City of Milpitas

Public Safety Broadband Data Communications

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City Milpitas Background

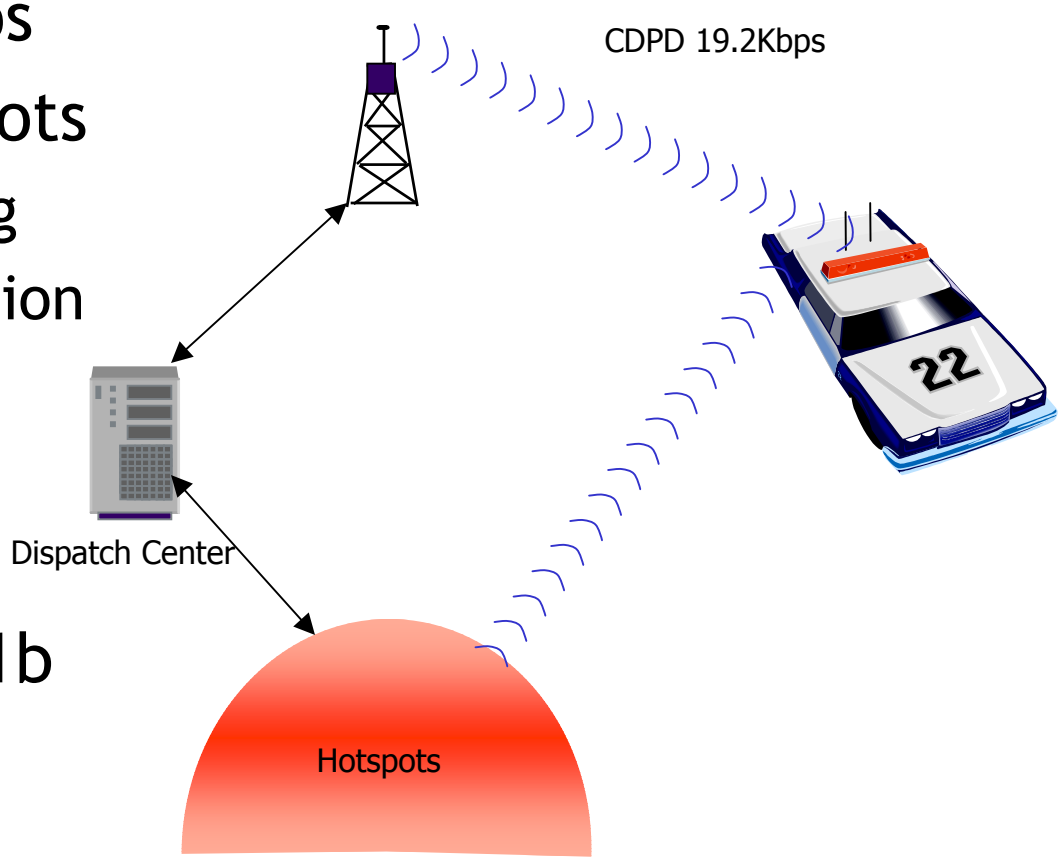
- Geographic – 13.5 square miles
- Population
  - – 65,000 residents
  - – 100,000 daytime
- Police Department – 130 employees, 95 sworn officers
- 30 patrol vehicles
- Fire Department – 79 employees
- 20 primary response vehicles

