CalPhoto
 - New CAD System (GPS/AVL/Mobile)
 - Other applications
- Carrier Solutions not available
- Coverage Problems in some areas

Alternatives Considered



Carrier-Based Wireless

- GSM/GPRS
- CDMA/1XRTT



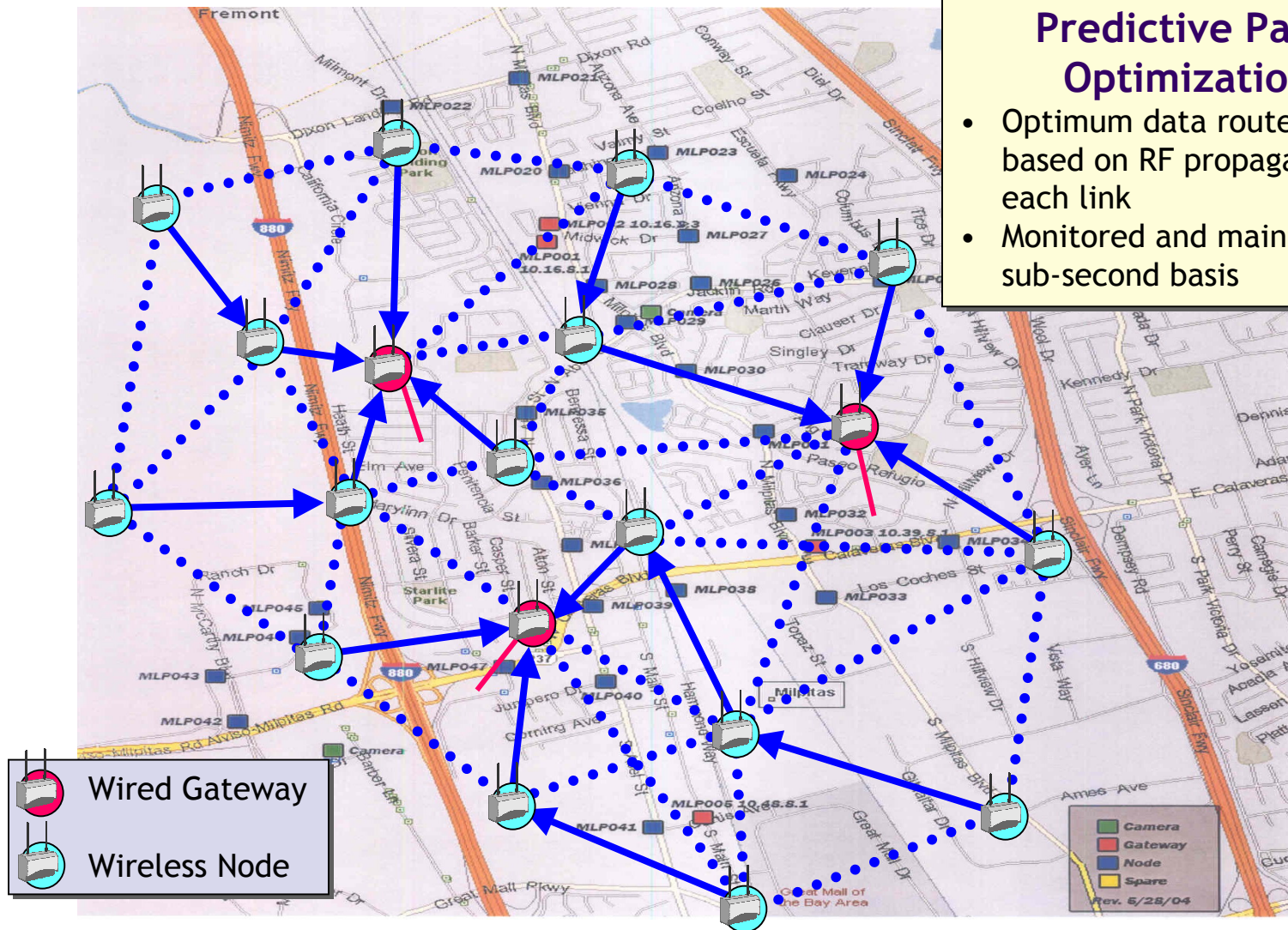
Private Wireless

- Private Radio (800 MHz)
- 802.11a/b/g

Or combination of the above ?

- Speed of 802.11
- Wide area coverage of Carrier solution
- "fill-in" coverage holes
- Some level of redundancy

