# Section C

## FORM 7
## MAJOR EQUIPMENT AND MATERIALS TO BE USED, CONDITION AND AVAILABILITY

*Provide make, model, year and serial number of Major Equipment and Materials to be used to fulfill requirements of this Contract, and their condition and availability.*
*Provide sufficient description, specifications and other information to allow the City to evaluate the equipment to be used. Attach catalog cuts of all major equipment and materials to be used.*

### Head-End Equipment

| Type | Make | Model | Year | Serial # | Condition | Lead Time |
|---|---|---|---|---|---|---|
| Enterprise Server | Smiths Detection | 8 channel/3008 | 2006/2007 | TBD | New | 2 weeks |
| NVR | Smiths Detection | 16 channel 4.5 TB/4016.45 | 2006/2007 | TBD | New | 2 weeks |
| NVR | Smiths Detection | 8 channel 4.5 TB/4008.45 | 2006/2007 | TBD | New | 2 weeks |
| Workstation | Smiths Detection | Workstation w/Dual 20" Monitors | 2006/2007 | TBD | New | 2 weeks |
| 40-42" LCD/Plasma | TBD | TBD | 2006/2007 | TBD | New | 1 week |
| Monitor | Samsung | SyncMaster | 2006/2007 | TBD | New | 1 week |

### Site Equipment

| Type | Make | Model | Year | Serial # | Condition | Lead Time |
|---|---|---|---|---|---|---|
| Camera | Bosch | Autodome 300 series | 2006/2007 | TBD | New | 1 week |
| FCC Licensed Radio | DragonWave | AirPair 100/23GHz | 2006/2007 | TBD | New | 2 weeks |
| License Exempt | Orthogon | OS-Gemini | 2006/2007 | TBD | New | 2 weeks |

### Network Equipment

| Type | Make | Model | Year | Serial # | Condition | Lead Time |
|---|---|---|---|---|---|---|
| Switch/Router | Cisco | 3550 | 2006/2007 | TBD | New | 1 week |
| Firewall | Cisco | PIX 515E | 2006/2007 | TBD | New | 1 week |
| UPS | APC | | 2007 | TBD | New | 1 week |

**\*\*See Attachment E for the specification sheets**

# Form 8

# Critical Infrastructure Monitoring System (CIMS) – Phase II

**Forward**

The Boston Critical Infrastructure Monitoring System (CIMS) project outlines an expansion to an existing wide area closed circuit television (CCTV) application. CIMS will encompass a total of nine municipalities (nodes). Of the nine nodes, five will require a full system build out including network, hardware, and software. The goal of the entire system is:

- High Availability

- Intuitive User Interface

- Inter-Node routing

The above goals are key aspects for the system design. These goals will be used throughout the system design as a quality control mechanism to ensure technical considerations do not compromise or conflict with overall customer needs. Additionally, the Smiths Detection design Team organized the solution into two key components; integration strategy and command and control.

## 1. Integration Strategy

This component sets forth a comprehensive strategy to ensure the systems in new nodes are fully compatible with existing nodes as well as scaling the existing nodes to support the additional "loads" brought on as CIMS expands.

Currently, the Smiths Detection Team deployed and maintain the existing system, with the exception of the Chelsea node. The Team's technical strategy is to first audit the existing components deployed during Phase I and augment them to accommodate new features required in the Phase II. This strategy will mitigate the cost associated with un-needed "fork lift" upgrades as well as streamline the overall phase II project implementation timeline.

During the audit process, key network, hardware and software components were analyzed and tested to ensure that the three system goals (high availability, intuitive user interface, inter-node routing) will be met. The analysis first identified that the addition of five new network nodes will not introduce enough additional data throughput to cause "choke points" at each nodes wireless head-end. Wireless network bandwidth currently dedicated to the existing nodes is a limited commodity that will need to be upgraded or load balanced with other redundant pathways in the future. This additional bandwidth is a combination of downstream to pull in video feeds but also upstream capacity to support remote nodes pulling video feeds. Secondly, an intuitive method for end users/operators to access systems in remote nodes will require full IP/layer 3 routing between nodes. The design Team also recommends leveraging the use of Domain Name Server (DNS) on each nodes local area network (LAN). This DNS server will provide private name routing (i.e. http:\\boston.CIMS.net, http:\\Chelsea.CIMS.net) that operators will use to access remote systems. These domain names can be stored in the workstations web browsers "Favorites" folder to further simplify the actions required by users.

Finally the existing backbone of the CIMS will be upgraded from a flat layer 2 network to a fully routed IP ring using Open Shortest Path (OSPF) routing protocols. OSPF will provide additional redundancy within the backbone. Upgrading the core backbone will prohibit extraneous broadcast traffic from each node propagating the backbone – leaving more bandwidth for the applications.

Key network metrics on the backbone include the following:
- Network availability greater than 99.9%
- Packet Latency less than 50ms
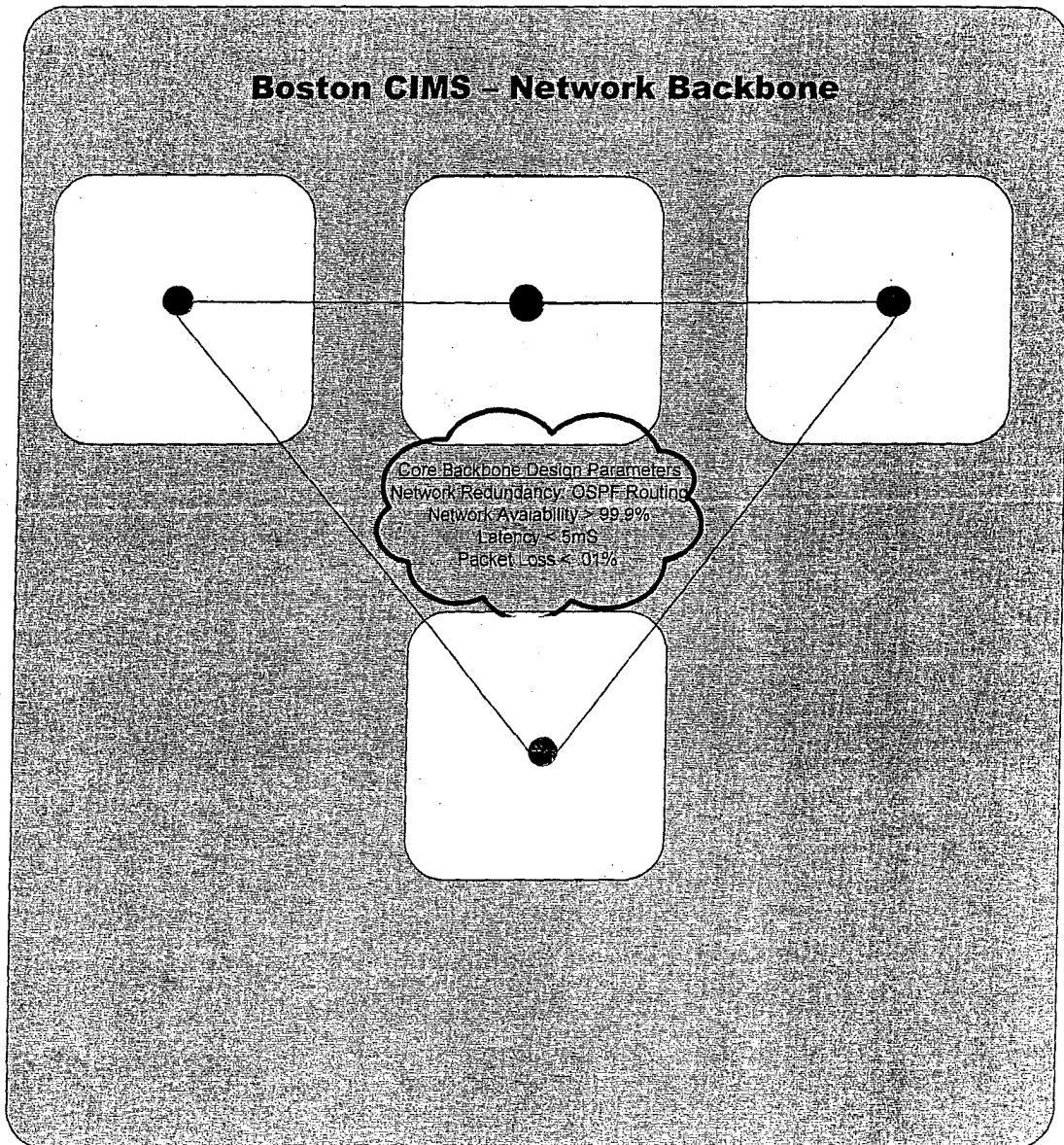- Packet Loss less than .01%



**Figure 5: CIMS Network Backbone**

## 2. Command & Control

This component involves the "human factor" as it relates to providing a true application – solution. Key aspects of this component such as: ease-of-use, manageability, intuitive system diagnostics and overall system stability were continually tested throughout the preliminary design phase.

- *Ease of Use*: All operator workstations will access the head-end FirstView System via standard web browsers such as Microsoft Internet Explorer. System control will be Graphical User Interface (GUI). FirstView applications will launch as default home page on operator workstations. Full objective based training will be provided to end-users.

- *Manageability*: System components will leverage standards based protocols and commercial off the shelf (COTS) hardware. This management strategy will provide greater long term flexibility to stakeholders in the CIMS project.

- *System Diagnostics*: A key element to measuring the System performance is to implement diagnostic software. The implemented diagnostic software will utilize industry standard Simple Network Management Protocols (SMNP) along with custom FirstView trap probes that monitor critical application layer components and services as well as network layer equipment such as routers, encoders and servers. All diagnostic information will be presented to end-users via an intuitive system diagram that shows the health status (i.e. up/down/warning) on active SNMP network elements. This diagnostic system will continually communicate every 30 seconds with active elements and notify CIMS node administrators and/or Smiths Detection support staff of any failures. The Smiths Detection CIMS Project Manager will work with individual node administrators to determine the appropriate thresholds as related to notifications, and minor/major alarms.

- *Stability*: Prior to deployment, all equipment will first be staged, burned-in and tested to ensure hardware components and software application/drivers operate together seamlessly. Additionally, reports will be continually reviewed from diagnostic system and used to determine appropriate adjustments to improve system stability.
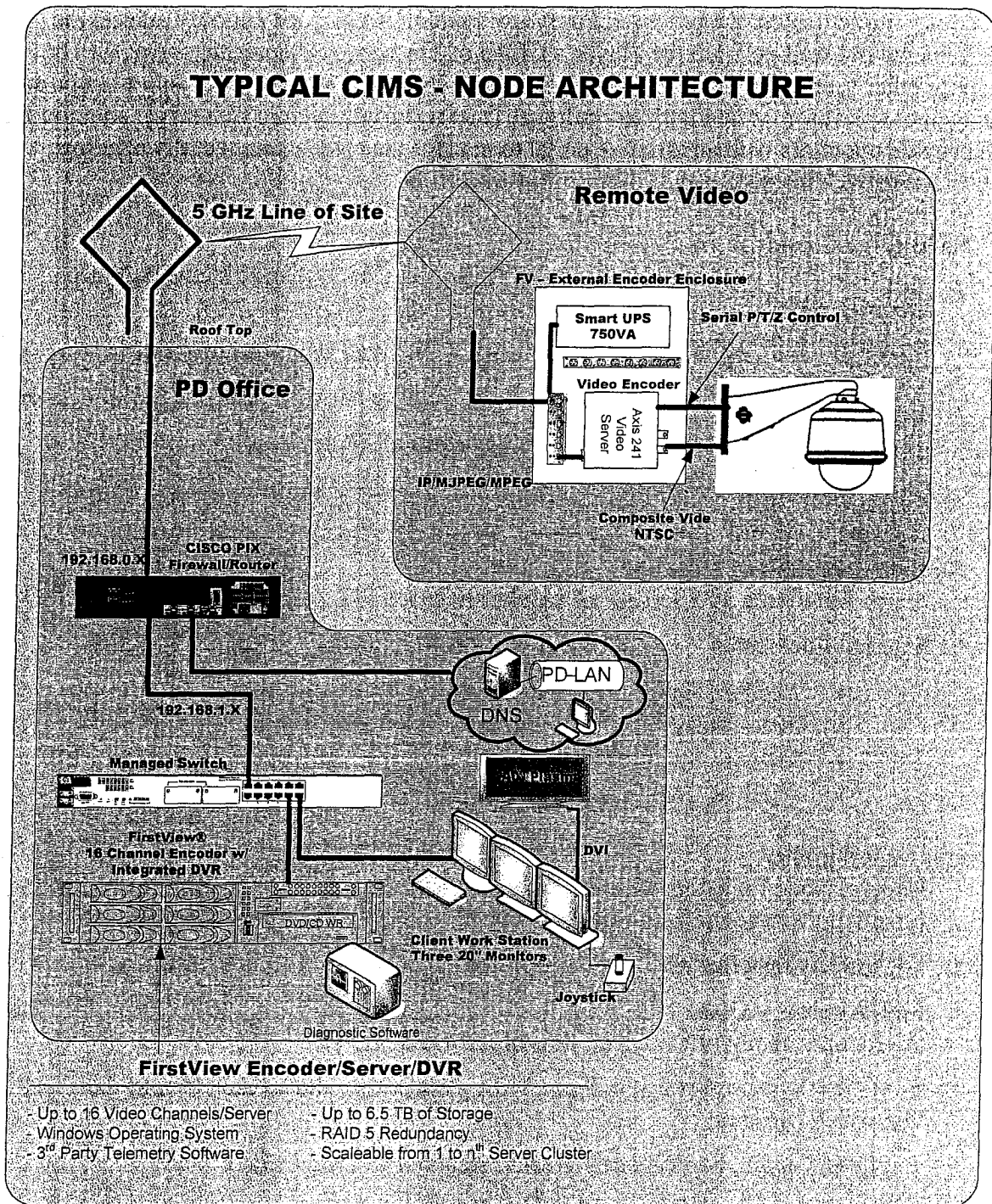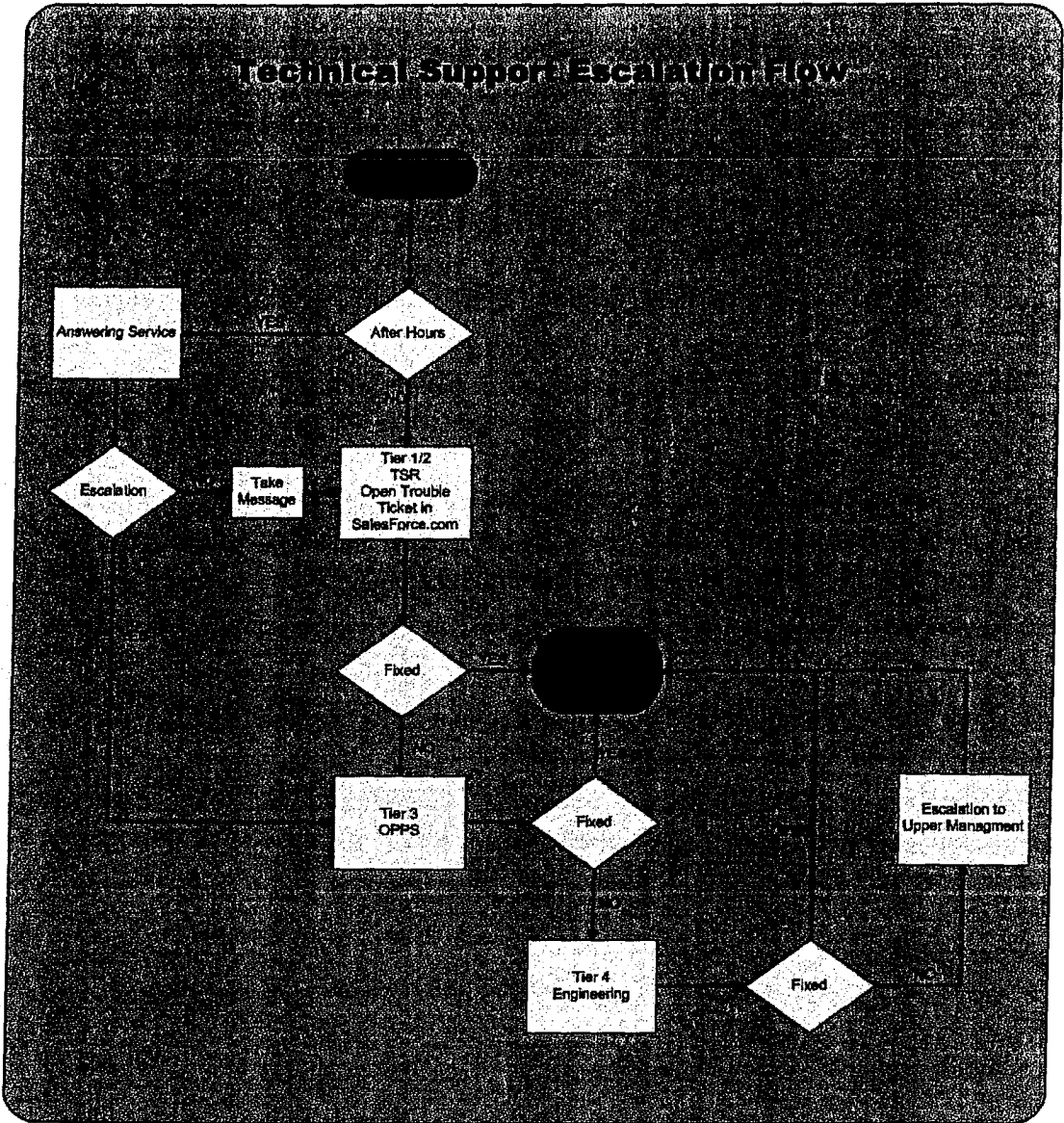
## TYPICAL CIMS - NODE ARCHITECTURE