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



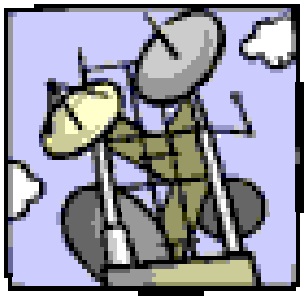
Requirements

- 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



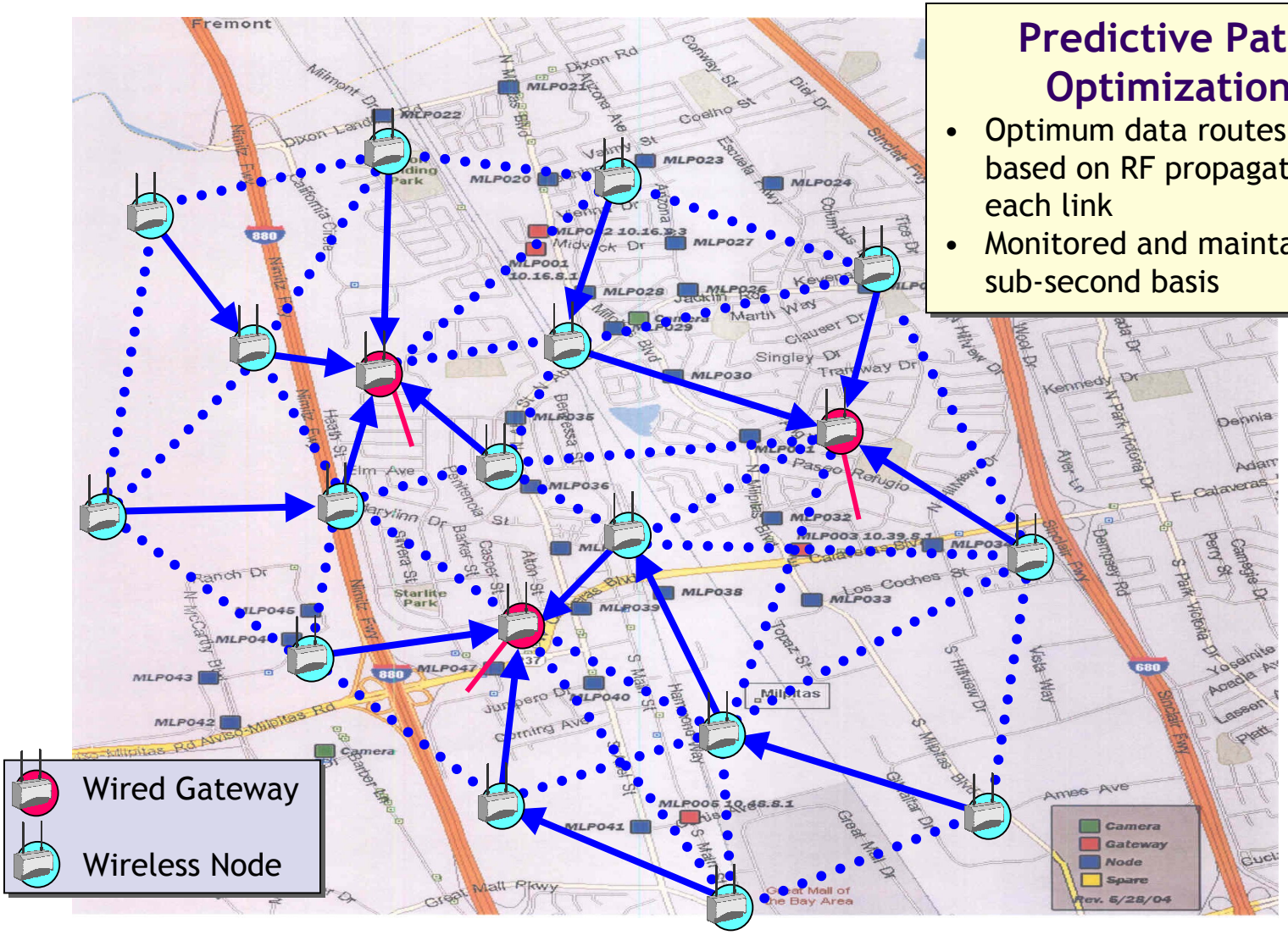
Private Wireless