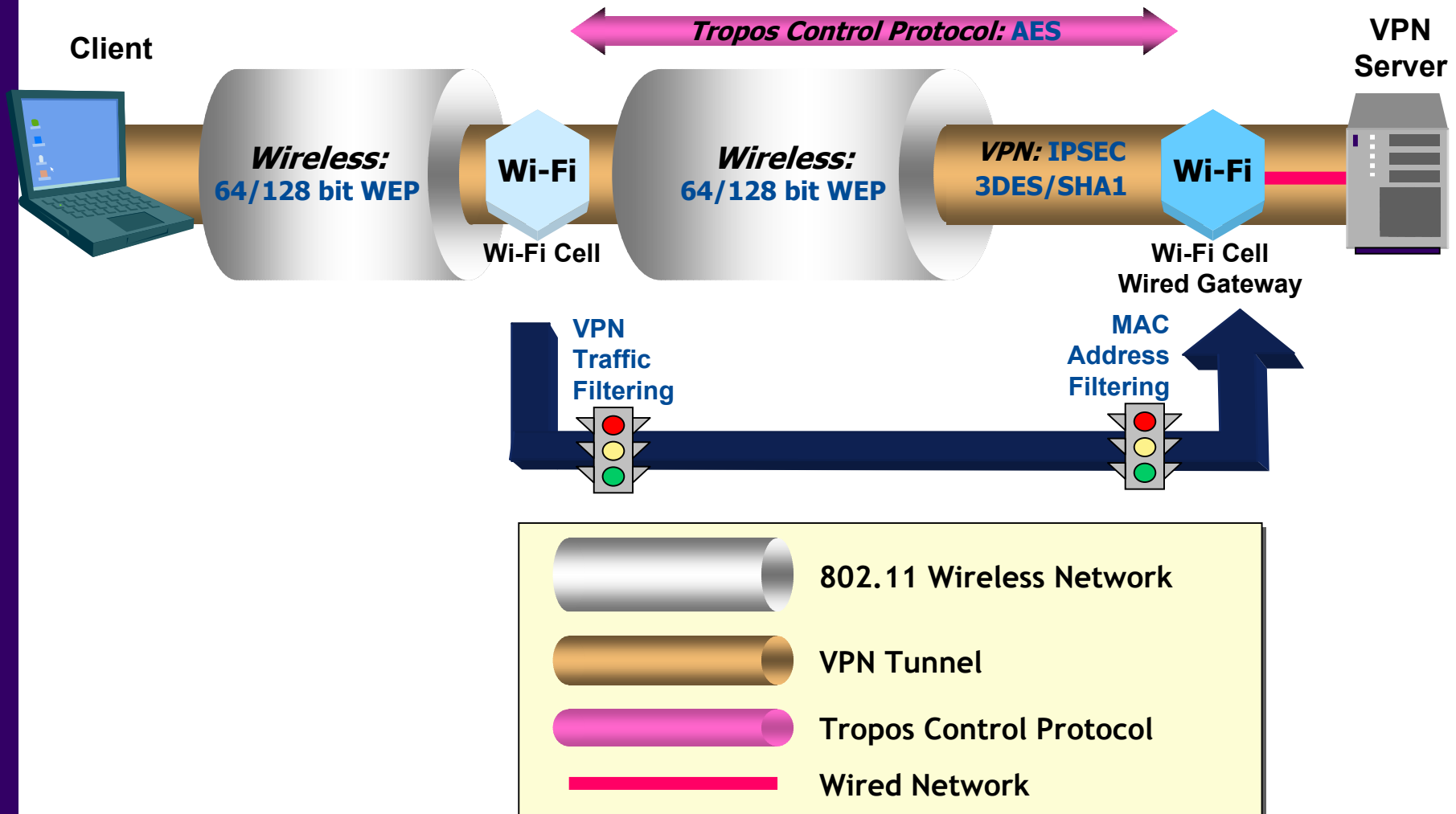
Dynamic Network Configuration



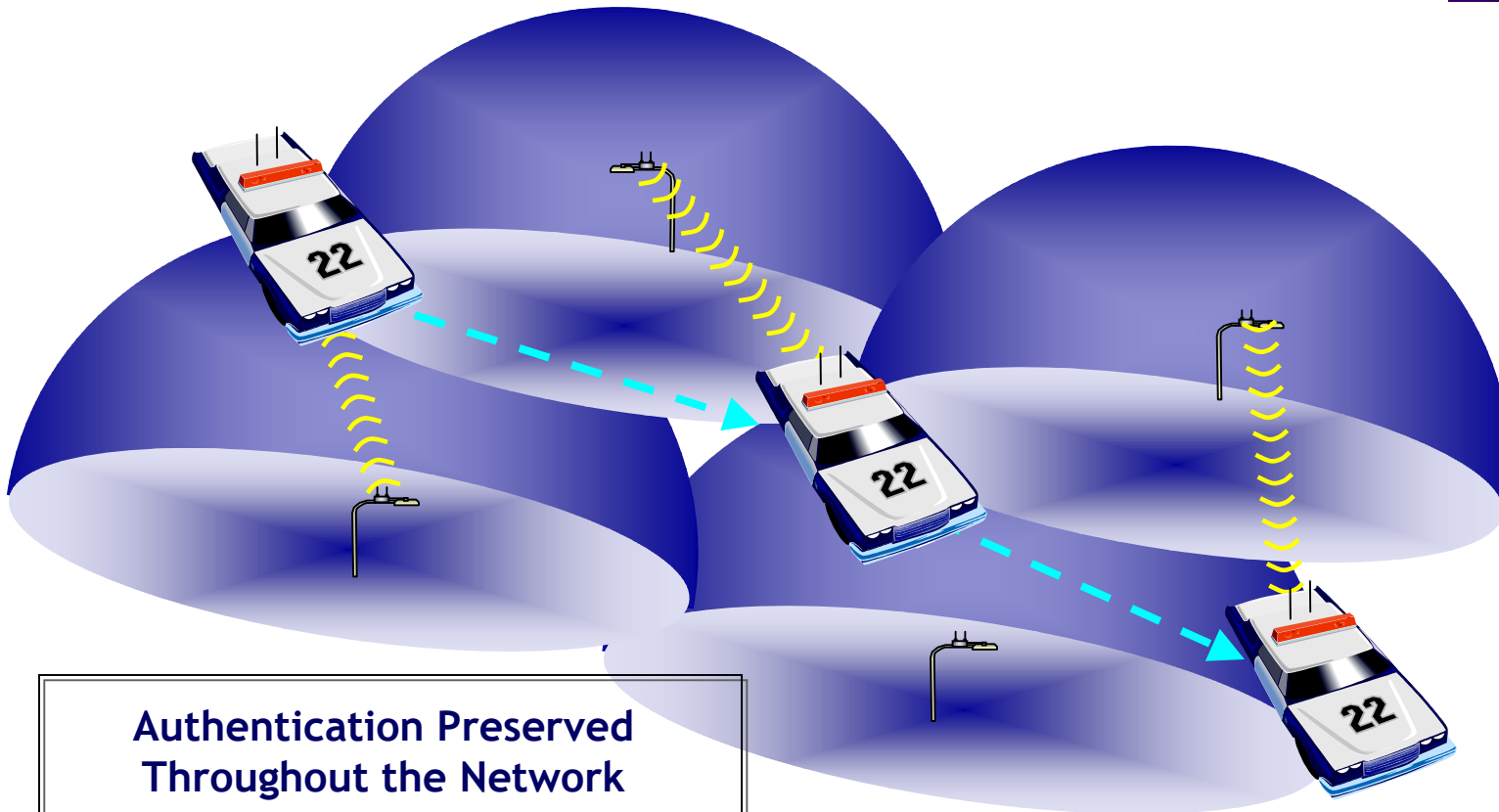
Predictive Path Optimization

- Optimum data routes set up based on RF propagation of each link
- Monitored and maintained on sub-second basis

Multi-Layer Security



Metro-Scale Roaming



Authentication Preserved Throughout the Network

- Sign-on required only at start of session
- Secure connectivity continues during re-association with nodes