**Remote Video**

5 GHz Line of Site

Roof Top

**PD Office**

FV - External Encoder Enclosure

Smart UPS
750VA

Serial P/T/Z Control

Video Encoder

Axis 241
Video
Server

IP/MJPEG/MPEG

Composite Video
NTSC

192.168.0.X

CISCO PIX
Firewall/Router

PD-LAN

DNS

192.168.1.X

Managed Switch

FirstView®
16 Channel Encoder w/
Integrated DVR

DVI

DVD/CD WR

Client Work Station
Three 20" Monitors

Joystick

Diagnostic Software

### FirstView Encoder/Server/DVR

- Up to 16 Video Channels/Server  - Up to 6.5 TB of Storage
- Windows Operating System  - RAID 5 Redundancy
- 3rd Party Telemetry Software  - Scaleable from 1 to n[th] Server Cluster

Figure 6: Node Architecture

**Figure 7: Support Escalation Flow**

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## Camera Functionality

The primary purpose of the cameras will be to monitor traffic flow and provide intelligence on the status of a mass evacuation. The secondary purpose of any and all cameras will be to assist local jurisdictions in providing for the public safety by monitoring critical infrastructure.

## Camera Specifications

The proposed FirstView system is compatible with over 45 PTZ and Fixed cameras such as those manufactured by: Pelco, Bosch and Panasonic. For the CIMS project, we are providing Bosch's Autodome 300 series exterior dome and pedestal Mount P/T/Z IP cameras. Each camera will support a minimum of the following:

- P/T/Z functionality with .5% preset accuracy

- Auto-focus with 26X optical zoom

- Auto day (color)/night (B/W) switching

- .005 lux at 1/2 sec shutter (color), .0005 lux at 1.2 sec. shutter (B-W) with auto gain control

- Image Sensor of 768 horizontal X 494 Vertical (NTSC)

- Appropriate camera type (dome or pedestal mount) will be selected for each location

- Visors and smoked dome covers to mitigate glaring will be provided as needed.

- Privacy Blanking with up to 8 - four side polygons with sides of any length at specific zoom ratios

- Fully programmable from the Jurisdiction's headend

- Digital zoom (12X) is a functionally provided, by each camera during P/T/Z control

## IP Video Encoders

- The proposed Bosch IP camera systems are designed to accommodate standards based MJPEG or MPEG-4 video codecs at CIF/2CIF/4CIF resolutions at frame rates up to 30fps

- All proposed settings can be modified remotely, over a TCP/IP enabled network

- All cameras designed for Phase 2 will be added to a telemetry network that will provide pro-active notification/alarms if video encoders malfunction

- All IP video encoders will support RS485/422/232 communication protocols for P/T/Z control as well as HTTP access for programming and diagnostics

- All encoders will be fully interoperable with adjacent system components

## Camera Programming

- Proposed cameras will provide the functionality to return to a "home" preset position after a designated time

- Proposed cameras can be programmed to remain static

- Proposed cameras can be set up to run "tour mode"

## HeadEnd Nodes and Workstations

- The system will be fully integrated with the existing video headend systems. All cameras within the system will be viewable and operable from any location.

- All head-end equipment is designed not to exceed 70% of its video encoding capacity ([X - Y)]/100) * 100.

  > Where X = Total System Video Channels
  > Where Y = Used Video Channels

- Users of any dedicated workstation on the node will be able to view all cameras from all other nodes simultaneously.

## Network Video Recorder (NVR)

- During the operational phase of the installation, objective based (not time) training will be provided to each jurisdiction. This objective based training will include modules on video recording and archiving.

- All NVR drives will be configured with RAID 5 - disk storage fault tolerance and will appear logically as a single drive in the NVR.

- All NVR's have been proposed with no less than 4TB of raw storage capacity; however, NVR storage calculations (based on number of cameras, the encoded protocol, resolution and frame rate) are provided to ensure the amount of NVR time is disclosed.

- Watermarking of recorded video using time/date/camera ID is currently available. A more sophisticated watermarking feature will be available with the FirstView software milestone/release in August 2007.
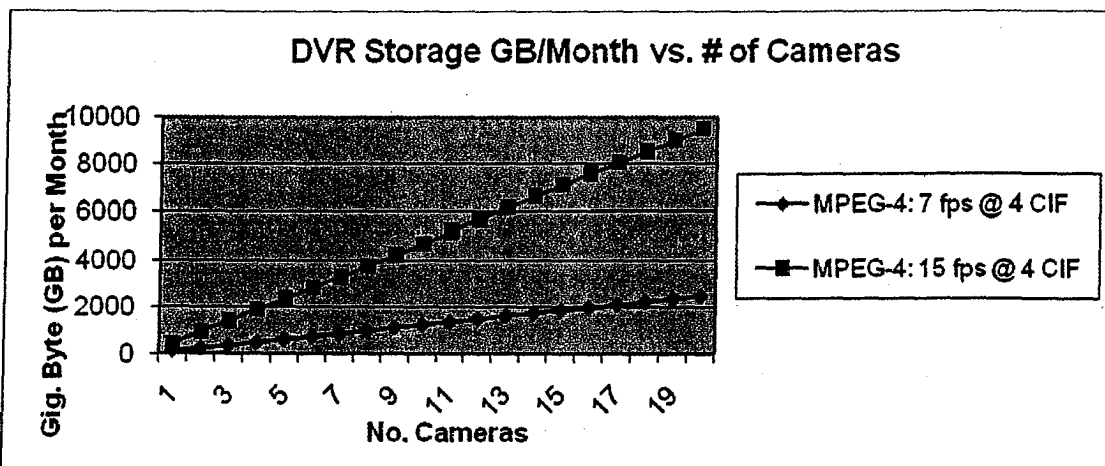


**DVR Storage GB/Month vs. # of Cameras**

Legend: —♦—MPEG-4: 7 fps @ 4 CIF, —■—MPEG-4: 15 fps @ 4 CIF. Y-axis: Gig. Byte (GB) per Month. X-axis: No. Cameras.

**Figure 8: Storage Calculations Snapshot**

## Workstations

- All camera functions such as P/T/Z control and presets can be controlled by the system workstation(s).

- Workstation(s) are enabled to search previously recorded video.

- All operator screens on the proposed FirstView system are Graphical User (point & click).

- A 3rd party SNMP telemetry/monitoring system will be loaded and networked to each operator station.

- This SNMP program will have local area maps overlaid with cameras coordinates and will display their respective status.

- All active network elements such as camera encoders, switches, wireless radios, FirstView Servers, and PIX firewalls will be enabled on the SNMP telemetry system. Additionally notifications can be configured to be sent (via email and/or text message) to local administrators in the event a device goes into alarm.

- Each Operator Workstation will be proposed with a FirstView PC Joystick

- Video archive recording will record, at the pre-programmed protocol, frame-rate and resolution.

- The proposed FirstView system provides a single touch "still image capture". This image is saved as a file and can be printed and emailed using standard Microsoft Windows Programs and Commands.

- The proposed FirstView system provides Operators the ability to "cycle/bookend" a live recording and export the file using standard Microsoft Windows Programs and Commands.

- All files can be archived on portable or removable storage devices such as CD/DVD and Zip Drives.

- The ability to "hide/blank" device from certain users or provide user log files that indicate which operators are/were on the system and the commands they invoked (new feature development to be provided free of charge prior to contract completion).

- FirstView systems are networked using Microsoft Windows servers and can be updated remotely.

- All camera functions (i.e. presets) can be programmed.

- User profiles can be set to allow or prohibit users from modifying camera presets.

- Remote users to a node will be programmed with low privileges so they do not compromise local user's ability to access and/or use the system.

- During the system planning stage, a Smiths Detection Project Manager will work with local node administrators to establish user(s) of the system and their respective rights.

- Workstations will be configured with three (3) 20" digital LCD displays along with a minimum of a 40" plasma or LCD screen.

## Telemetry/Monitoring System

The telemetry/monitoring system is configured in a manner to show potential network problems before end-users suffer downtime or degraded performance. Simple Network Monitoring Protocol (SNMP) probes discover and query active network elements such as: FirstView DVR servers, data switch ports, field encoders, router ports, and UPS devices. The software then analyses the responses from each probe and presents the data to the system administrator.

Active maps give a visual, real-time view of traffic flows through and between network elements and links. *Status windows, strip charts, and device lists provide easy access to critical network data such as: IP traffic statistics (MRTG), errors, utilization, % CPU utilization, CPU Temperature, FirstView database layer components, packet loss, link latency and outage information.* This easy to read interface greatly simplifies the day to day system management into a single easy to use application.
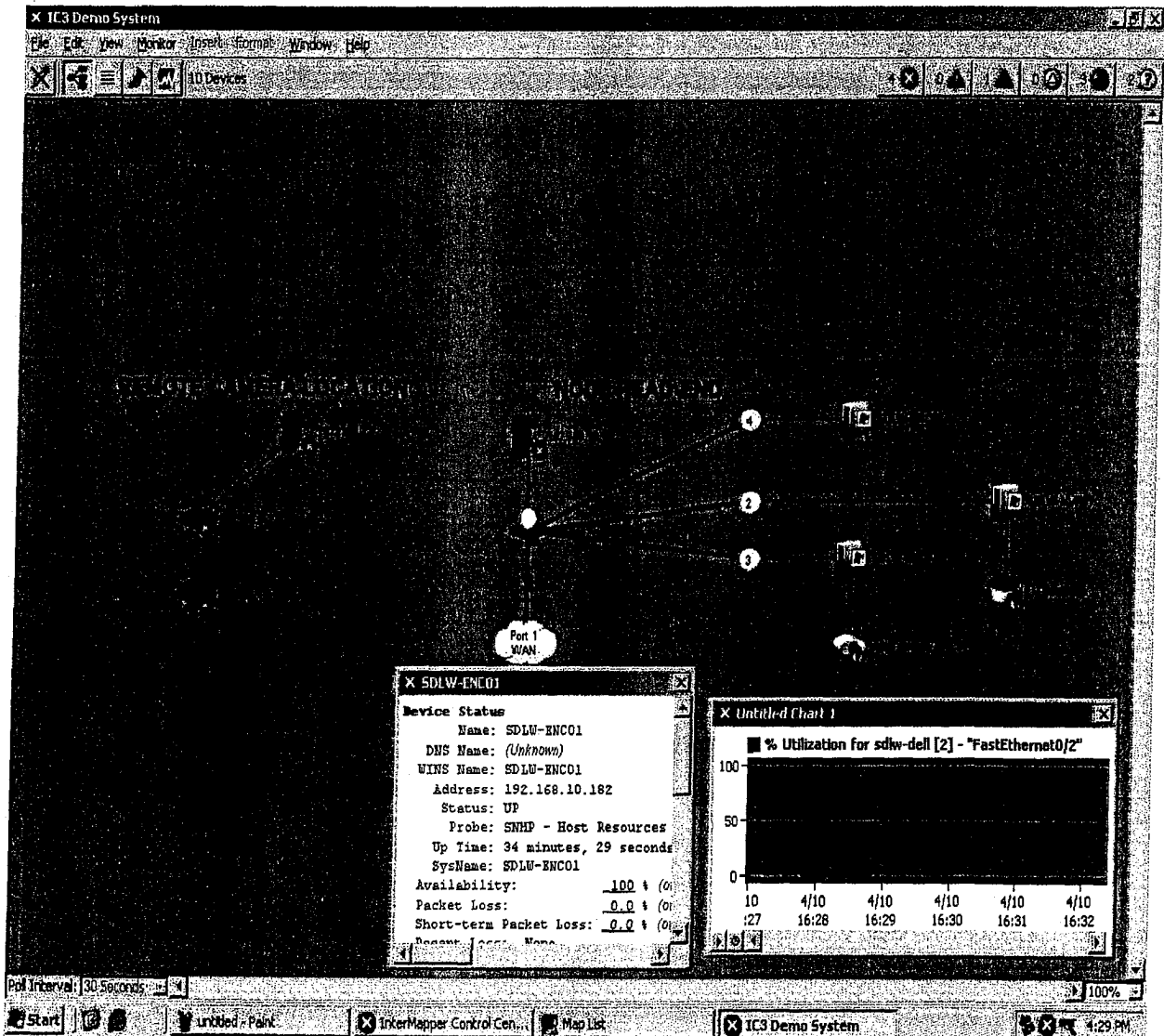