- 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

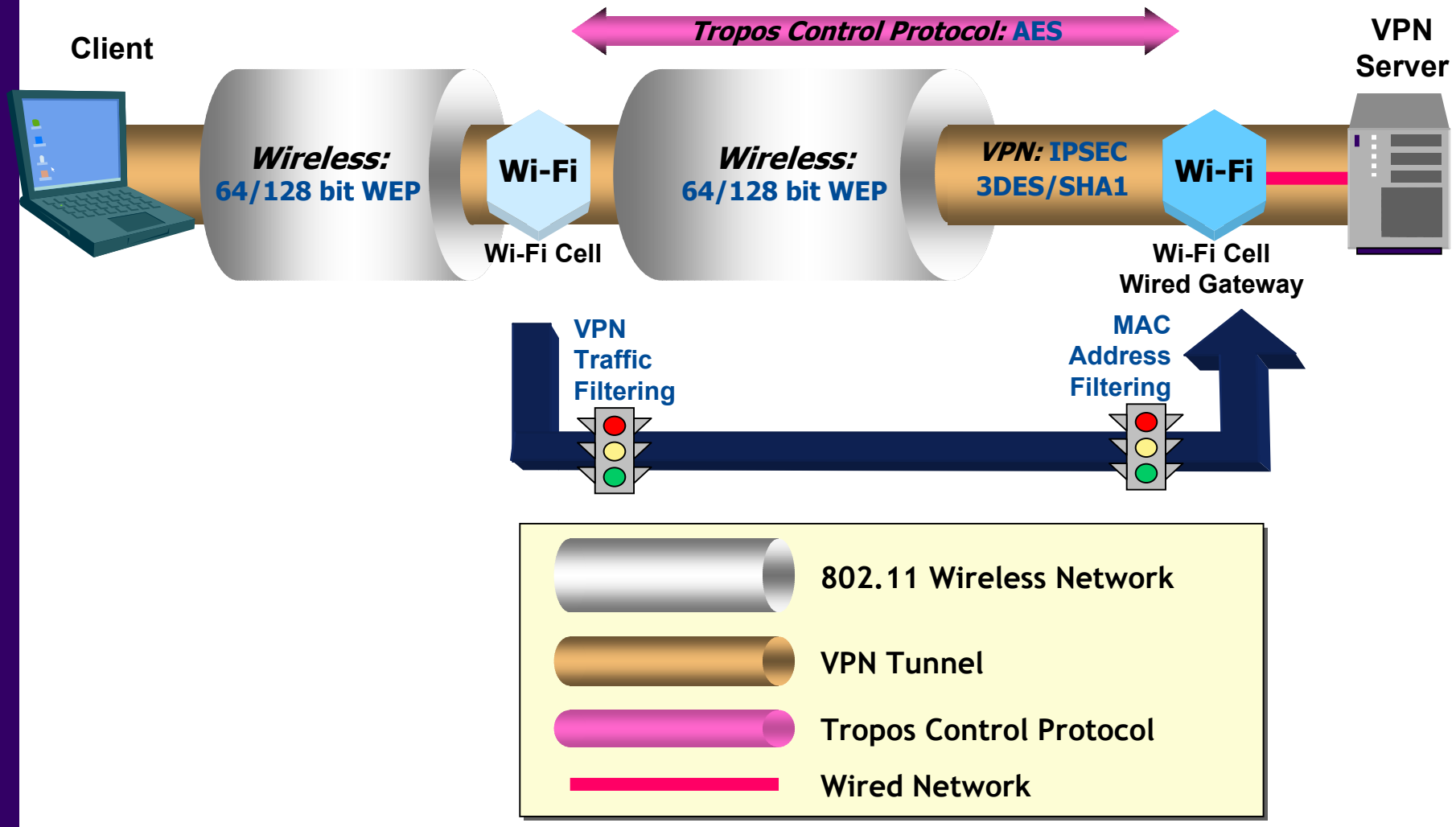
Dynamic Network Configuration



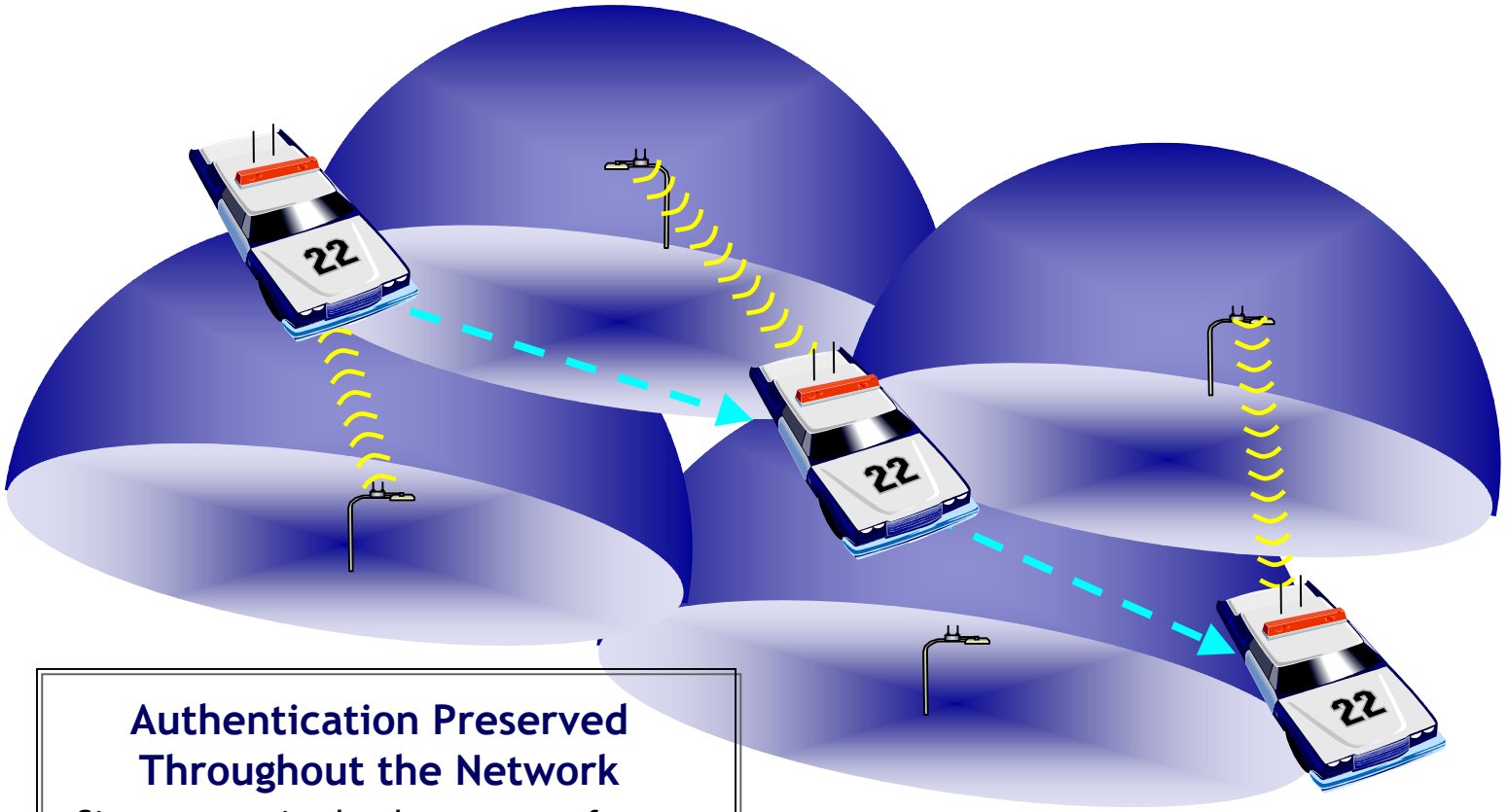
Predictive Path Optimization

- 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