- IP address maintained while roaming between subnets

The Deployment



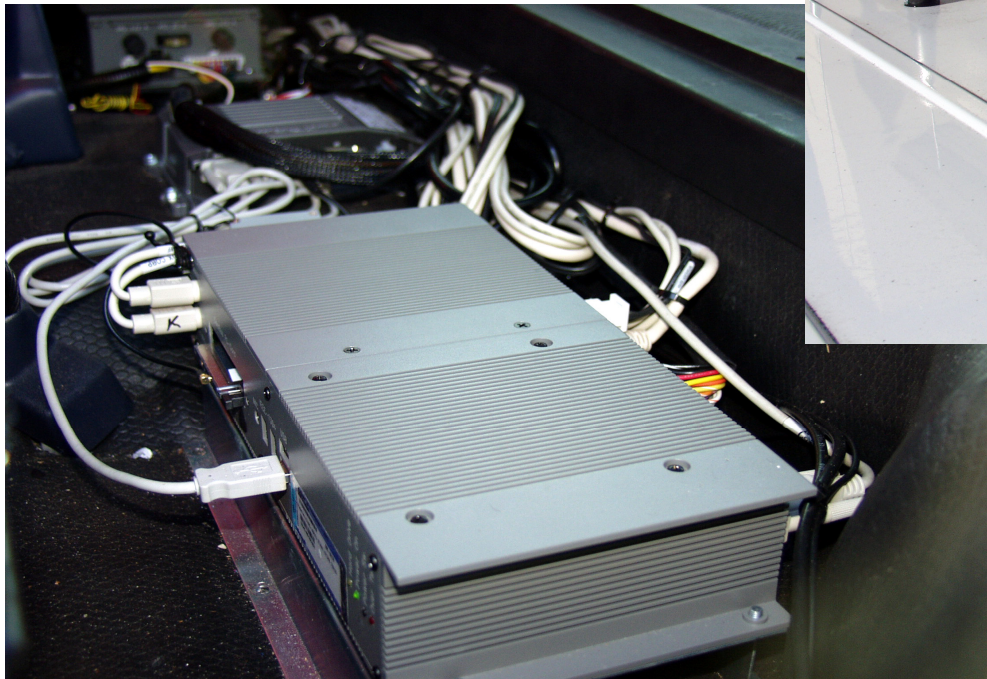
- 30 Patrol Cars
 - Data 911 mobile computers
 - Cisco 350 802.11b PCMCIA cards
 - External 2.4 GHz antenna
 - CPDP modems replaced with 1XRT modems
- City owned street lights
- Backhaul points at City Facilities
- Partnership with Tropos Networks
 - 12 Node Pilot
 - 26 Node Follow-on + 14 Node Expansion