Figure 9: Telemetry/Monitoring Snapshot

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## FirstView Software

### Flexibility

Smiths Detection retains an entire software team, to include research and development (R&D), on its staff in Middletown, Rhode Island. FirstView is not sub-contracted externally or overseas which can increase the time between new software releases. In fact, a software team within Smiths Detection works on project release milestones to ensure that the customer's needs and desires are met on a regular basis. This project focused software team is unique to a company with the size and global reach of Smiths Detection.
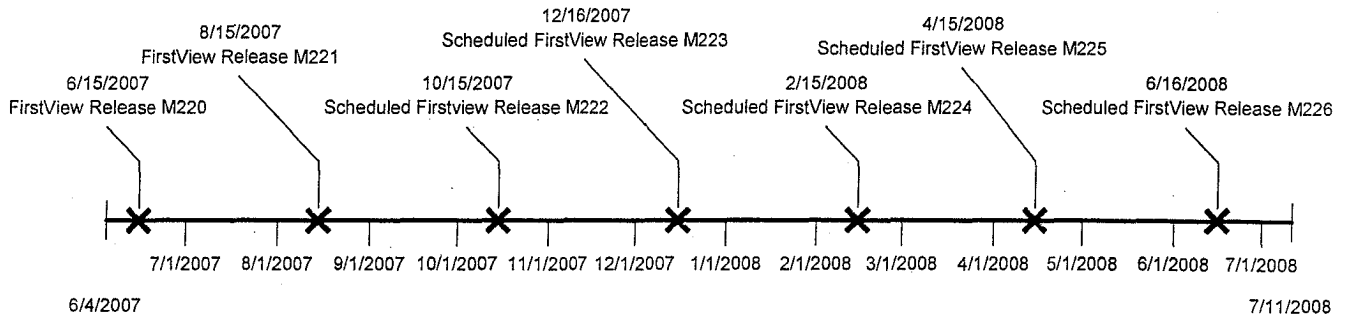


### Milestone Release Feature Descriptions

Milestone 220 (M220) June 15, 2007 -
- Advanced auditing features
- Axis MPEG4 codec integration
- Improved alarm management (internal diagnostics, external access control)
- Archiving improvements

Milestone 221 (M221) August 15, 2007 –
- Improved video watermarking
- Video camera signal loss notification in the Mapping Interface

Future Milestone features will be released shortly.

The FirstView system is a Java J2EE web application. The system is deployed on a set of networked windows enterprise grade servers. The client application requirements are limited to a Java enabled browser. The software is developed using a standard java tool set. Certain advanced video encoding functionality and integration to third party product requires development in Microsoft C++ and C# .NET this is interfaced to Java thorough JNI into Java. The current release version of the software is Milestone 219.

Due to the fact that all features are provided by HTTP to a web browser, all features are available for third party integration. FirstView has an SDK which allows accelerated integration of FirstView into third party applications. The SDK covers the core feature set and additional SDK APIs can be provided on a custom engineering basis.

All access to FirstView is provided thorough secure login. Access can be restricted to the use of HTTPS and via the use of SSL certificates restricted to particular encryption algorithms to provide the highest level of data security currently commercially available, including the DHS and DoD mandated AES encryption algorithm. FirstView has the ability to set user assigned access to specific functions within the system. Advanced auditing capability is planned to be provided in the next release of the software and will be provided free of charge to existing customers.

**User Interface**
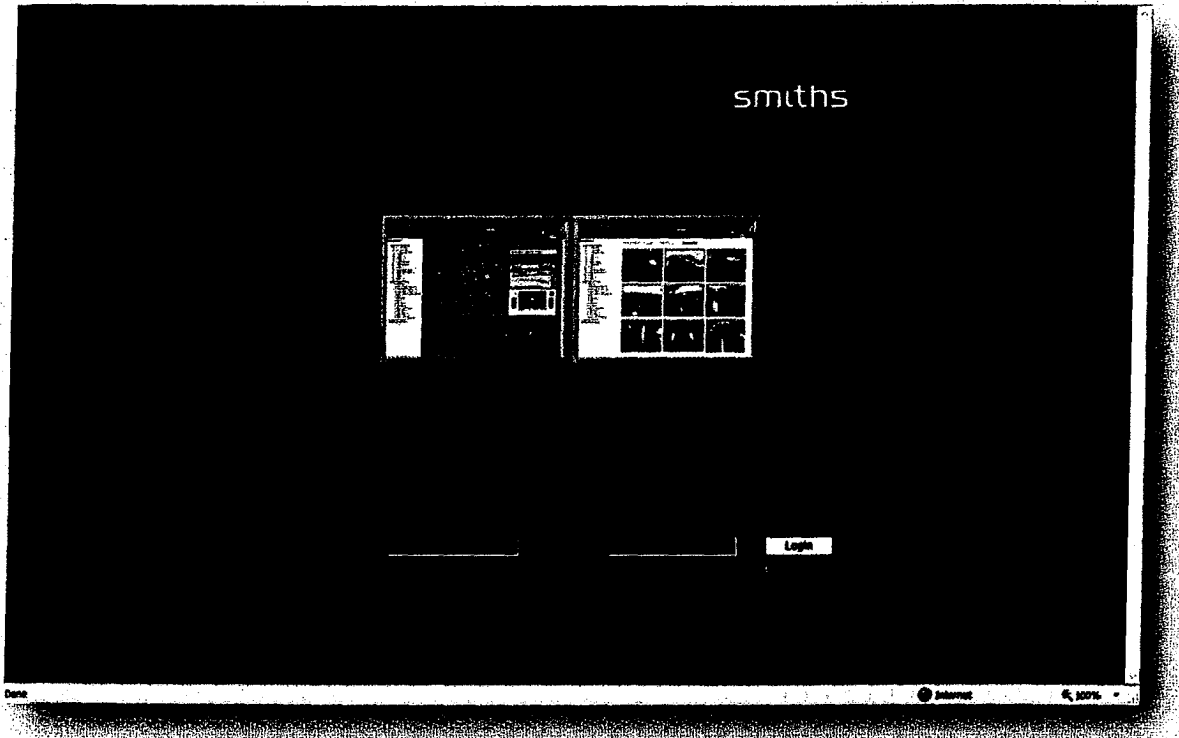


**Figure 10: User Log-In Screen**
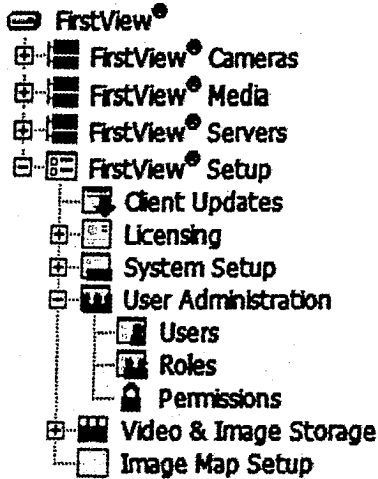
**Figure 11: User Administration Drop Down Menu**

Upon successful logon, the server will display a web page showing the FirstView interface's Welcome Screen. On the left hand side will be the FirstView Menu showing the video servers, digital video recorders (NVRs/DVRs), and cameras. The menu and graphics might look slightly different from what is pictured below as customers have different hardware devices, naming conventions, and features installed on their servers. This does not affect FirstView's operation.
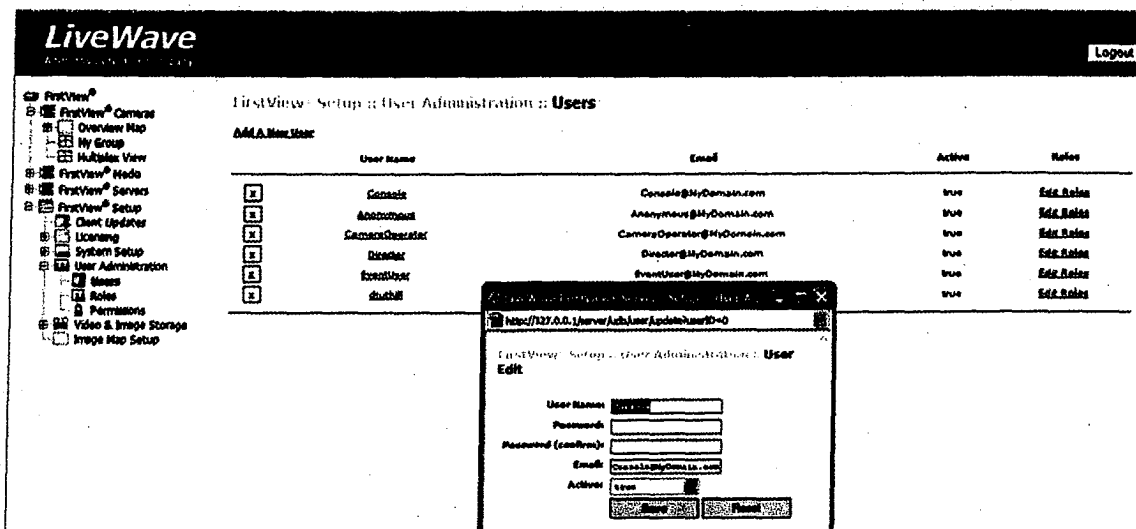
**Figure 12: Adding a User**

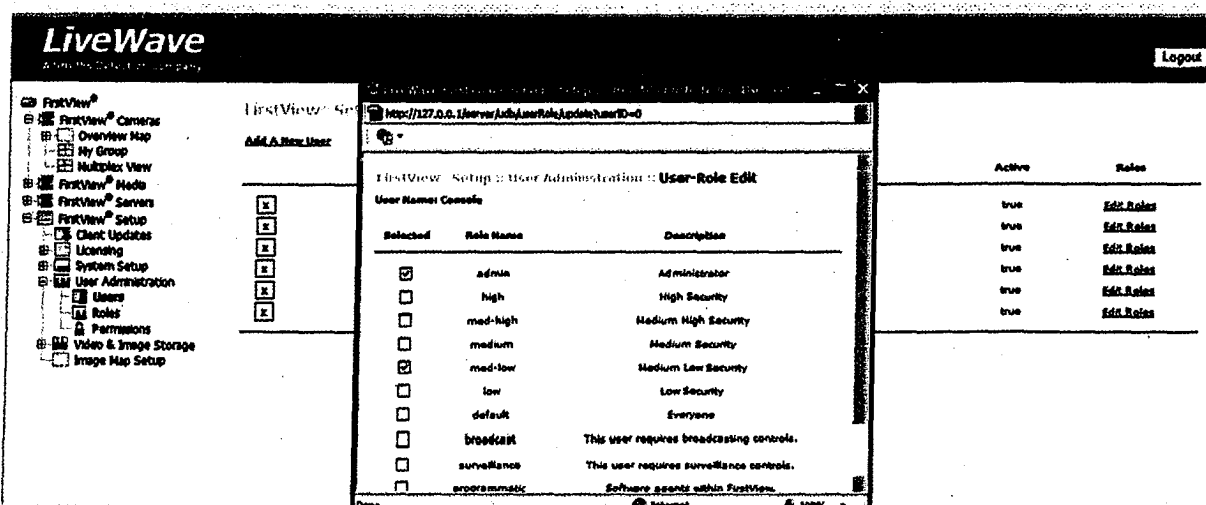Figure 12 above shows how easy it is to add a user to the system.



**Figure 13: User Role Edit Menu**

Roles for each user can be determined and designated quickly and easily. The pop-up window above shows each level that can be selected for a user.
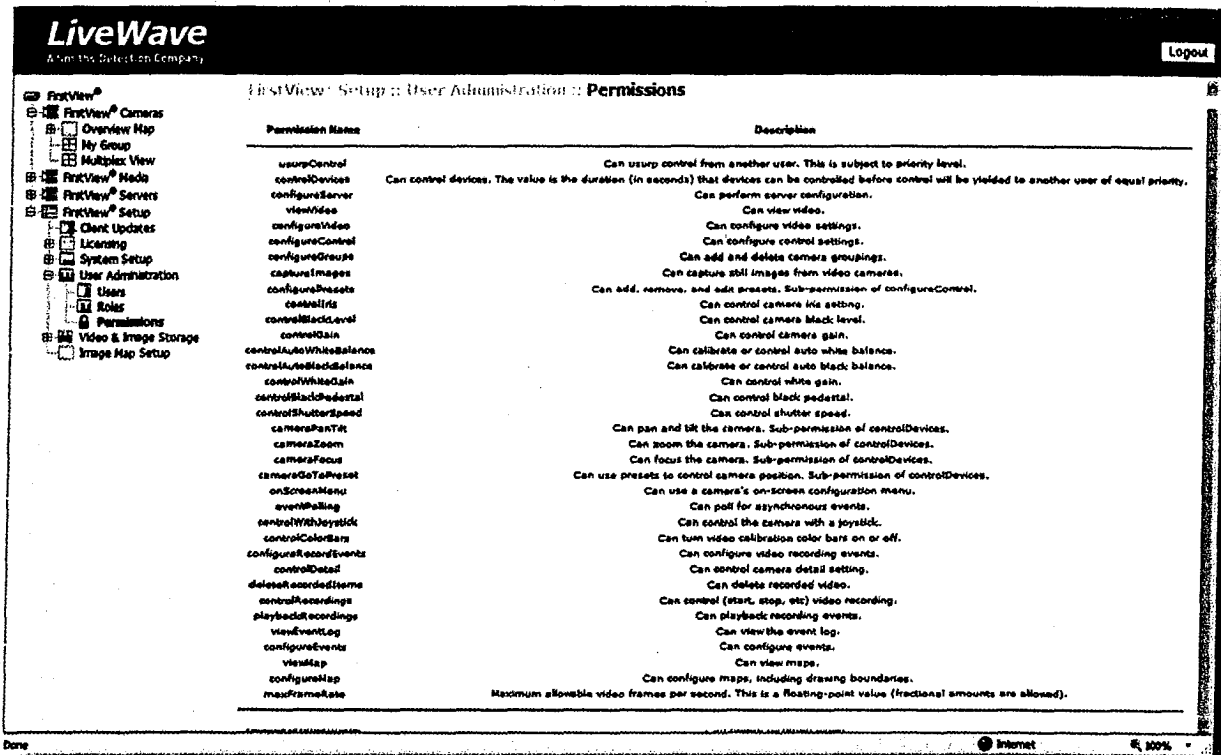
**Figure 14: User Permissions Definition Page**