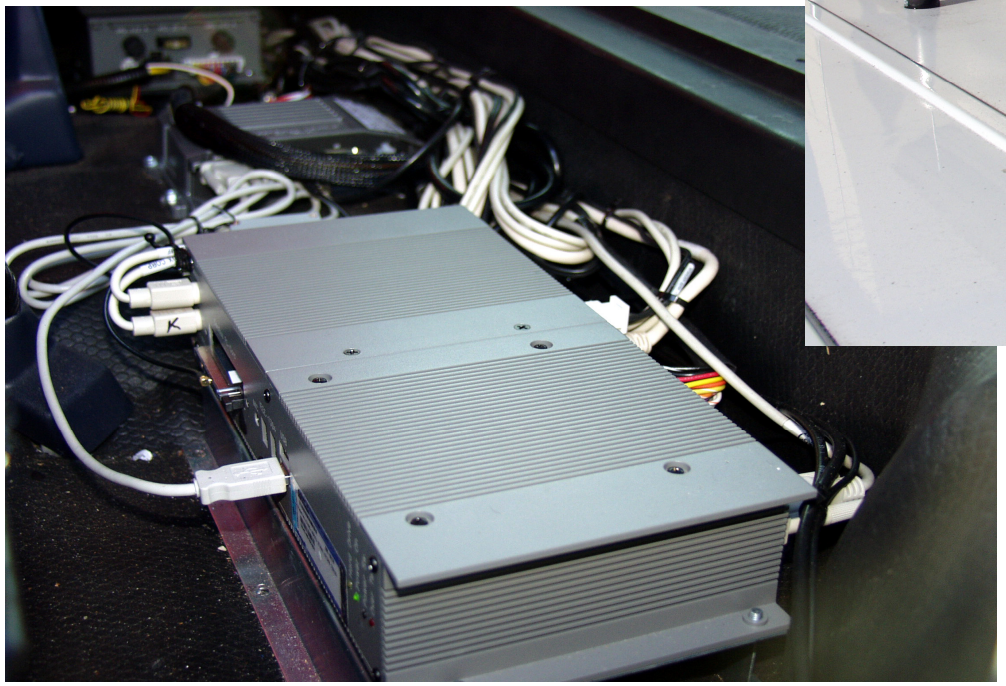
- Sign-on required only at start of session
- Secure connectivity continues during re-association with nodes
- IP address maintained while roaming between subnets