Vehicle Equipment



Data 911 CPU



External 2.4 GHz
antenna

Vehicle Equipment

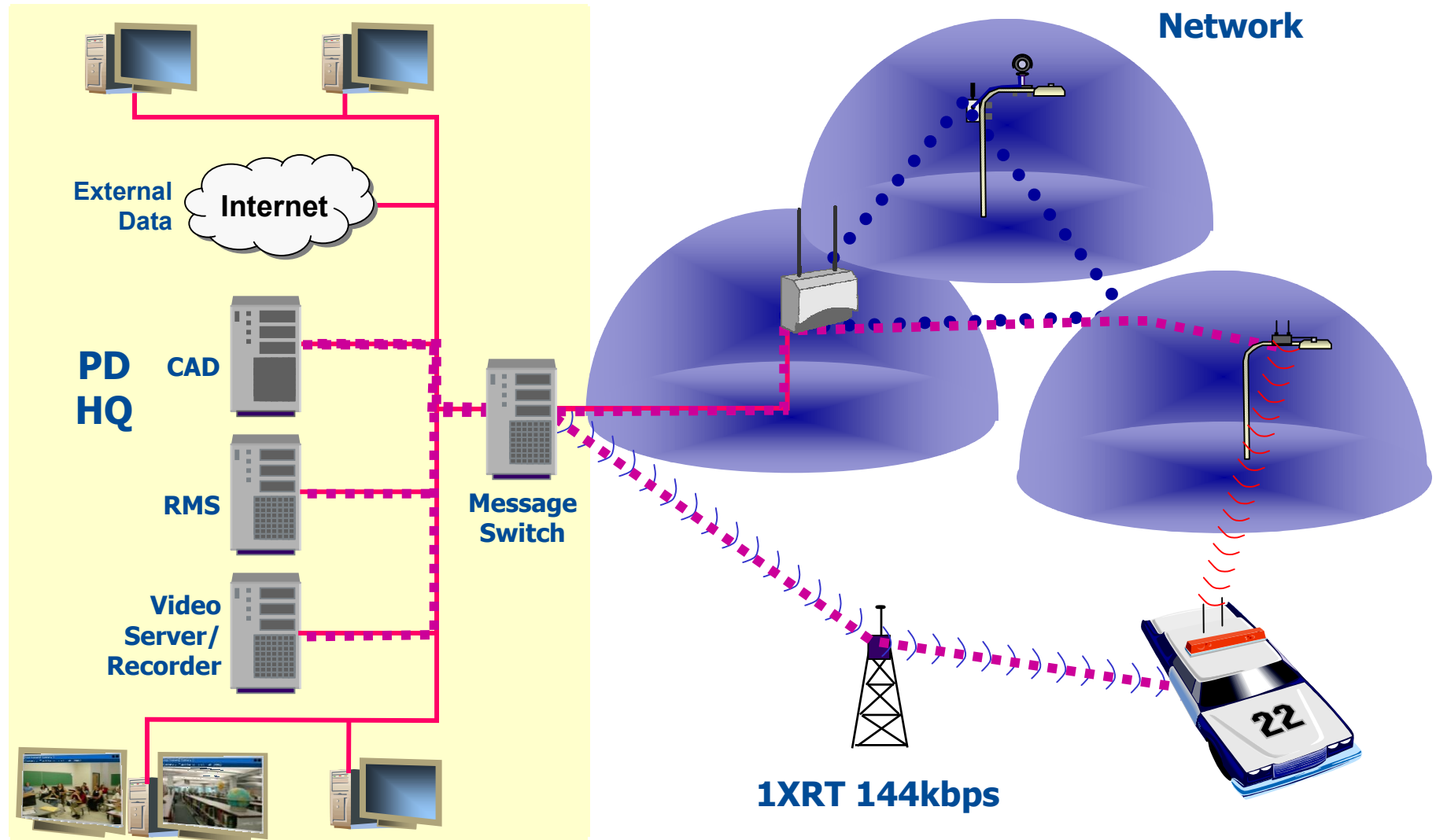


Data 911 Display and Keyboard

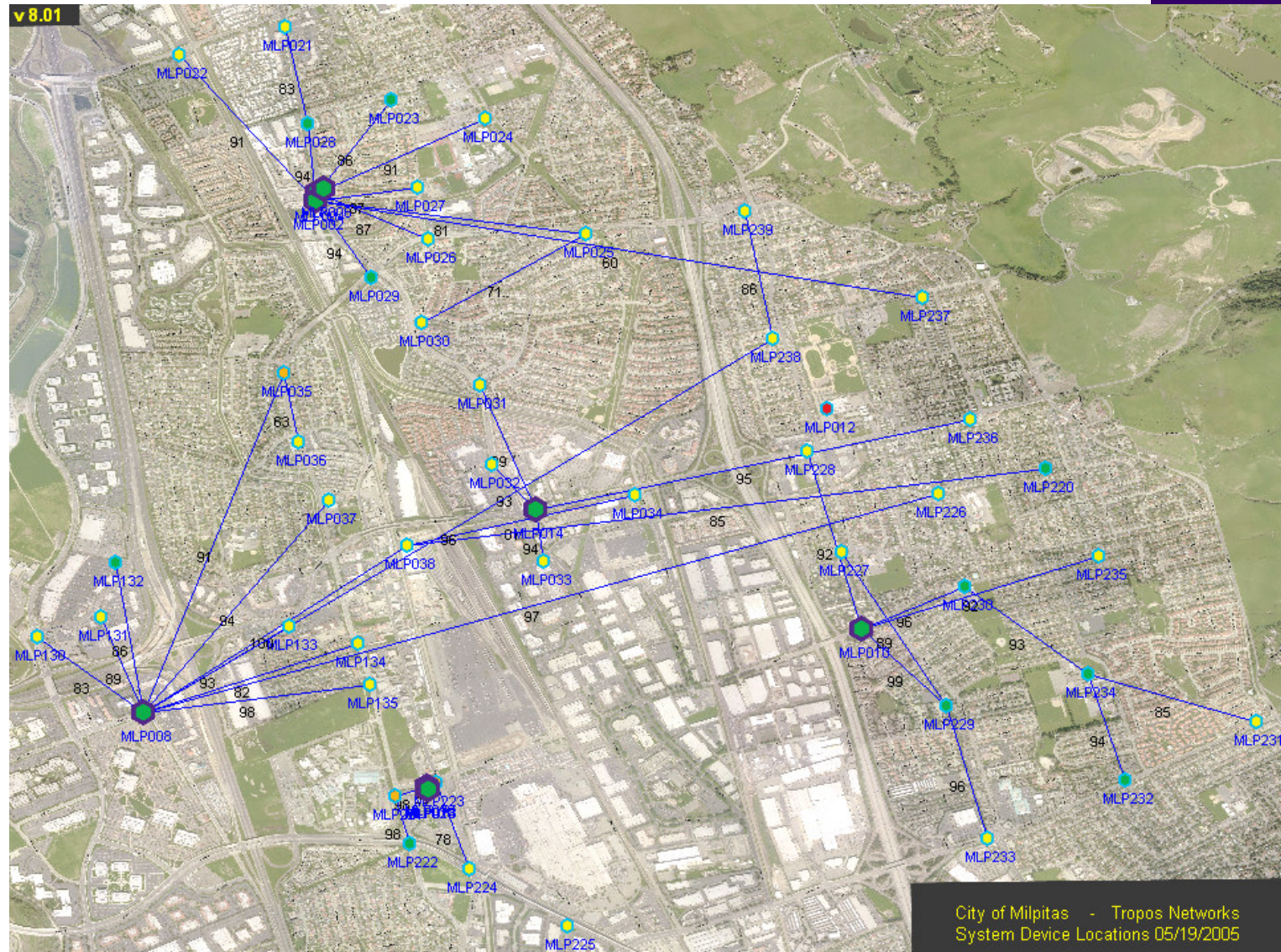
Current Configuration



Wi-Fi Cellular Metro Network



Coverage Area



Coverage Area



WiFi versus 1XRTT Traffic



Mobility XE Connection List - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print

Address: https://iris:8080/connection_list.jsp Go Links

Server Status | Client Status | Server Settings | Client Settings | Policy Management | Licensing | About

mobilityXE.

Logoff Help

< Back **Connection List - Server: iris**

Refresh ☒ Auto-refresh Filter by Server: iris Apply Columns...

Connection count: 17 Page 1 of 1 Page Size: 50

Select: All / None Reconnect | Force Failover | Disconnect | Quarantine Device | Quarantine User

	Device Name	User Name	Status	Virtual Address	POP Address	Version	OS	Battery
<input type="checkbox"/>	MOBPD26	MILPITAS\clee	Connected	10.20.5.26	10.30.5.11:22414	6.01	XP	n/a
<input type="checkbox"/>	MOBFDE04	MILPITAS\ve3	Connected	10.20.5.112	10.30.5.14:10513	6.01	XP	n/a
<input type="checkbox"/>	MOBFDTK4	MILPITAS\ve4	Connected	10.20.5.105	10.30.5.16:23480	6.01	XP	n/a
<input type="checkbox"/>	MOBFDP3	MILPITAS\pt3	Connected	10.20.5.109	10.30.5.28:28574	6.01	XP	n/a