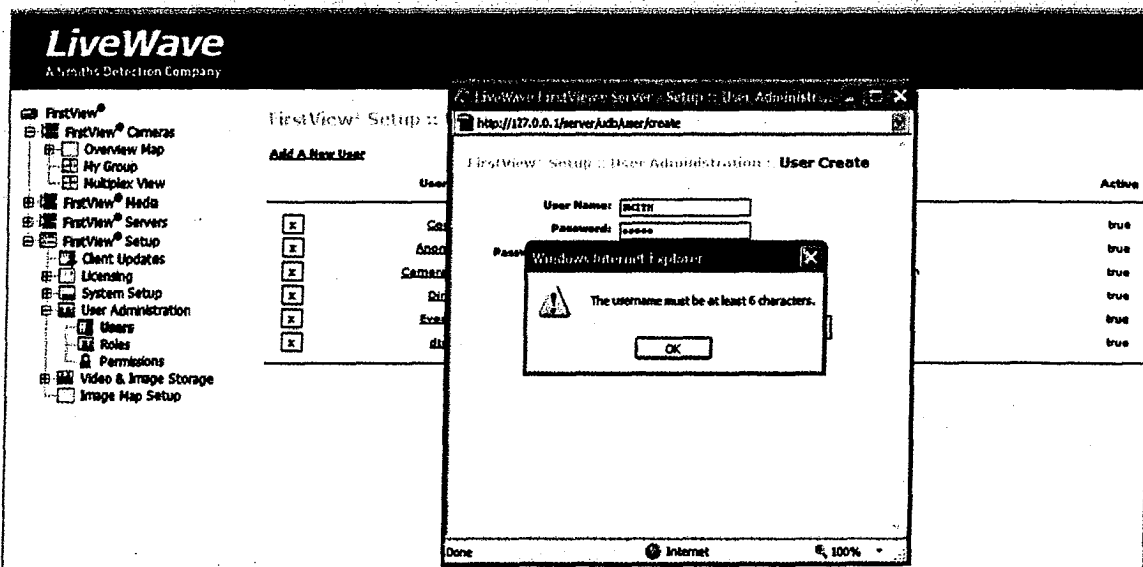Figure 14 defines the user permissions associated with the roles.
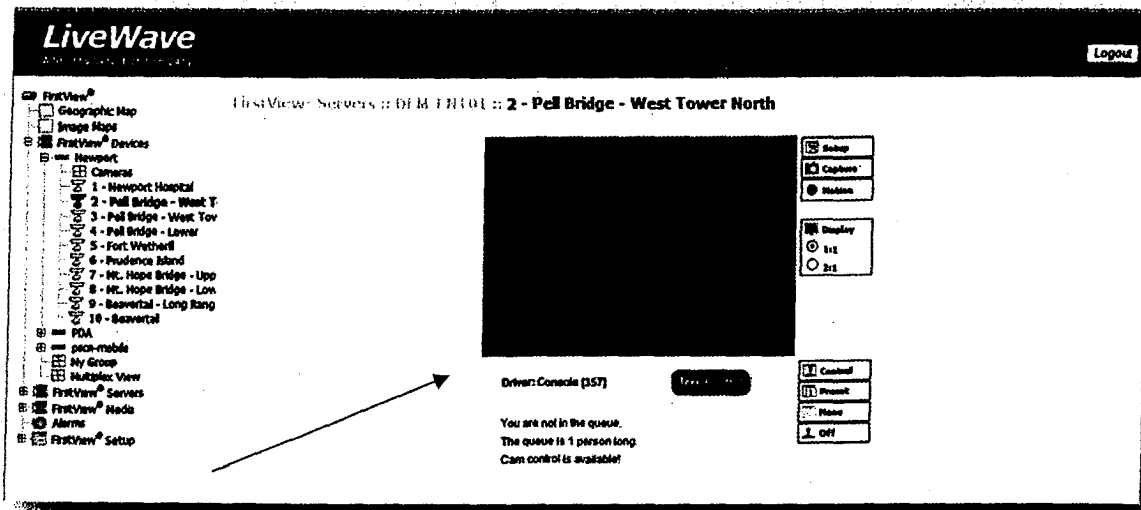


**Figure 15: Username and Password Creation**

**Figure 16: User Queue**

Figure 16 shows the default PTZ user queue and information. The arrow is pointing to the name and unique ID of the user that is in the line or "queue" and the user with current control. The green take control button would register the new user in the queue or, with permissions, usurp control from the current user.
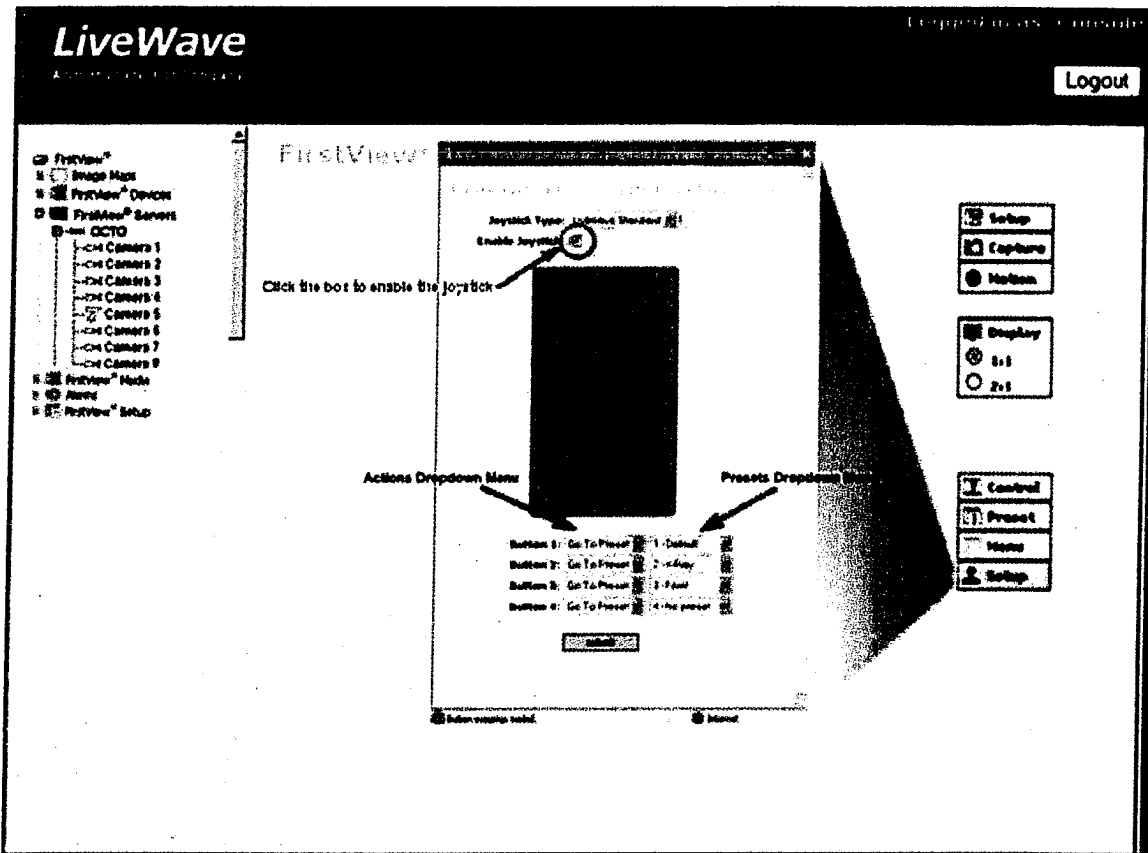
**Figure 17: FirstView Joystick (Separate Hardware) On Screen Menu**

This menu shows the user how to and allows them, through the use of drop down boxes, to select commands for the joystick buttons.
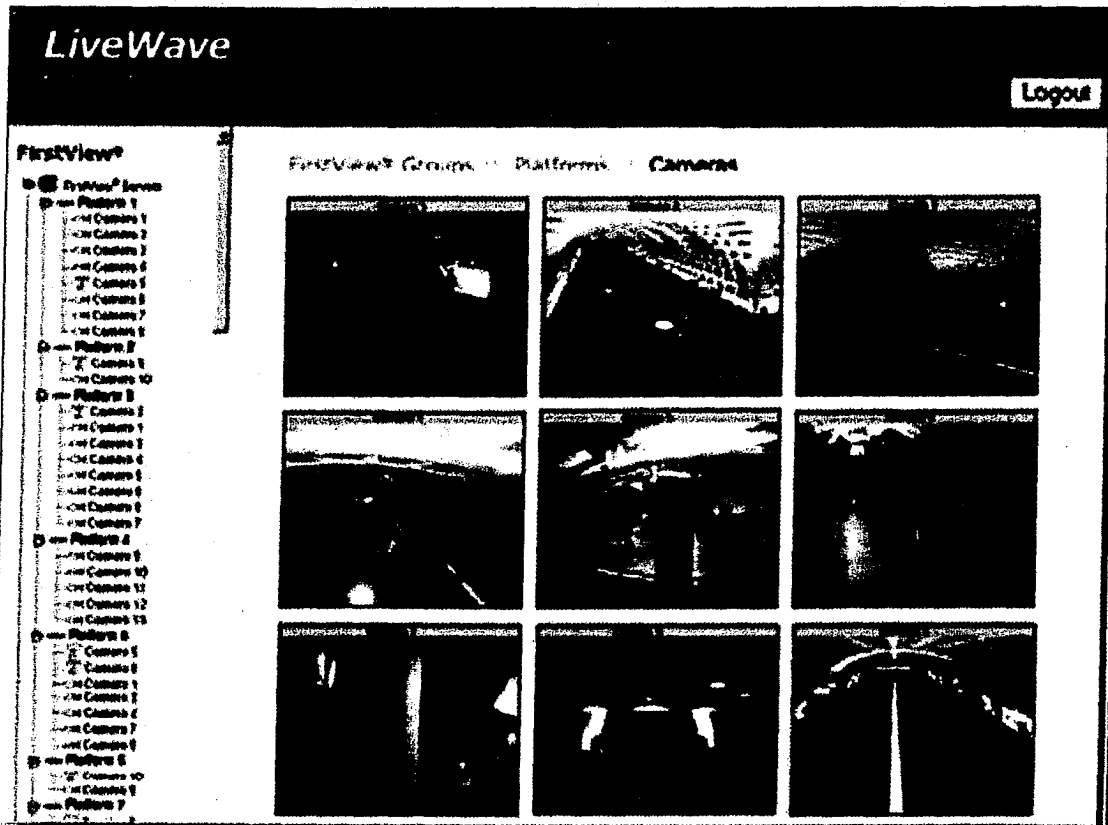
**Figure 18: "Heads-up" My Group Camera Control**

Heads-up camera control: To control a single camera, move the mouse over the video. Press C to take control and use the mouse to move the camera. When finished with the camera, press R to release control. Press Z while clicking the mouse to zoom the camera; and similarly, F to change focus. Selecting this menu item allows the user to create a custom camera group. Simply drag a camera icon from the FirstView menu onto the screen. The browser will refresh with the video of the chosen camera. As you add additional camera feeds, video windows will shrink to accommodate the new feeds. To delete a camera from your group, click on X on the title bar.
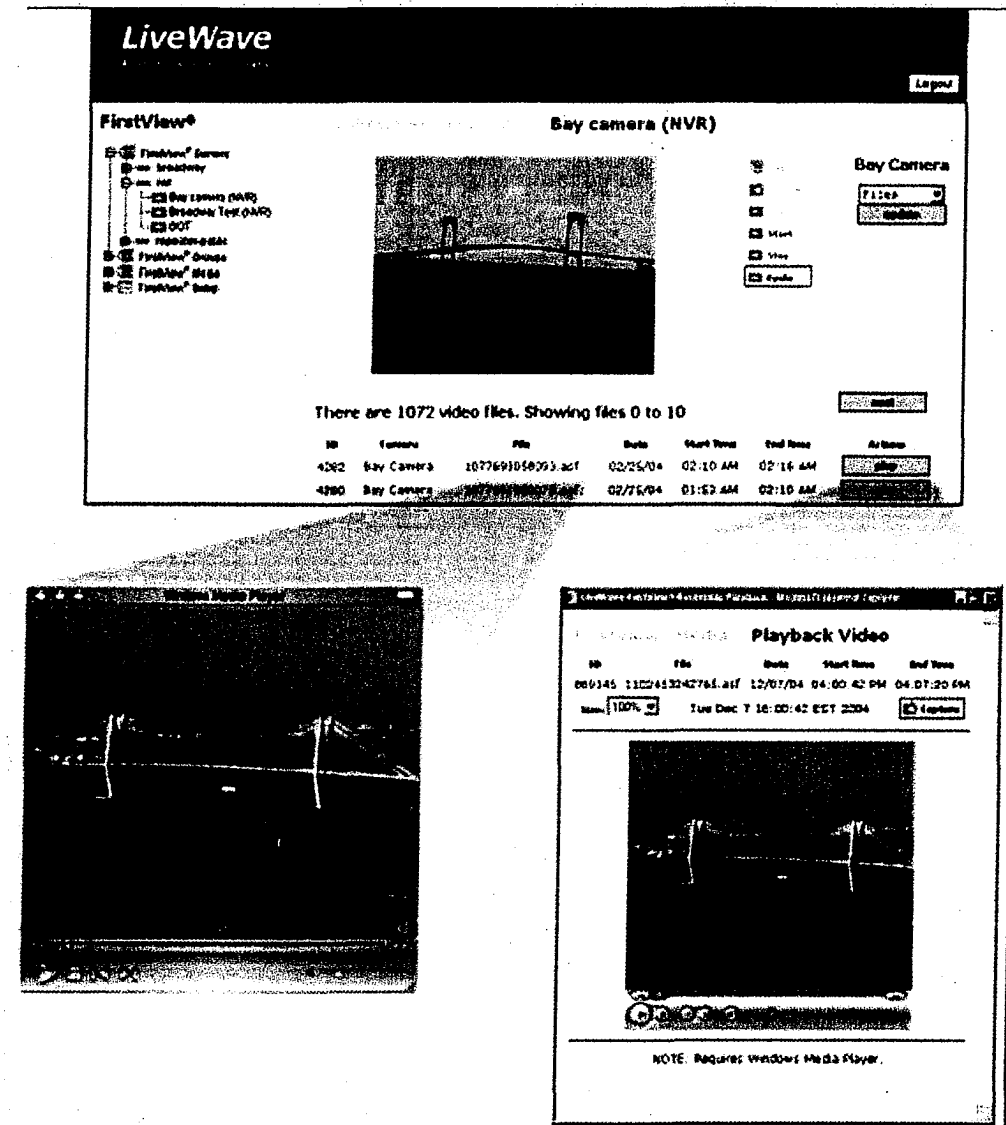
**Figure 19: NVR File Management**

All network video files are searchable using several different parameters:
**Type:** View video by individual files or by event tags
**Camera:** View all cameras at once or select a specific camera
Time Range: Select from several dropdown parameters and manual time insertion. To the right of the time text boxes is a small icon that the user can click to bring up a calendar. Click again to make it disappear.