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

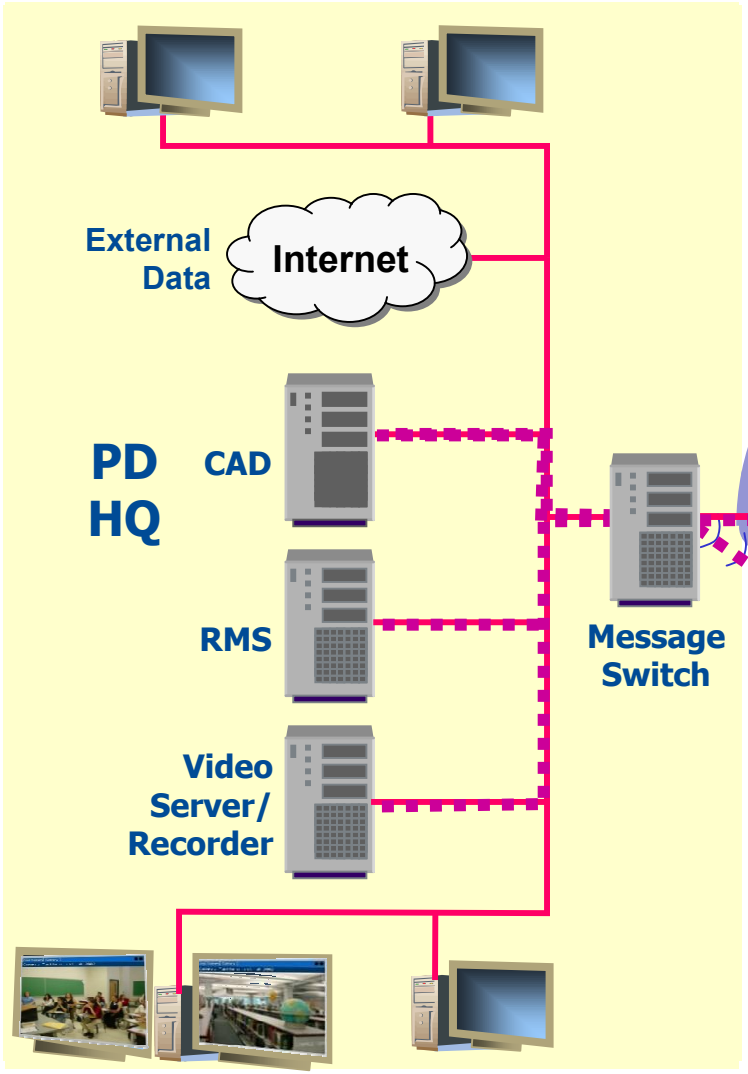


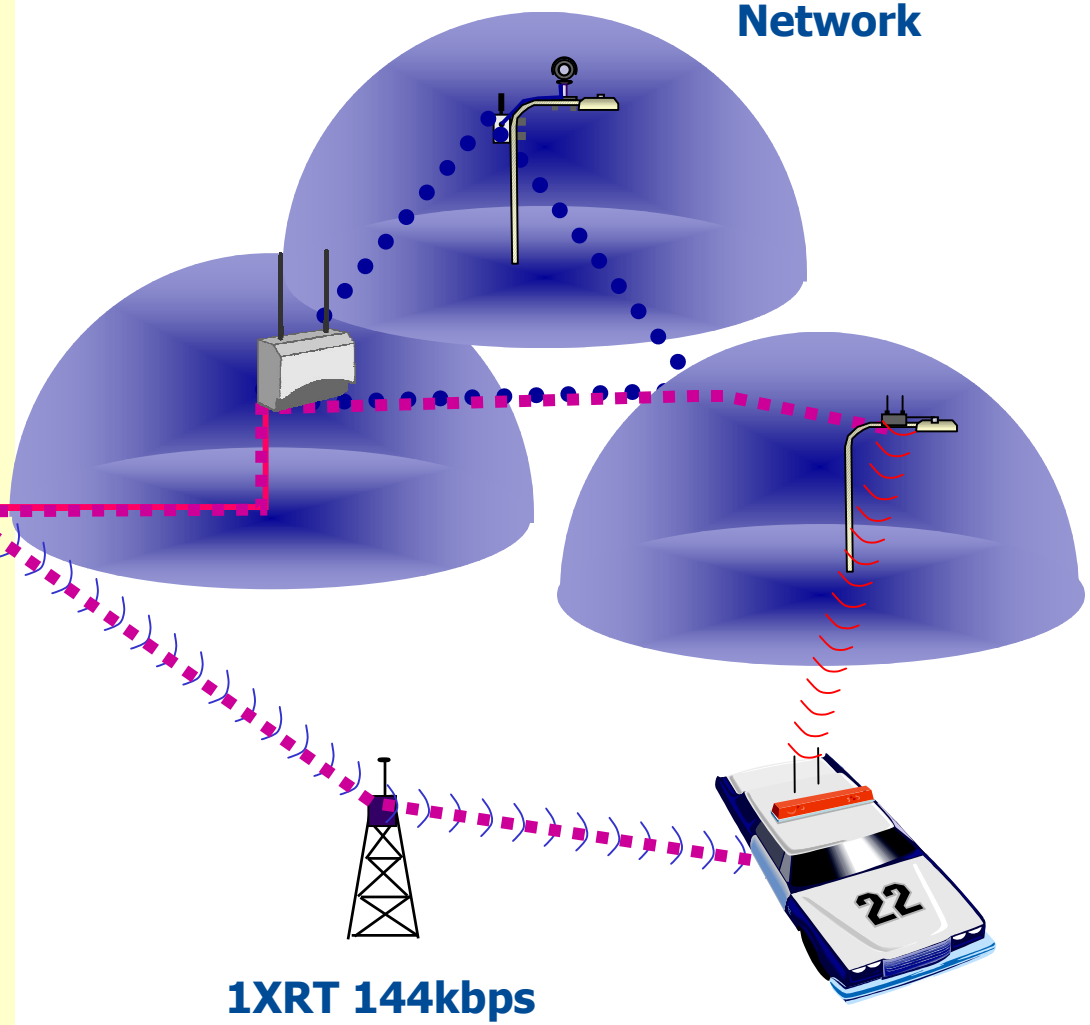
External 2.4 GHz antenna

Vehicle Equipment

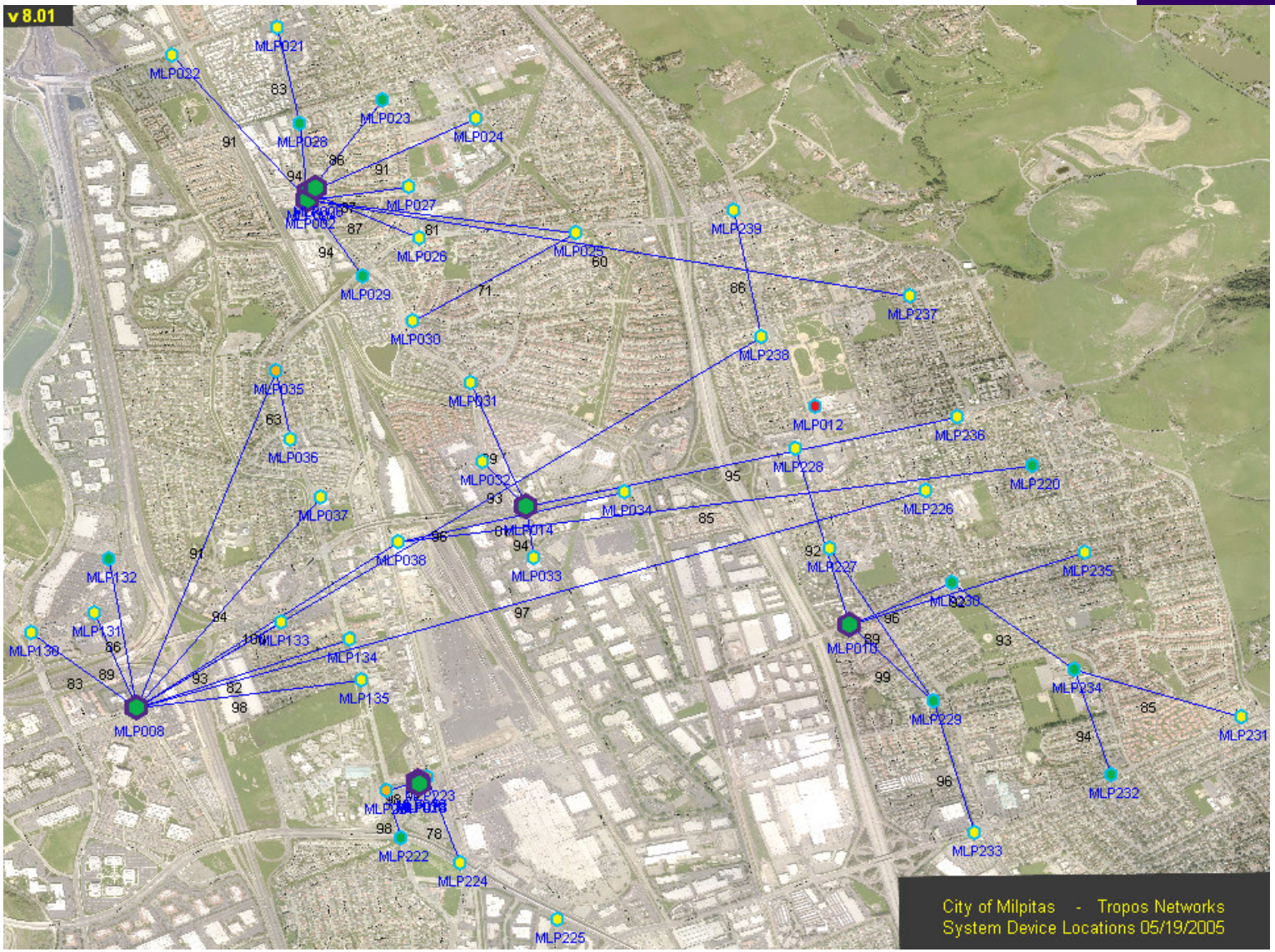
Data 911 Display and Keyboard

Current Configuration



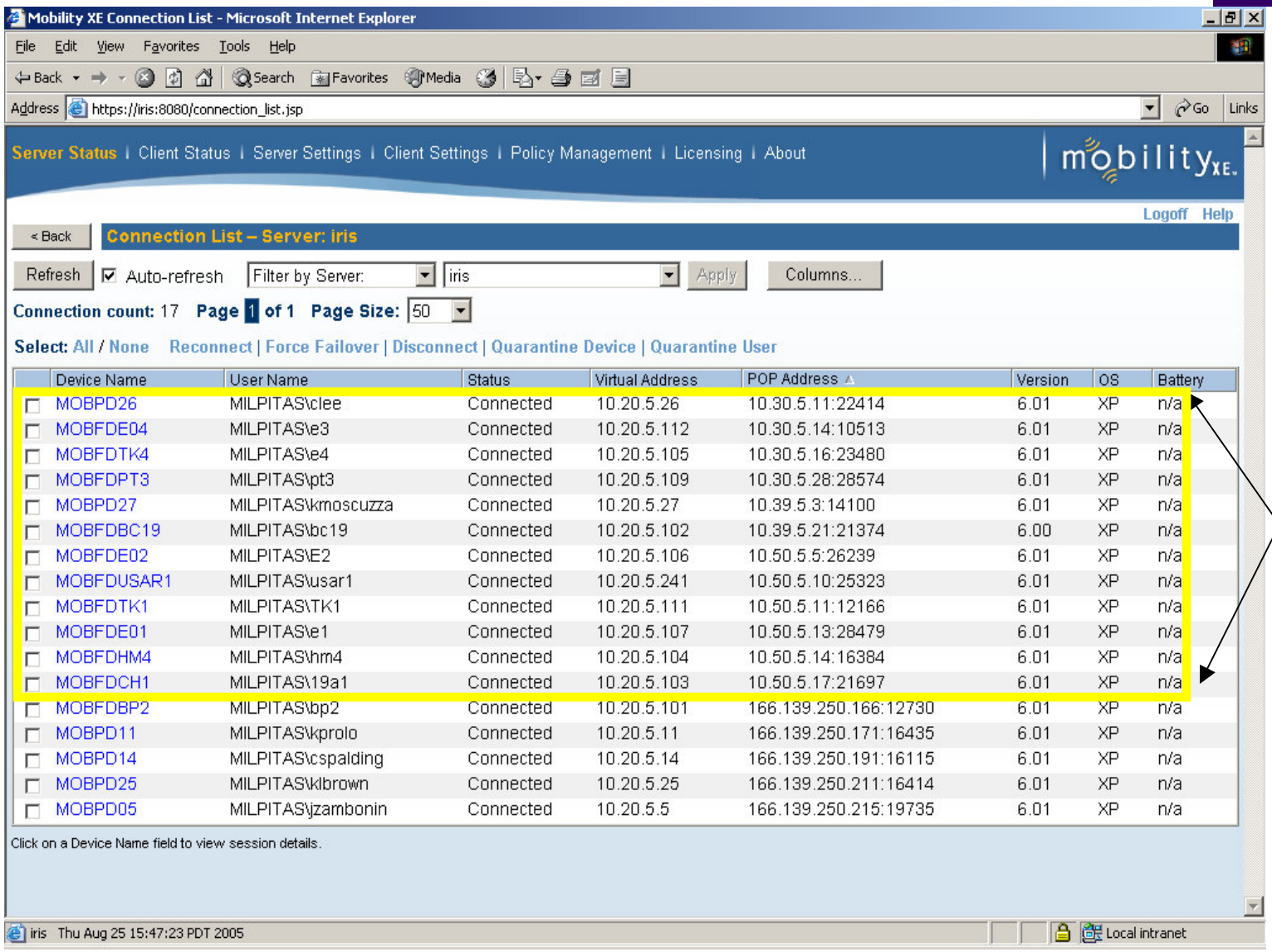