<input type="checkbox"/>	MOBPD27	MILPITAS\kmoscuzza	Connected	10.20.5.27	10.39.5.3:14100	6.01	XP	n/a
<input type="checkbox"/>	MOBFDBC19	MILPITAS\bc19	Connected	10.20.5.102	10.39.5.21:21374	6.00	XP	n/a
<input type="checkbox"/>	MOBFDE02	MILPITAS\ve2	Connected	10.20.5.106	10.50.5.5:26239	6.01	XP	n/a
<input type="checkbox"/>	MOBFDUSAR1	MILPITAS\usar1	Connected	10.20.5.241	10.50.5.10:25323	6.01	XP	n/a
<input type="checkbox"/>	MOBFDTK1	MILPITAS\TK1	Connected	10.20.5.111	10.50.5.11:12166	6.01	XP	n/a
<input type="checkbox"/>	MOBFDE01	MILPITAS\ve1	Connected	10.20.5.107	10.50.5.13:28479	6.01	XP	n/a
<input type="checkbox"/>	MOBFDHM4	MILPITAS\hm4	Connected	10.20.5.104	10.50.5.14:16384	6.01	XP	n/a
<input type="checkbox"/>	MOBFDCH1	MILPITAS\19a1	Connected	10.20.5.103	10.50.5.17:21697	6.01	XP	n/a
<input type="checkbox"/>	MOBFD2P2	MILPITAS\bp2	Connected	10.20.5.101	166.139.250.166:12730	6.01	XP	n/a
<input type="checkbox"/>	MOBPD11	MILPITAS\kprolo	Connected	10.20.5.11	166.139.250.171:16435	6.01	XP	n/a
<input type="checkbox"/>	MOBPD14	MILPITAS\cspalding	Connected	10.20.5.14	166.139.250.191:16115	6.01	XP	n/a
<input type="checkbox"/>	MOBPD25	MILPITAS\klbrown	Connected	10.20.5.25	166.139.250.211:16414	6.01	XP	n/a
<input type="checkbox"/>	MOBPD05	MILPITAS\yzambonin	Connected	10.20.5.5	166.139.250.215:19735	6.01	XP	n/a