All recorded video feeds, in FirstView, are easily identified and associated by camera. The recorded files are automatically named using a time/date/camera ID stamp format so an archive file can easily be located. Lastly, FirstView utilizes Microsoft Media player to play back archived video files. Media Play has a built in FF/REW feature. See Figure 18 below.

Figure 20: NVR File Search View
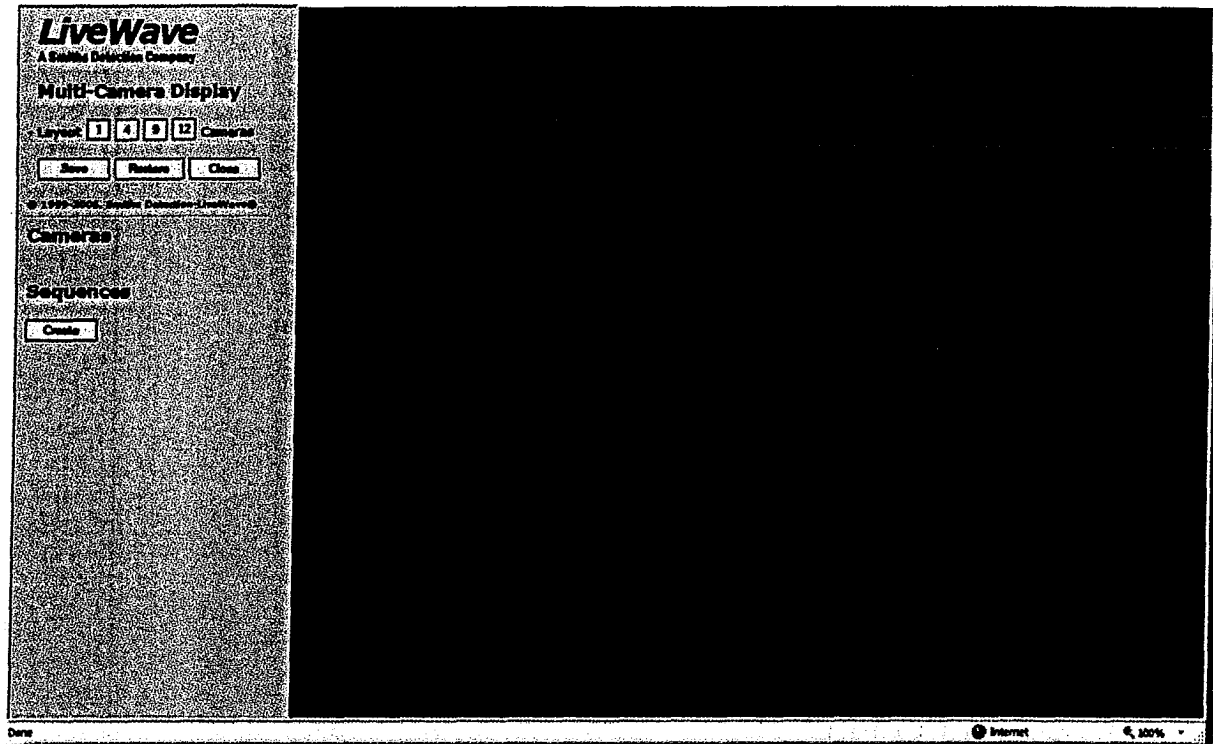
**Figure 21: Auto-hide window**

The FirstView Multiplex View allows the user to create a custom view. Figure 22 below shows the Multiplex View with the auto-hide window shown. Figures 23/24/25 show the same view with the auto-hide window closed.
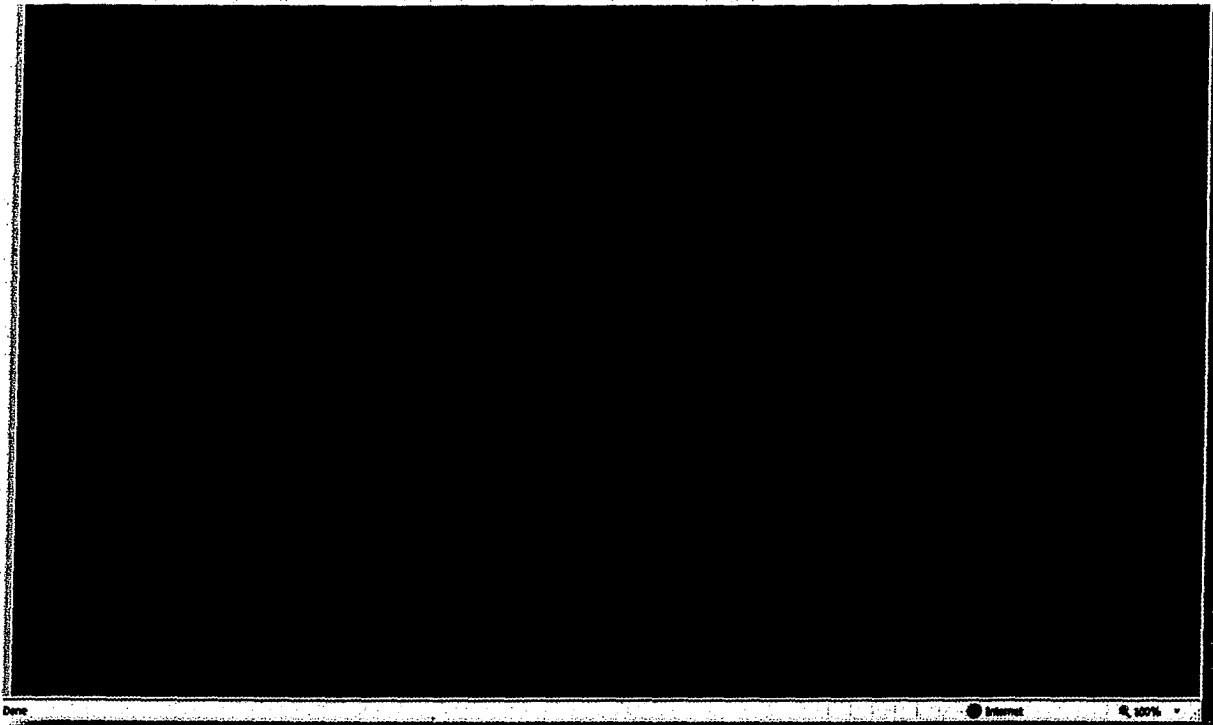
**Figure 22: Auto-hide window closed**

A screen shot of the MUX view with no grids or the user menu showing.
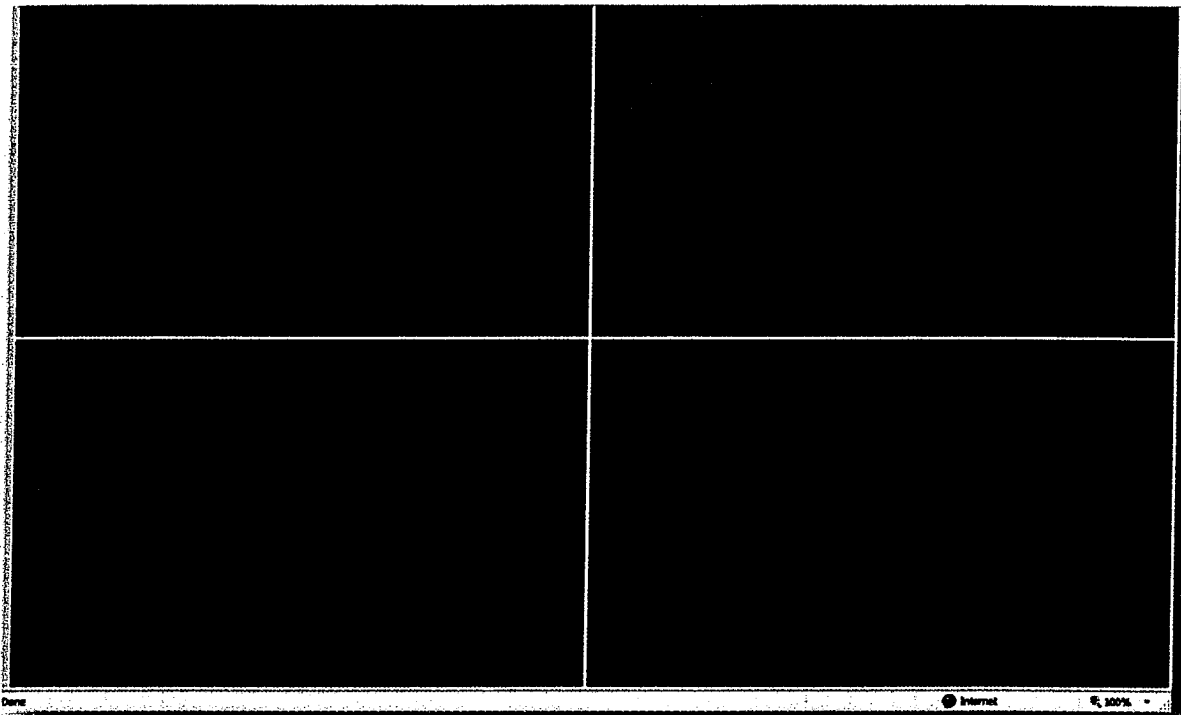
**Figure 23: Quad View**
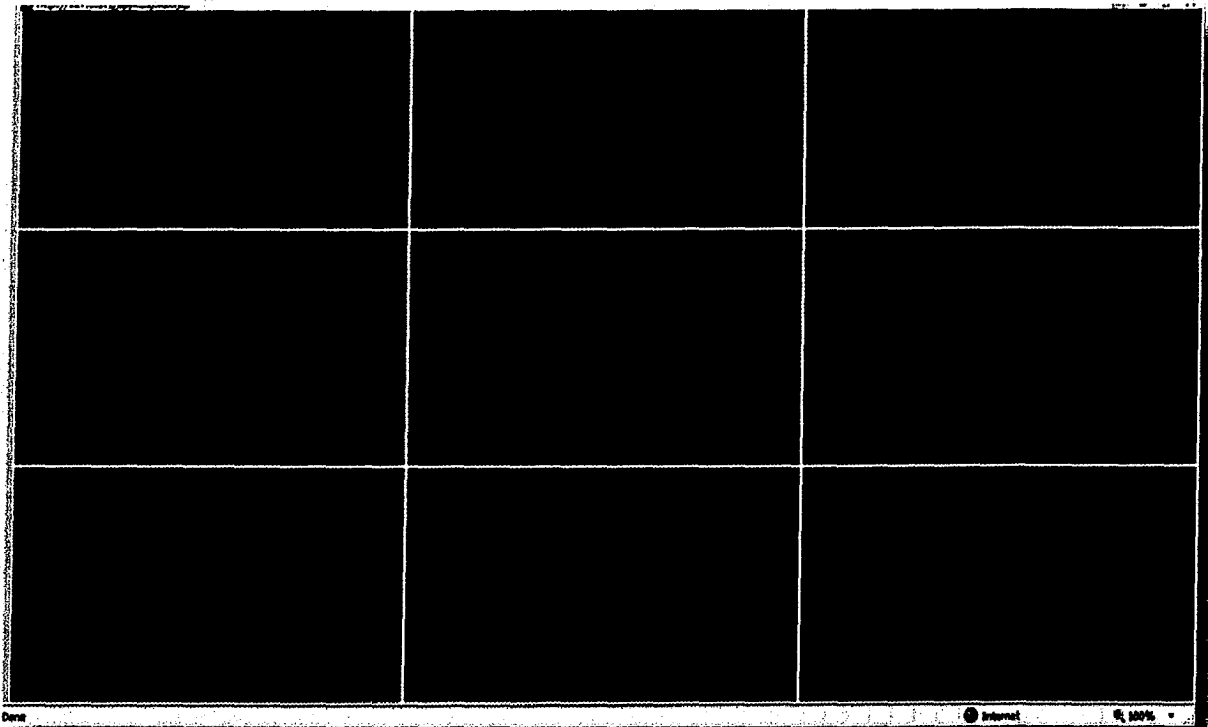
**Figure 24: 9 Panel View**
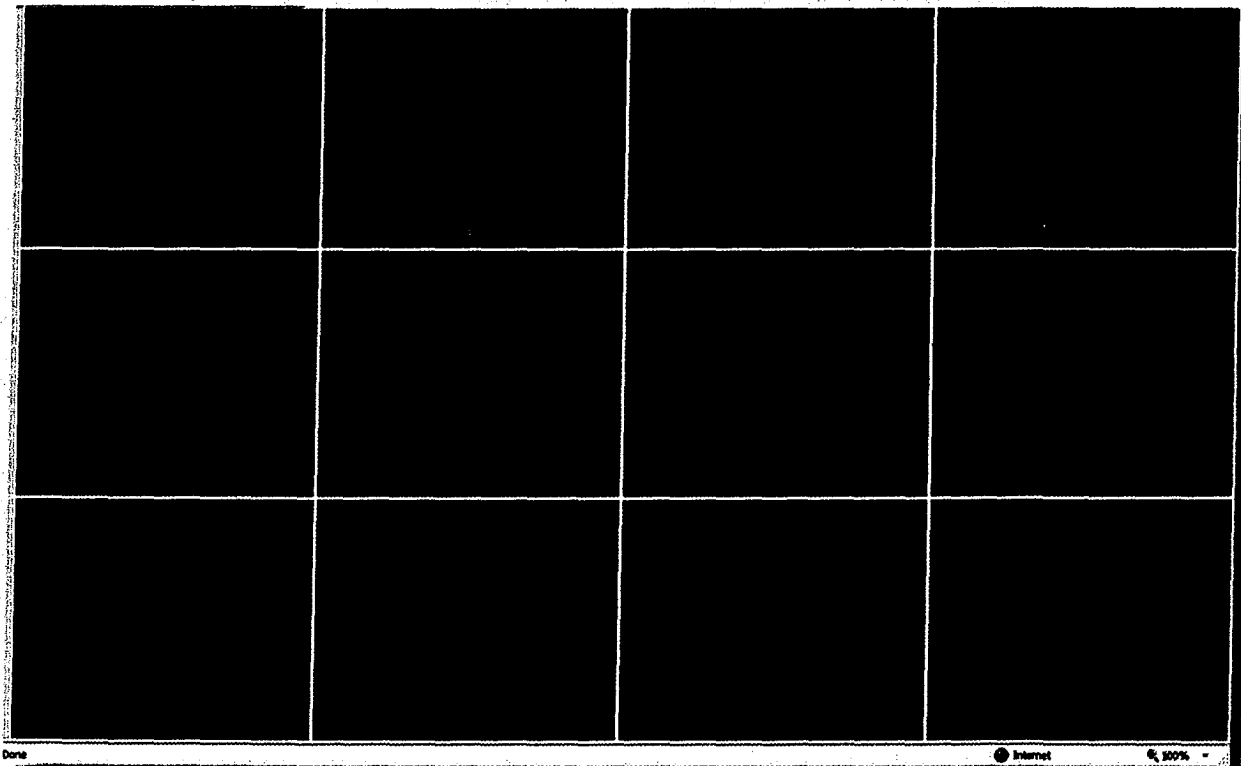