Coverage Area



Coverage Area

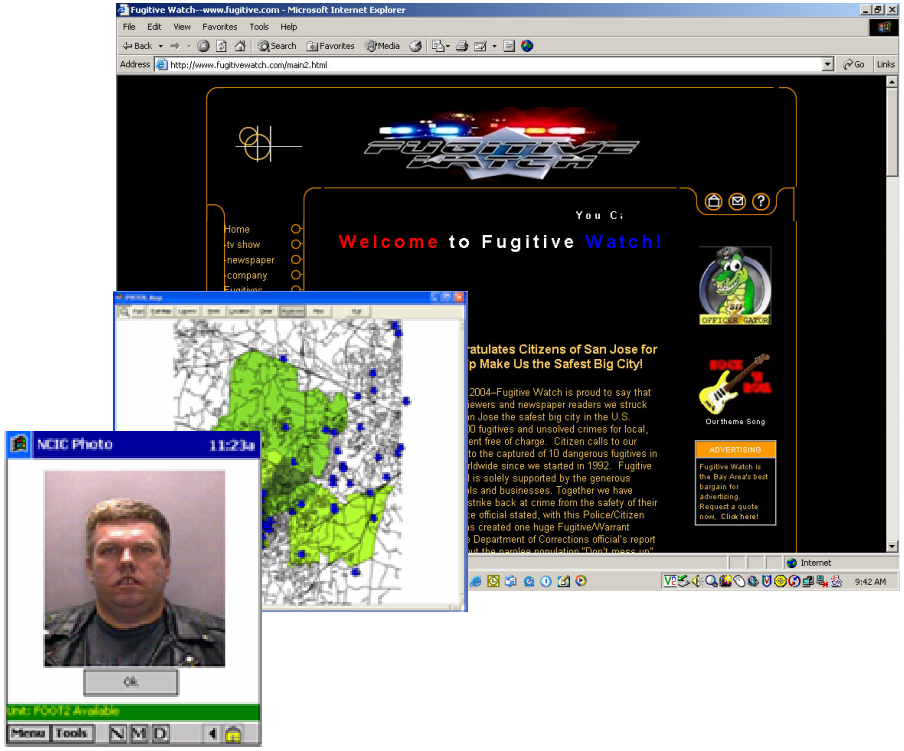
WiFi versus 1XRTT Traffic



WiFi
70%

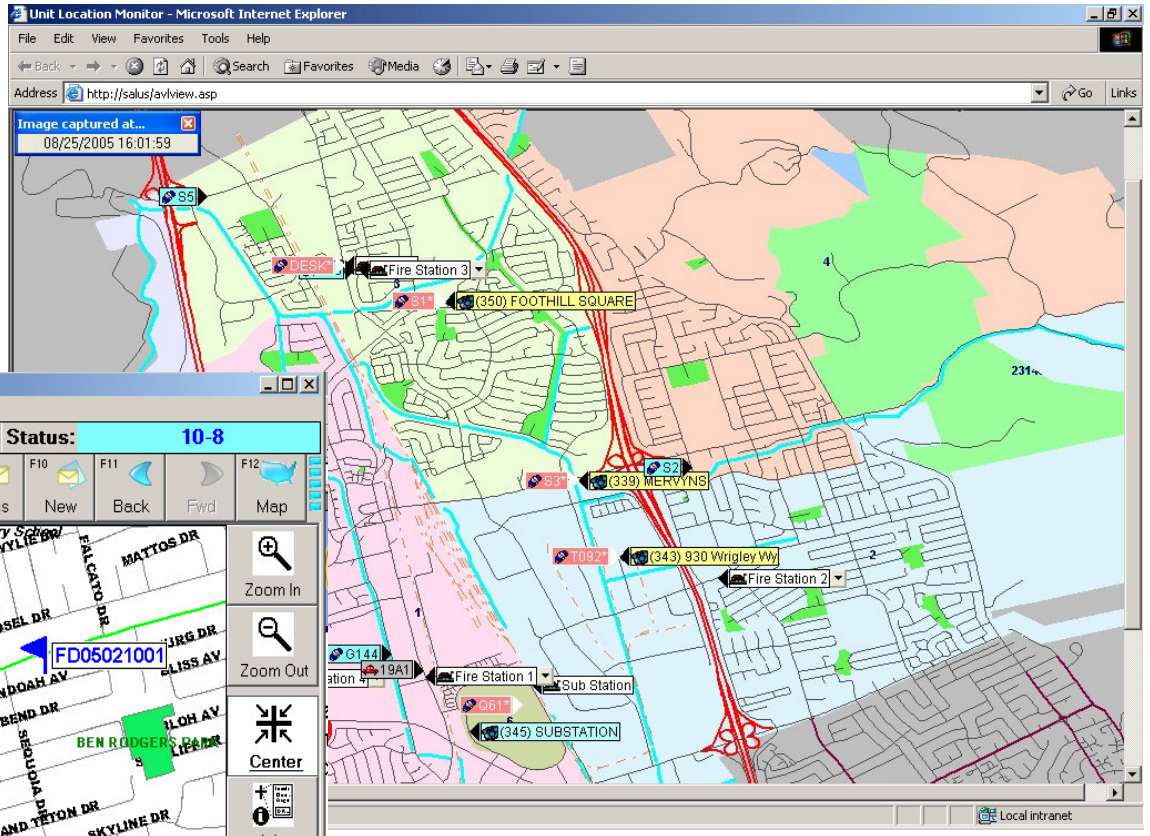
Current Applications

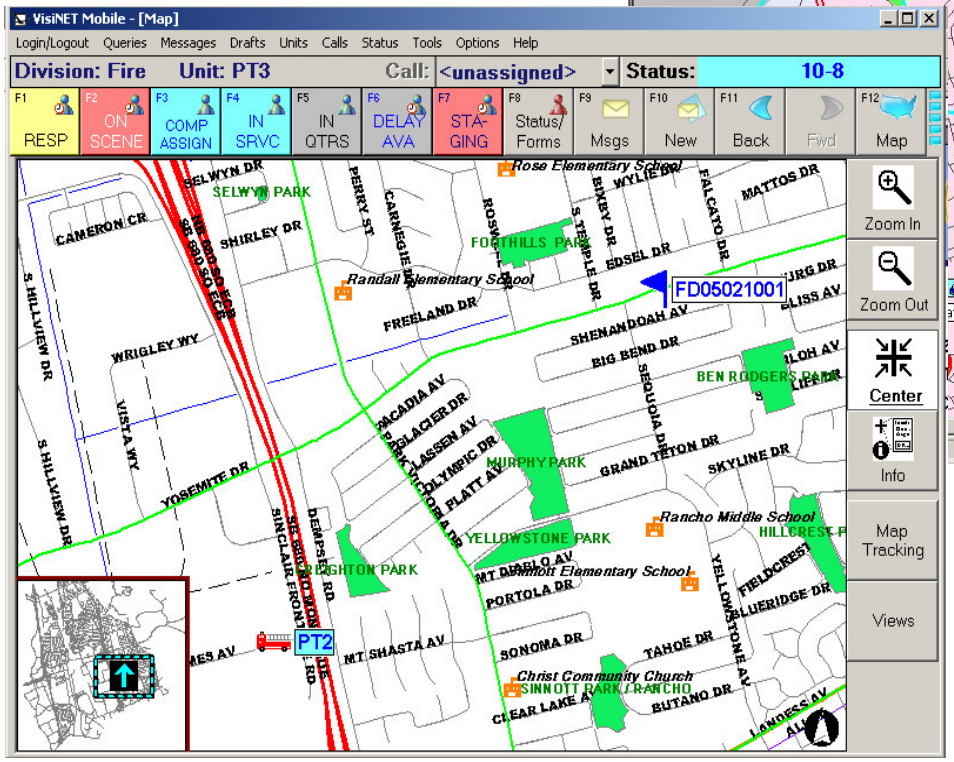
- CAD, Records Management, Reporting
- Access to law enforcement applications