Click on a Device Name field to view session details.

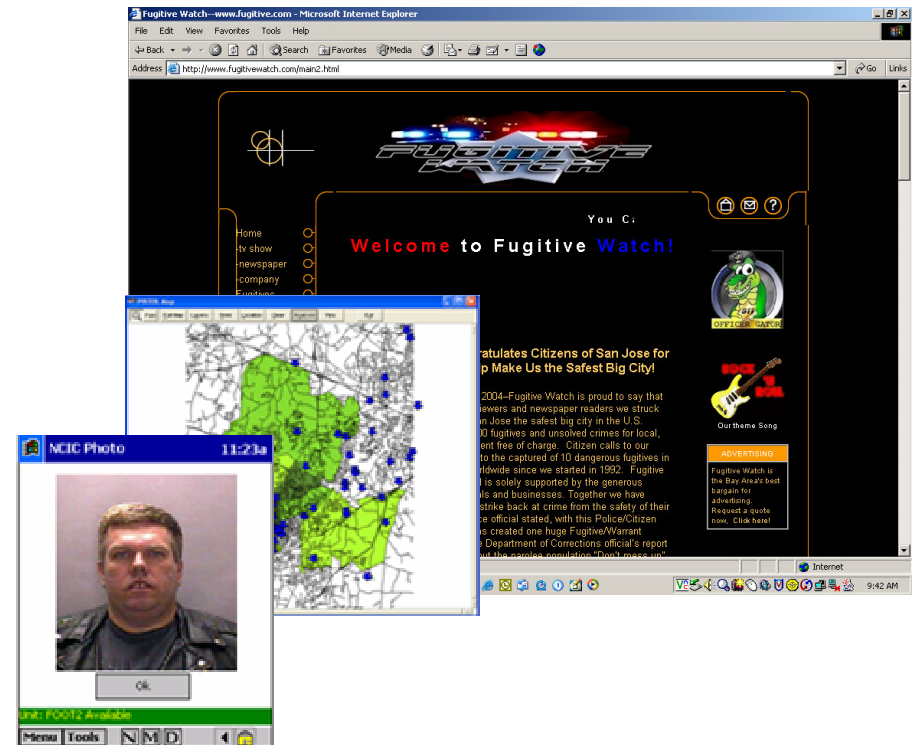
iris Thu Aug 25 15:47:23 PDT 2005 Local intranet