**Figure 25:  12 Panel View**
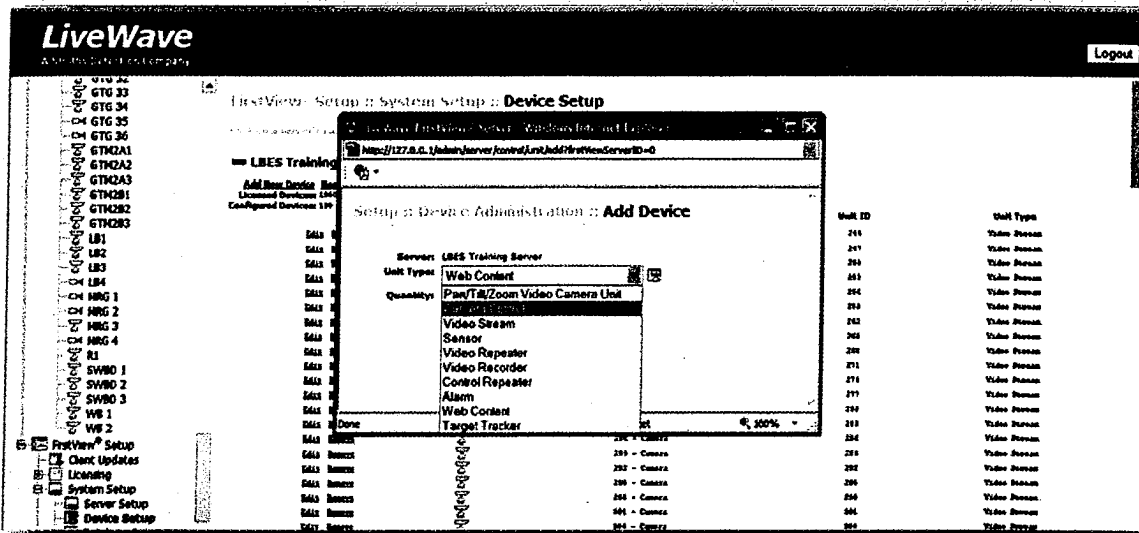
Figure 26: User Selected Sensor Icons
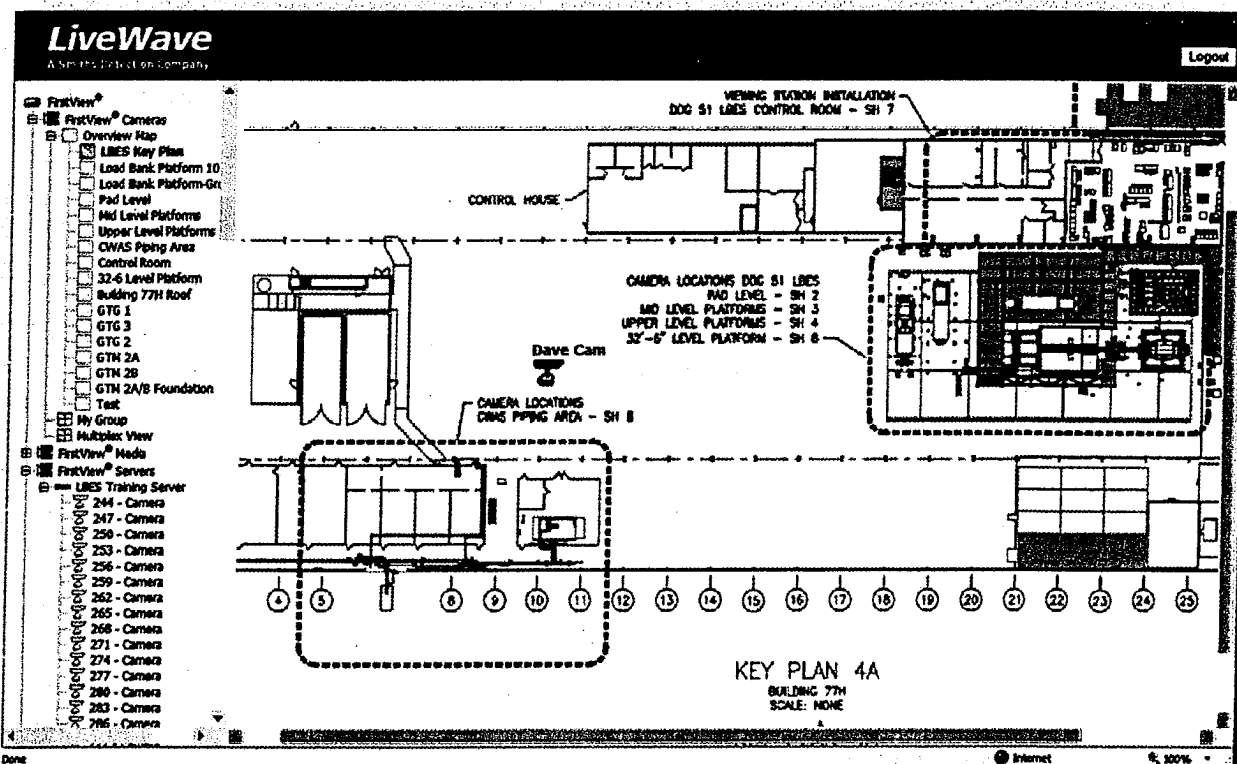


Figure 27: Maps and Tree Hierarchy
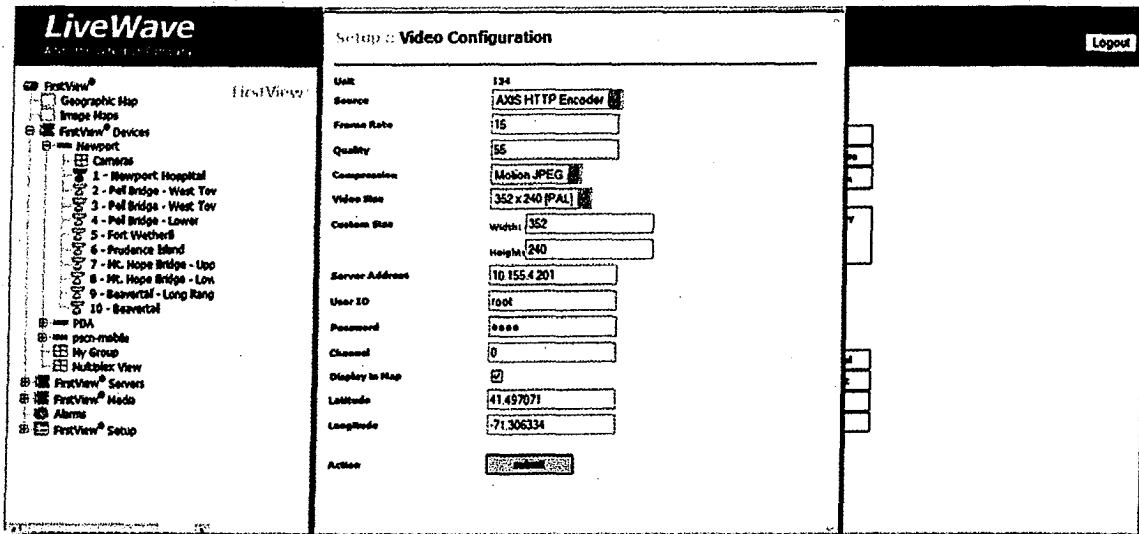
**Figure 28: User Selectable Camera Features**



**Figure 29: Photo Capture**

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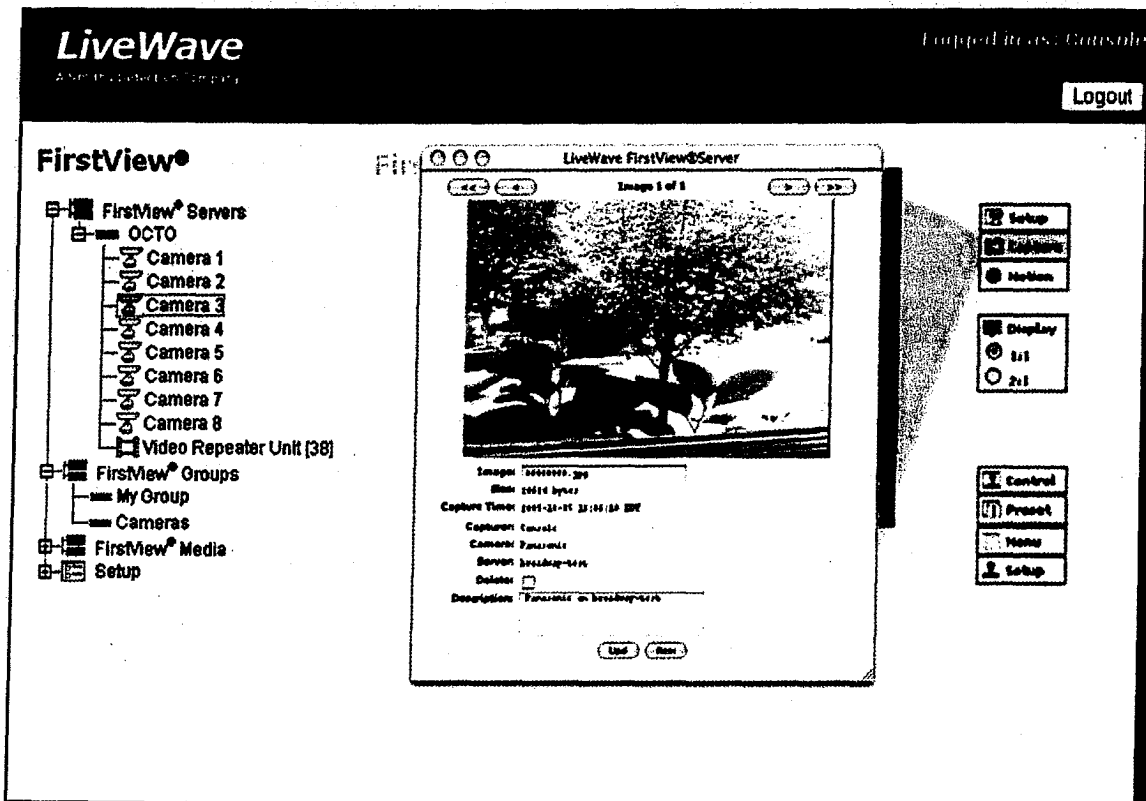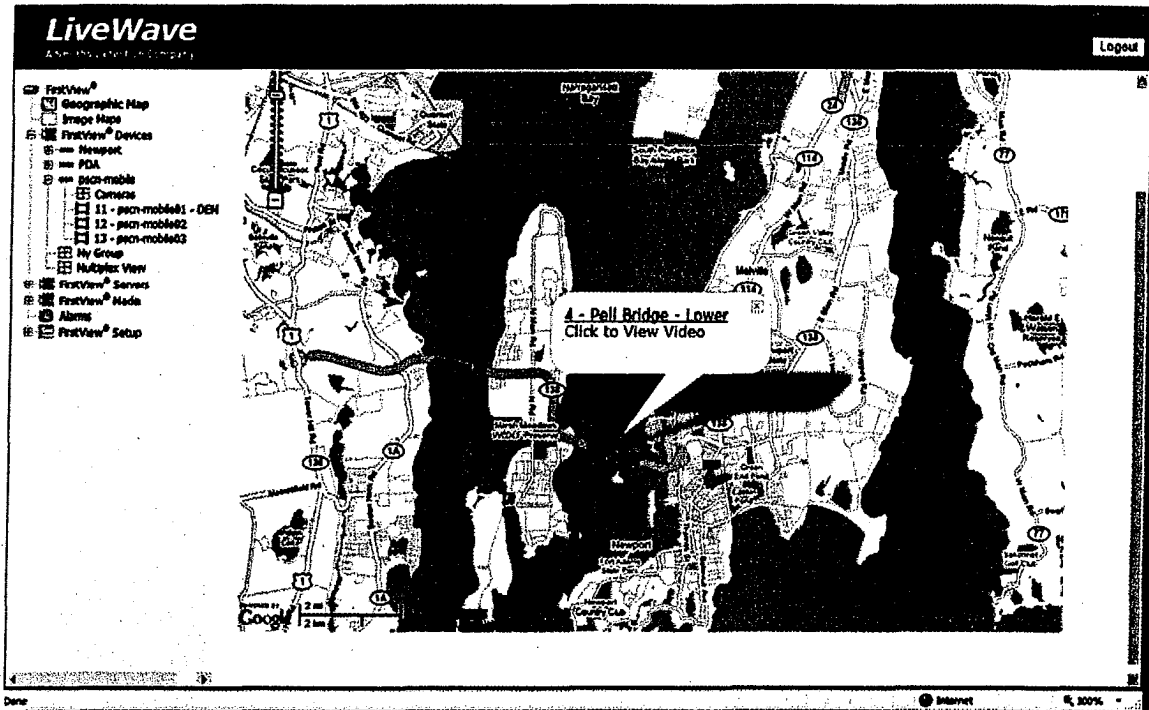
**Figure 30: Hierarchical Map View with Balloon Description**

The left arrow shows the reduction of screen clutter through the use of a collapsible/expandable tree menu. The user has the option of seeing every device or node in the tree menu or collapsing them to show the highest level understood by the user. The arrow on the map shows a camera in its natural state. Clutter the device description is reduced until selected, as shown in the bubble.