  - Cal Photo
    - DMV records, with high resolution photos
  - Fugitive Watch
  - Criminal Code
  - 511 Silicon Valley
    Traffic info
- Fire Department applications
  - Hazmat Data
  - Weather Forecasts



Current Applications

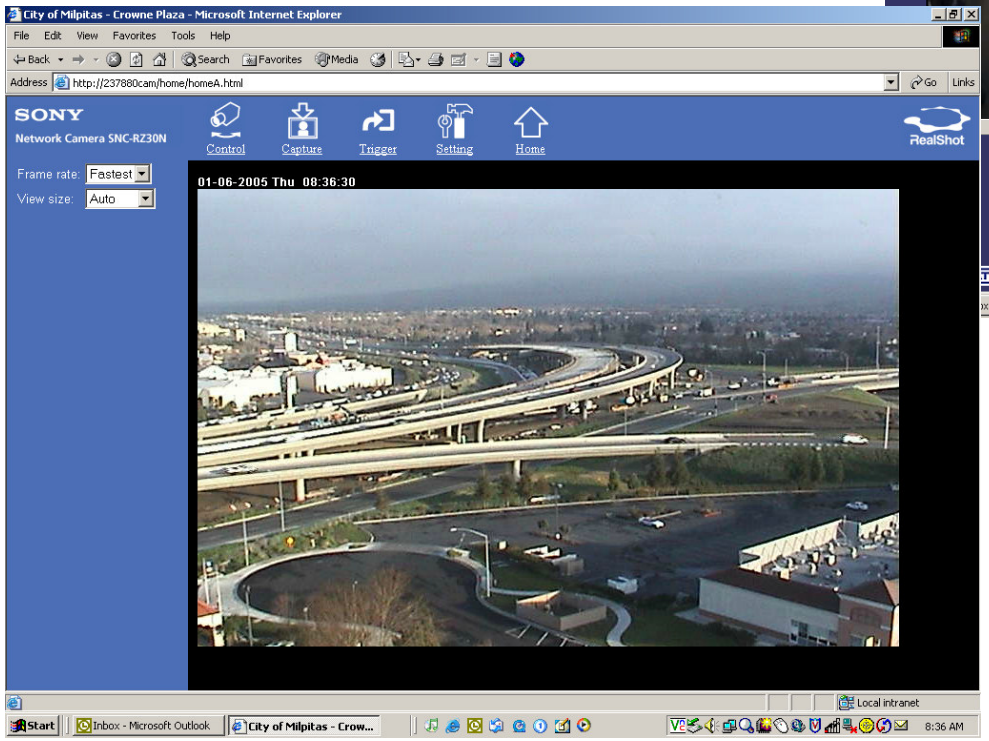
- Vehicle Location and Response Recommendations
- Call Dispatching and Status Changes





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)
	$55,000	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 ?

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Information Services

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