WiFi
70%

Current Applications



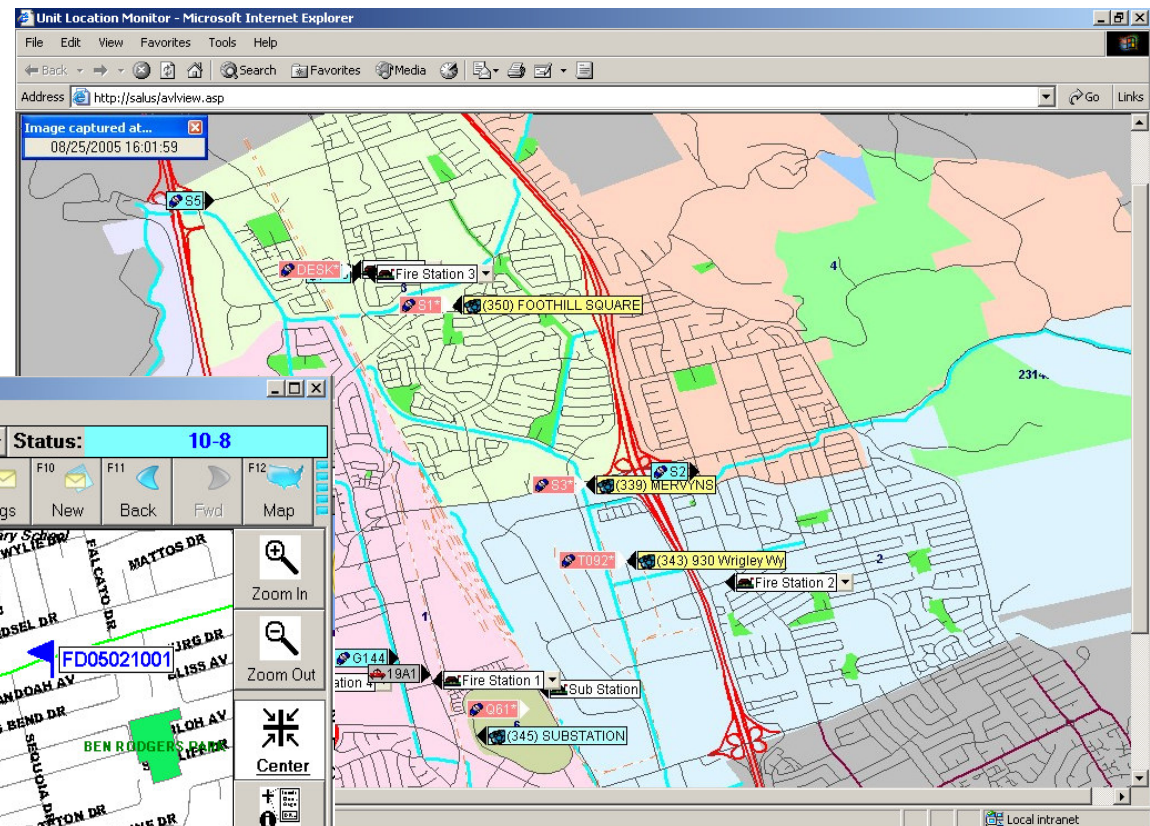
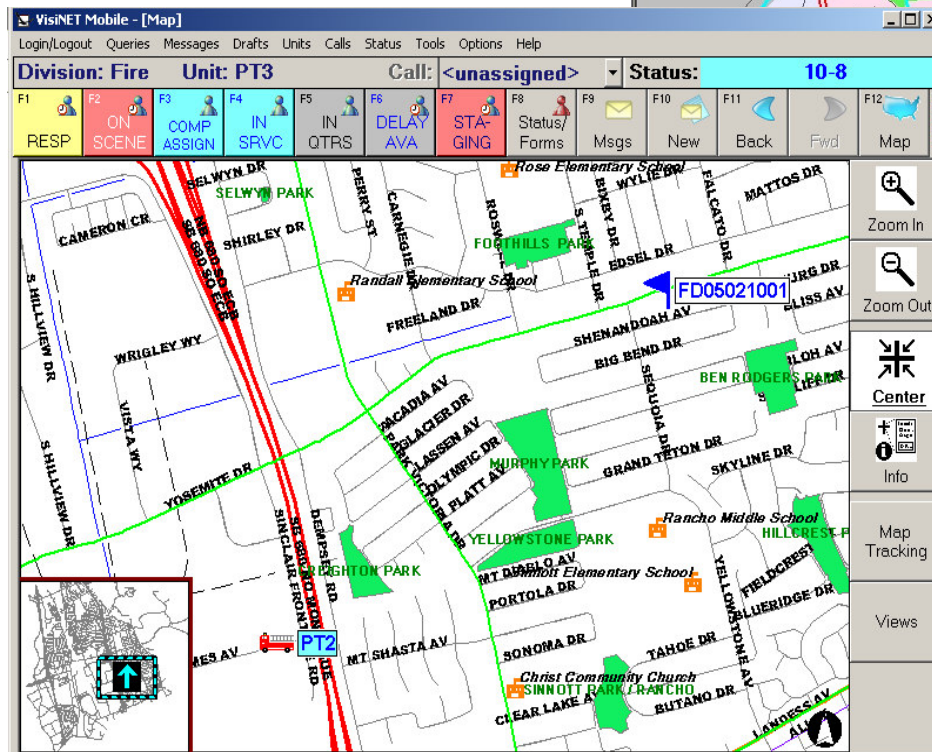
- CAD, Records Management, Reporting
- Access to law enforcement applications
- Cal Photo
 - DMV records, with high resolution photos
- Fugitive Watch
- Criminal Code
- 511 Silicon Valley
- Traffic info
- Fire Department applications
 - Hazmat Data
 - Weather Forecasts