**Figure 31: Single View**

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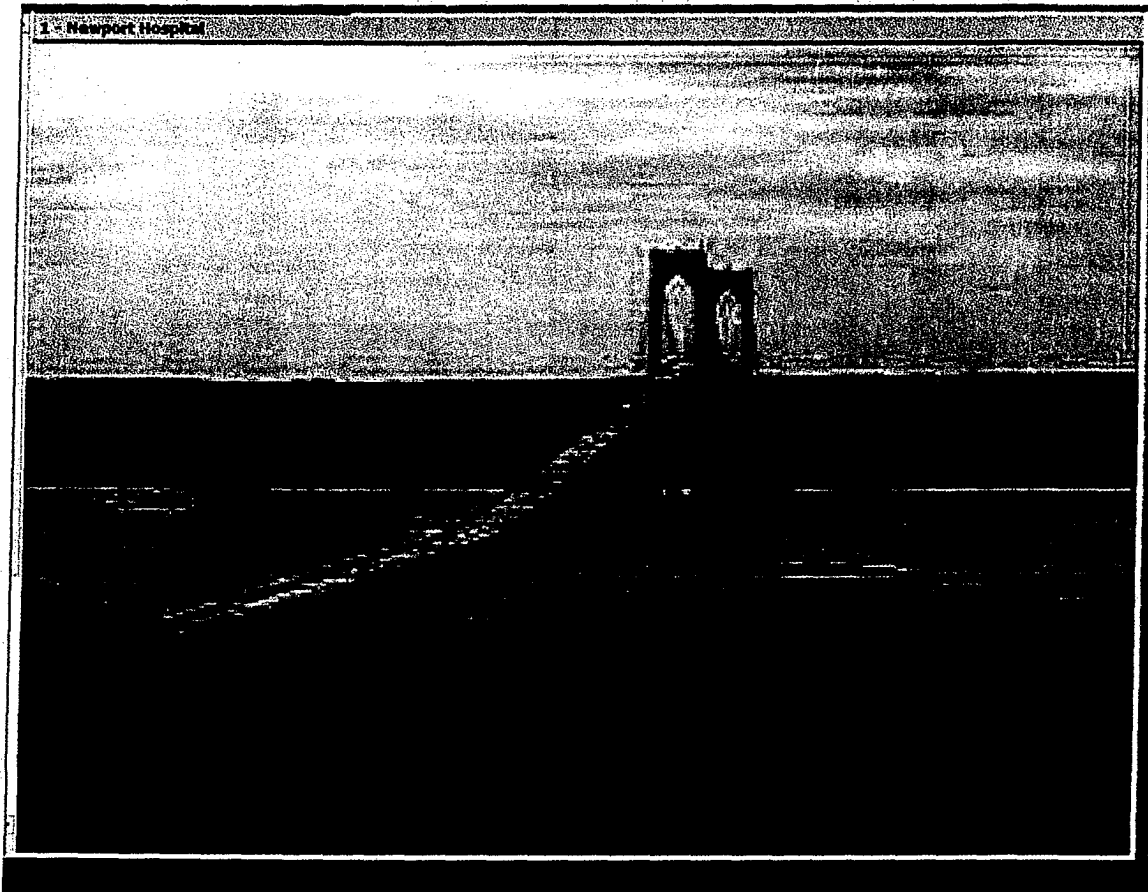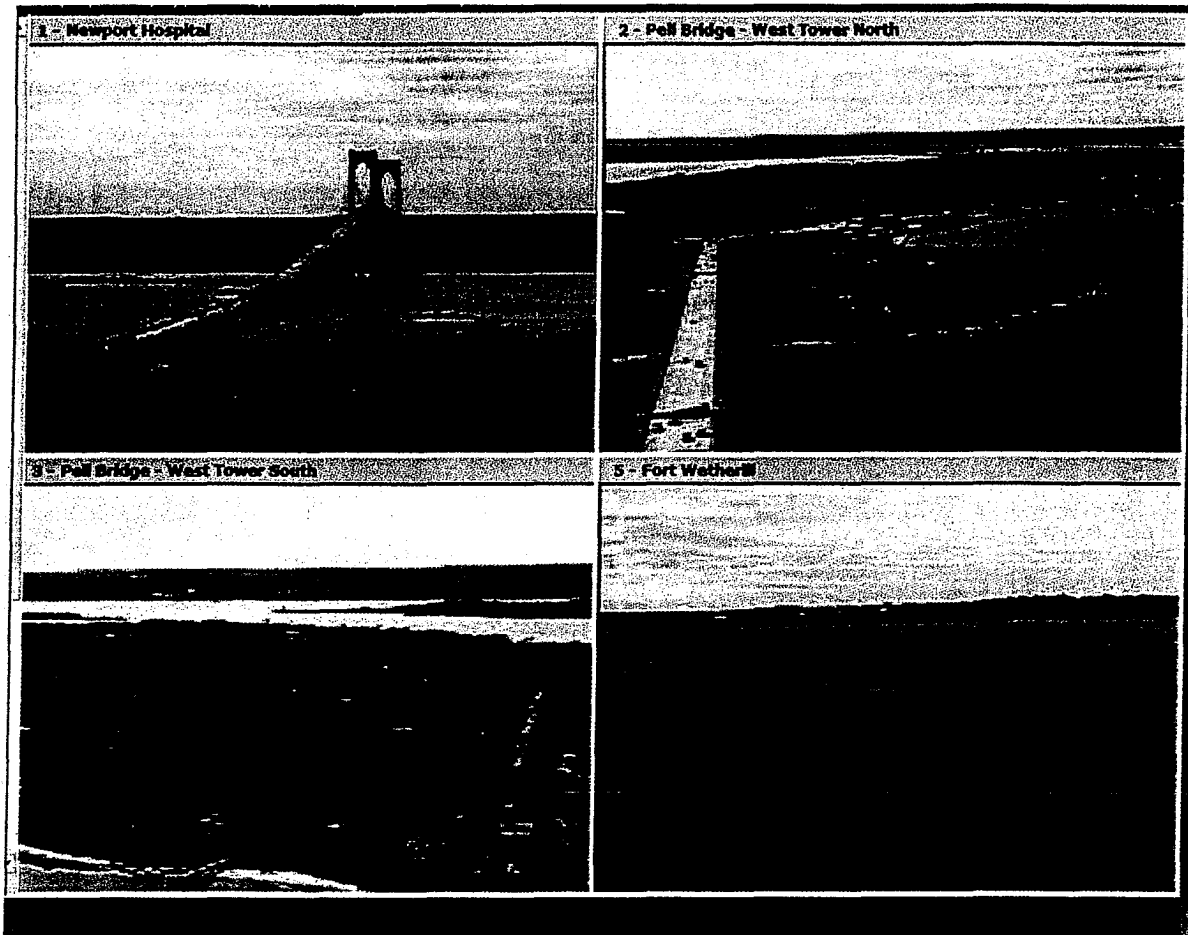
**Figure 32: Sample Multi-View**
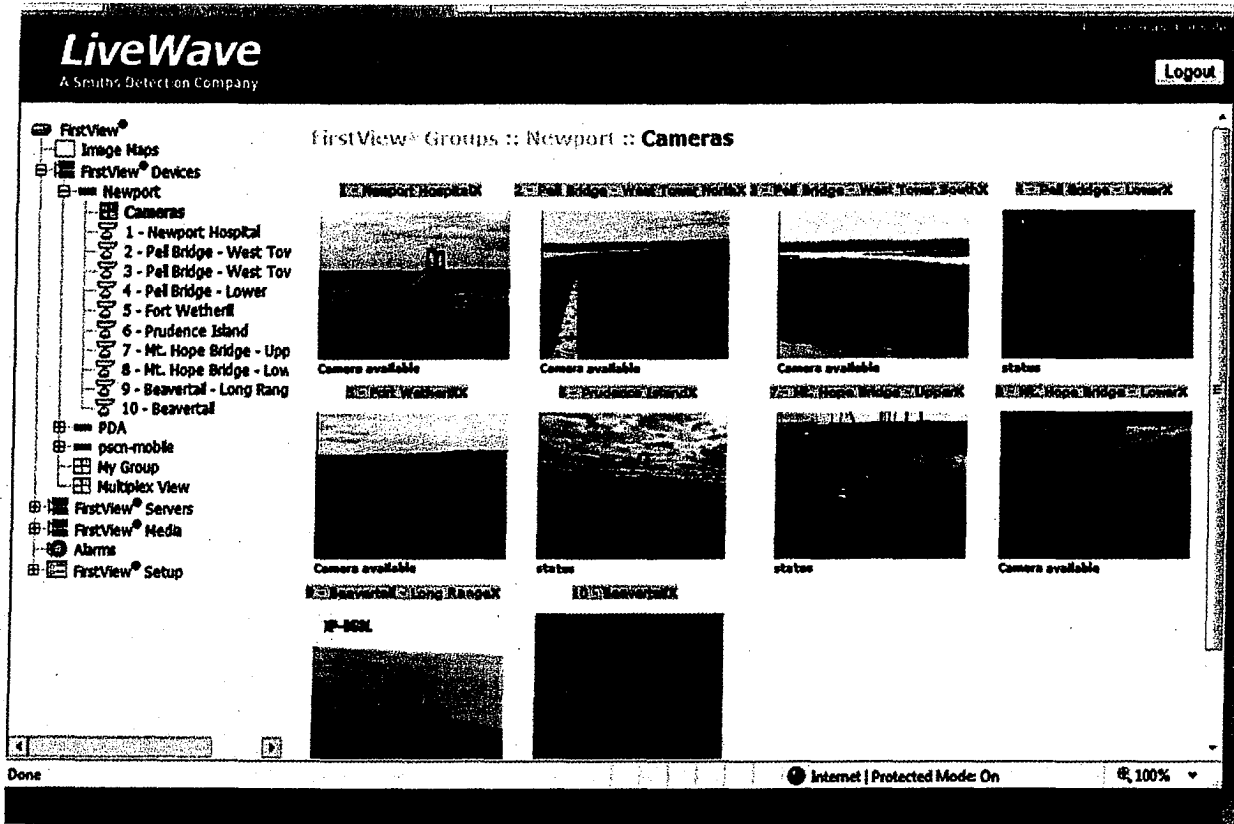
Figure 33: Select View of a System with All Views Displayed

**The Network**
Our proposal for the Phase 2 system will incorporate the most resilient and advanced wireless devices available today with an innovative frequency strategy coupled with the strategic use of existing wired infrastructure. This approach will provide the City with the most reliable, expandable and usable network possible.

Phase 2 of CIMS will include, as requested, the addition of 5 MBHSR cities and 65 cameras to the existing Phase 1 system. Options for its expansion and enhancement include:

*Option 1:*
Priority Group 2
34 Cameras

*Option 2:*
Priority Group 3
36 Cameras

*Option 3:*
Boston 30
30 Cameras

*Option 5:*
WLAN Upgrade

**BASE**
*Core Backbone System*
At the center of the current CIMS network is a collection of licensed wireless Ethernet links connecting through switches and routers. These devices form the "Core" of the system that provides carrier-class connectivity and interoperability between the Partner PDs (PPD) and to the Federal Protective Service (FPS).

The "Core Backbone" connects each PPD through a group of carefully selected buildings in each city [*Figure 34*] these buildings, generally chosen for their height and right of access, make up the Core Backbone – each one a Node.

By designing the Core Nodes with multiple paths "in and out," we provide an extra level of reliability. Failure of a single wireless link will trigger the system to "switch-over" to the redundant wireless link. Failure of an entire Node will isolate that Node from the Core Backbone, but the Core Backbone will continue to provide service and connectivity the remaining PPDs.
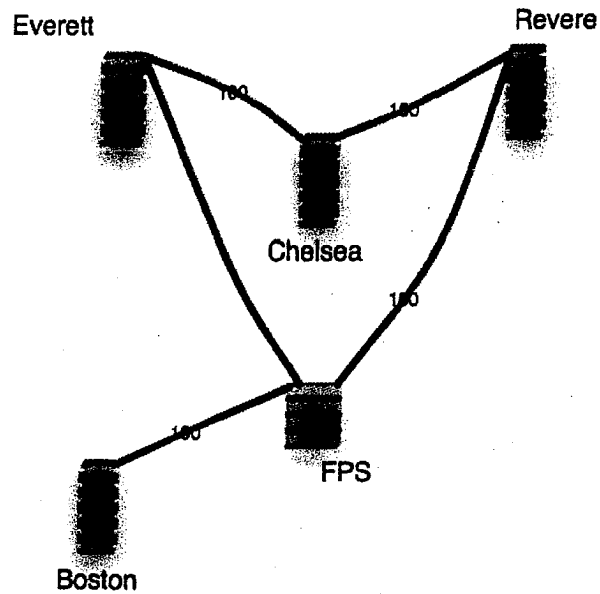
**Figure 34: The Current Core backbone network**

*Core Expansion*
Our approach for the network topology for Phase 2 will be consistent with that of Phase 1, with a few slight variations.