Current Applications



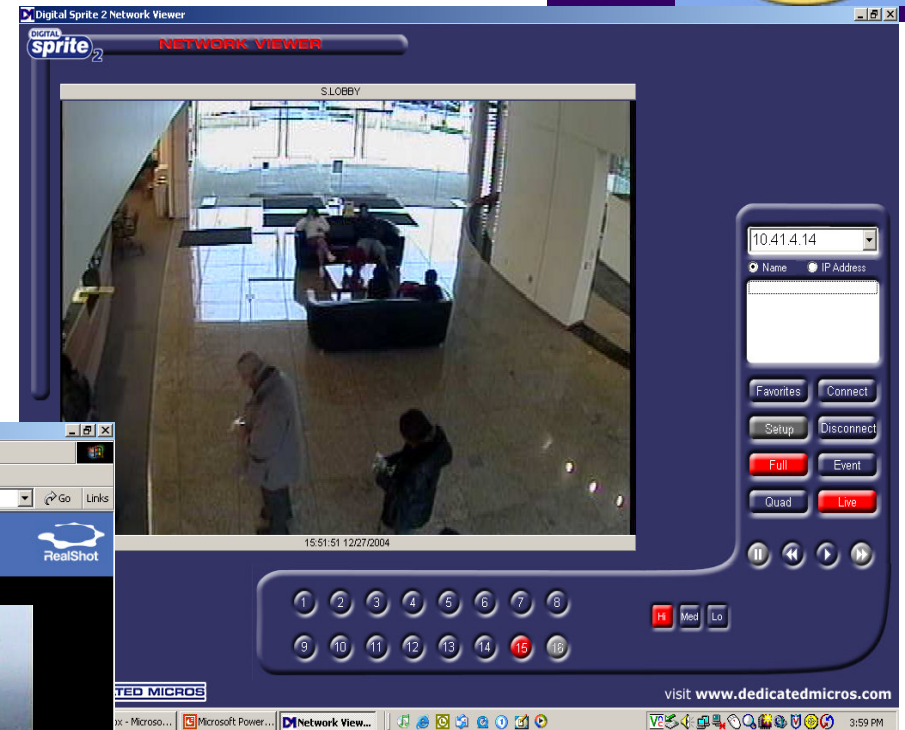
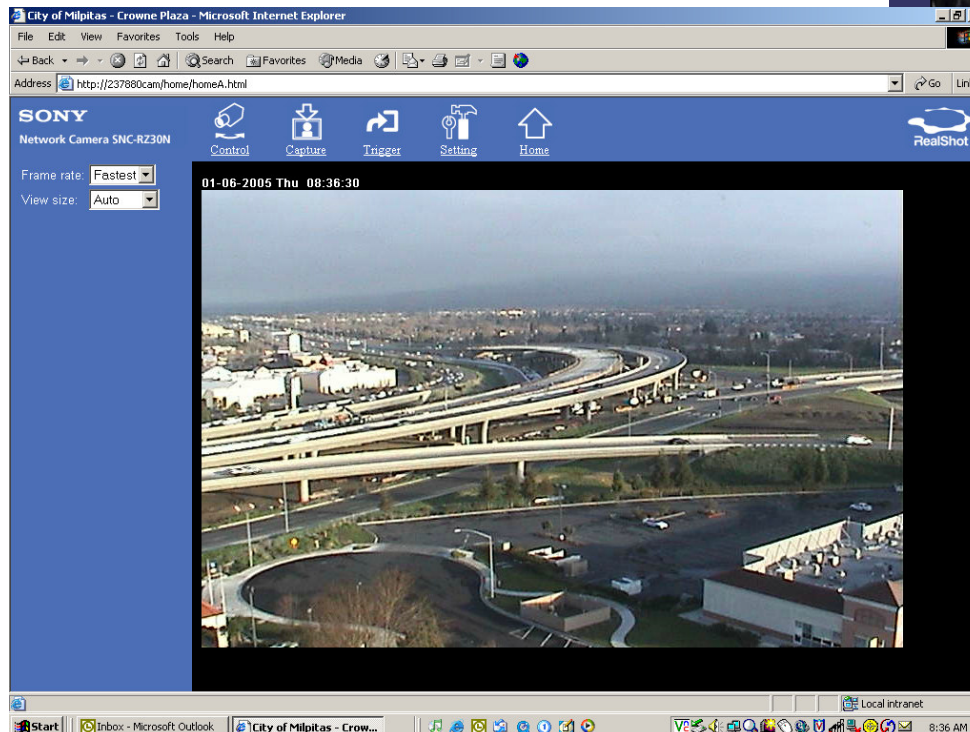
- Vehicle Location and Response Recommendations
- Call Dispatching and Status Changes



Future Applications



- Desktop applications used in the Station now available in the field
- In-vehicle video monitoring



Cost/Benefit



Costs

- | | | |
|----------------------|-----------------|-------------------|
| ● Initial Deployment | \$24,000 | (Technology Bond) |
| ● Network Expansion | \$84,000 | (Tropos Grant) |
| ● Planned Expansion | \$31,000 | (Technology Bond) |
| | <u>\$55,000</u> | Actual Cost |

Benefits

- | | |
|-----------------------------------|------------------|
| ● Ability to deploy new apps | - PD Requirement |
| ● Redundant wireless data network | - Fail Over |
| ● Reduction of Carrier Charges ?? | - Real Savings |
| ● Cool Technology | - Priceless |

Future ?



Technology

- 802.11g, 802.11x, 802.11q
- WiMax, Multi-band
- 4.9 GHz Band

Application

- Shared Access
- Digital Divide, Economic Development
- Public Utility ?

City of Milpitas Information Services



Bill Marion

bmarion@ci.milpitas.ca.gov