The Smiths Detection Team (the "Team") will expand the Backbone Core to include the 5 PPDs on the RFP – Brookline, Somerville, Cambridge, Winthrop, and Quincy. These PPDs will be connected using licensed wireless links [*Figure 35*]. While proper surveys will be needed to complete a design, our initial proposal includes wireless connections for each PPD. The Team will investigate the use of existing fiber to connect not only PPDs to the Core, but for any network connection in general. Any existing fiber assets will be utilized where possible.
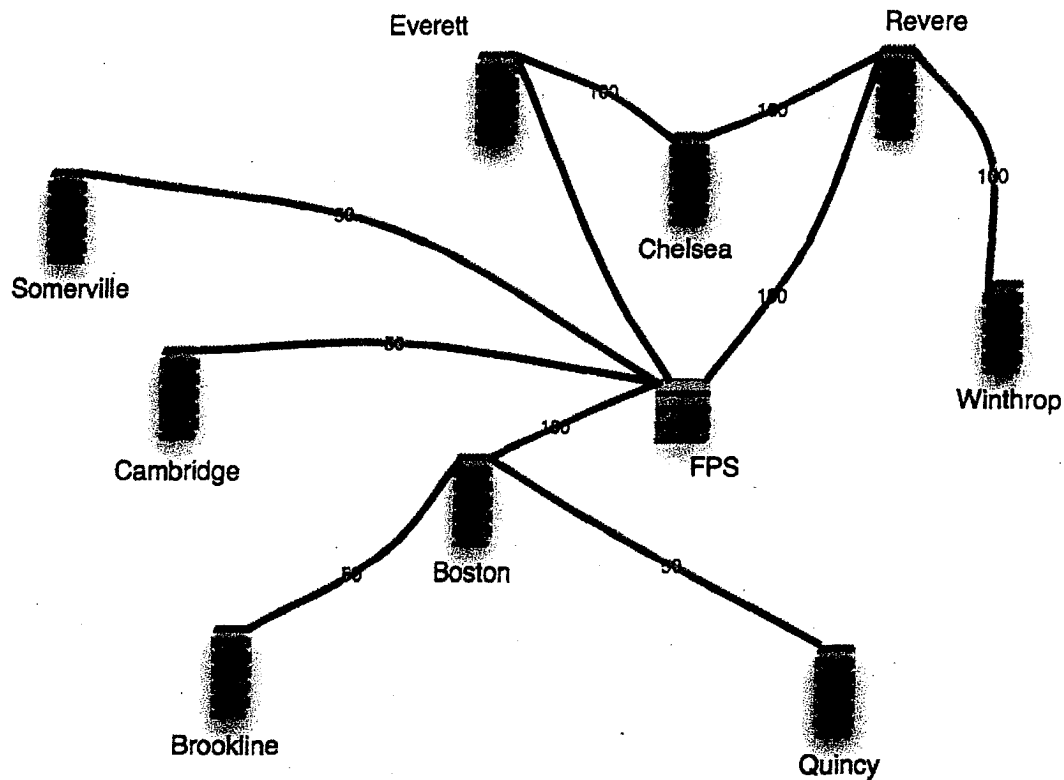
**Figure 35: The current Core Backbone network with expansion (blue)**

The Team will connect each of the 5 PPDs to the existing Phase 1 Core Backbone. Connection will be made to one of the existing Core Nodes (

ı:. Preference will be given to the

In almost all cases, the buildings housing the PPDs in Phase 1 provided no line-of-site to any of the Core Nodes listed above. We expect a similar topography in Phase 2. Accordingly, we will repeat our design from Phase 1 of identifying "high points" for each of the 5 new PPDs [*Figure 36*]. Criteria for the selection of these "high points" will include each candidate's distance from the PPD, the ability to secure equipment on its roof, the building's line-of-sight to the PPD, the building's line-of-site to a Core Node, location of the planned camera sights, and the ease of obtaining roof rights, among others. Connections from the PPDs to their respective "high points" will be made using an appropriate licensed or license-exempt radio. The precise make and model of these links will be determined upon site survey. Care will be taken to choose a radio that will provide the highest level of throughput and reliability for its price.
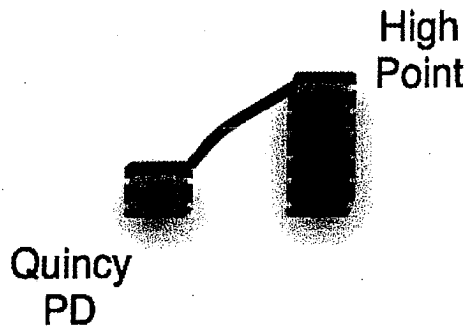
**Figure 36: Example of the "high point"**

The Core Backbone expansion will be created using licensed microwave bridges. Frequencies for these devices will be determined by analyzing the path distance, throughput requirements, structural strength of mounting locations, and weather data for the Boston region. Typically, we will be using Dragonwave 18 GHz and 23 GHz radios initially capable of 50 Mbps. The links will be engineered to provide 99.99% availability and will have software upgrade paths to allow for greater throughput needs. All FCC licensing will be handled in the same manner as Phase 1. The Team will arrange licensing, but the license holder will be the City of Boston.

We have selected FCC licensed links for the backbone for several reasons. Most importantly, licensed links provide protection against RF interference, whereas license-exempt radios and radios operating on bands with no government frequency coordination do not. We can provide a much greater level of "link availability" or reliability using licensed links, which by nature, requires frequency coordination. Also, these devices generally have a greater "mean time between failure" than license-exempt devices. Please refer to this product's specifications sheet attached to this document for more information.

The Team will install a cabinet at each new Core Node providing intelligent routing and switching between nodes. These cabinets will be mounted in the most secure location available given the restraints of communication cable runs, power, HVAC, etc. Each Core Node will have an uninterruptible power supply (UPS) that will provide power during an outage for a minimum of 30 minutes. The UPS will be configured to trigger alarms/traps in the event of power loss [Approximate power draw of cabinet components will be 550 Watts. Estimated time of service is 40 minutes]. Cabinet temperature will be polled every 5 minutes and relayed to a management server. Cabinet door tamper sensors will be used to alert entry via SNMP.

*Edge Wireless*
License-Exempt and 4.9 GHz
Connecting a system of cameras (over 200 at project completion) that stream a constant 2 Mbps of traffic using only license-exempt frequencies in an urban setting is, for anyone, a daunting task.

During recent frequency tests in downtown Boston, we found noise levels in the license-exempt 5 GHz band from -70 dbm to -55 dbm. [*Figure 37*] Proposed "Municipal WiFi" projects and

their use of the 5 GHz band will make maintaining a reliable wireless network even more difficult. Achieving reliable fade margins (signal to noise ratios) is difficult in this noisy environment.

Even the relatively new FCC Public Safety 4.9 GHz band is congested in the Boston area. During Phase 1 of the CIMS project, the Team employed the use of several 4.9 GHz links to distribute video from remote locations. Before project completion, many of these links were replaced as increasing interference in the 4.9 GHz band made the links unusable.

As the radio interference increases and encroaches on a radio band that is being used to transmit camera images, the throughput of the link decreases and camera frame-rates drop. To make matters worse, high interference conditions often trigger "snow-balling" problems as Ethernet packets are retransmitted and "backlogs" occur across the network. "Intelligent" radios can dynamically change frequencies to avoid interference. However, these can often trigger a "domino" effect as the radios hop around looking for on open channel to transmit, thus presenting new interference for other links.
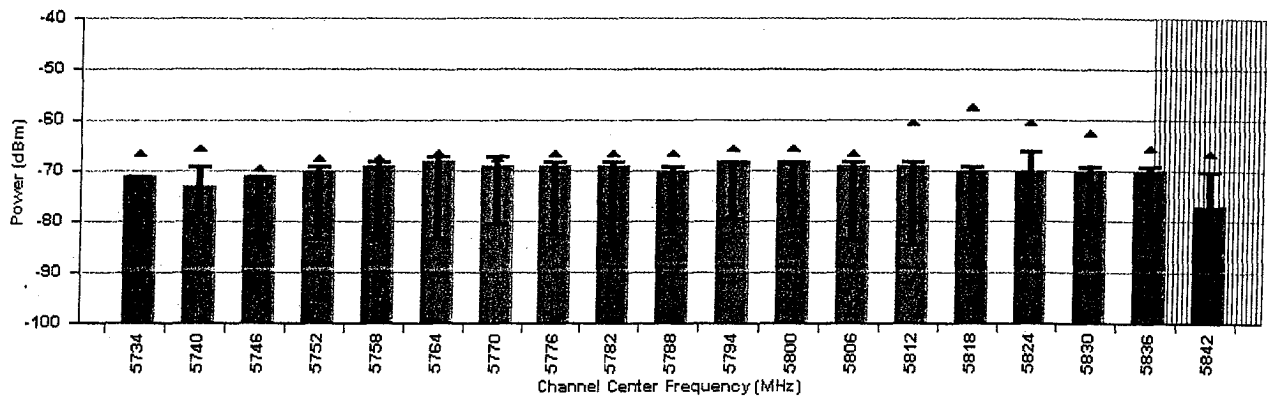


Figure 37: Noise levels as heard from a BPD radio at

*Making It Work*
The Team will use a strategy of carefully placed aggregation points, narrow beam antennae, radio power control, high data-modulation rates, innovative radio selection, and mindful frequency planning to provide connectivity to the remote camera sites, or edge sites.

We will coordinate with the MOEP representative and the local PPD to choose locations for antennae that can best deliver a fresnel-clear path to collection points. Edge wireless devices will be designed to accommodate a minimum of 3 Mbps upstream and 256 kbps downstream per camera. This will provide a comfortable margin in times of adverse wireless conditions and will help network health during a link overload.

An investigation will be made to find local wire infrastructure, including unused copper pairs or dark fiber in city utility conduits. The Team will make use of such infrastructure to provide the best possible connectivity solution for the system.

In general, cameras will be connected to video encoders at the camera sites. These encoders will be connected to the edge wireless devices which will aggregate at key collection points. Aggregate points will house mini-cabinets containing switches and routers, UPS systems, and network monitoring devices. Aggregate sites will connect to the appropriate PPDs "high point," or Core Node. The stream of data from the cameras will be fed from this Core Node directly to the video servers, at the PPD.
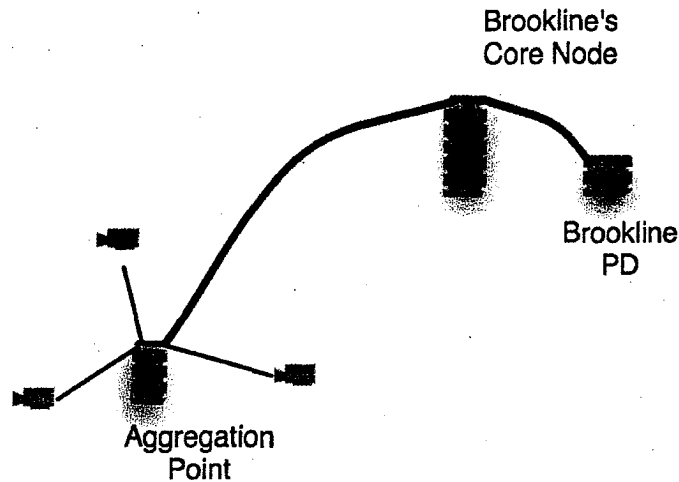


**Figure 38: Aggregation Point**

The primary request for the CIMS network calls for the addition of 65 cameras. To support this system of cameras, which are widely spread across the PPDs, the expansion of the Core Backbone is required. A rough topology of the addition of camera sites and the Core Backbone extension to the existing Phase 1 system is shown [*Figure 39*].
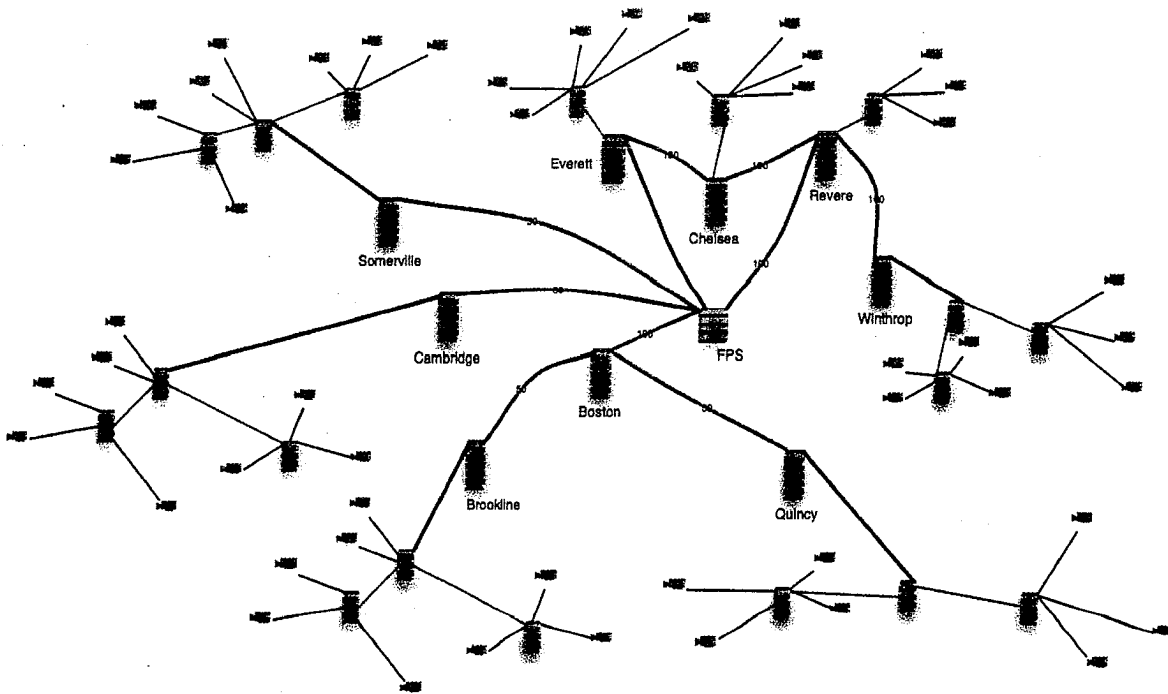
**Figure 39: General topology of Core Backbone expansion and camera additions.**

*Labeling*
All Ethernet and RF cabling will be clearly labeled at both termination points. Devices will be labeled with IP information. Equipment cabinets will contain contact information for maintenance.

*Security/Encryption*
Maintaining a secure network requires a vigilant audit of all potential ingress routes– both in the wireless and wired medium. While care must be given, possibly the greatest vulnerability to a system of this size and reach is through physical access to any one of the hundreds of camera points where devices terminate and ethernet ports are accessible. Access to the system can also be made by physical access to the cabinets at Core Nodes, and aggregation points. These locations are often unsecured and accessible to local personnel.

The wireless system is also a potential access point for security breaches. Care must be taken to insure that radios are paired, control lists are set, and encryption keys used.

The Core Backbone's Dragonwave point-to-point wireless bridges will use three independent systems to achieve "best-in-class" security. They are: directional point-to-point communication with narrow beamwidth, bit-level data streaming with proprietary synchronization and framing, and Dragonwave's proprietary radio authentication scheme.

Dragonwave radios also supports NSA level encryption through TACLANE and SECTERA devices. While these devices are not included in this proposal, they may be added to the system at any time.

Orthogon Systems Gemini point-to-point product uses MAC address authentication. The device will only communicate with its chosen peer radio. "Rogue" devices are ignored. Orthogon Systems provides the option of enabling its link encryption using the Advanced Encryption Standard, FIPS-197. This standard of AES is a FIPS-approved symmetric encryption algorithm that may be used by U.S. Government organizations to protect sensitive information. AES encryption on the Orthogon units will not be included in this proposal but will be offered as an option.

*Maintaining a Healthy Network*

Any wireless network must be built to withstand the detrimental effects of weather, power outages, inclement radio interference, as well as IP layer vulnerabilities such as IP broadcast storms and other network meltdown conditions.

Care will be taken in all aspects of the physical, data, and network layer installations. Radio coax connections with outdoor exposure will be weather-sealed. Outdoor cable runs will be housed in rigid galvanized steel conduit with capped weather-heads where applicable.

Antennae will be mounted on secure masts and safety cables used for added protection where needed. Lightning protection will be used in all areas where providing a barrier and layer of protection to other equipment is beneficial.

A system-wide Network Management System, similar to what is currently in use, will be used to provide statistical data on all IP devices [*Figure 40*] as well as environmental data (i.e. room temperature, door open, etc. [*Figure 41*]. Traffic will be managed on all segments of the system and overages and outages reported via SNMP traps and email/pager alerts.
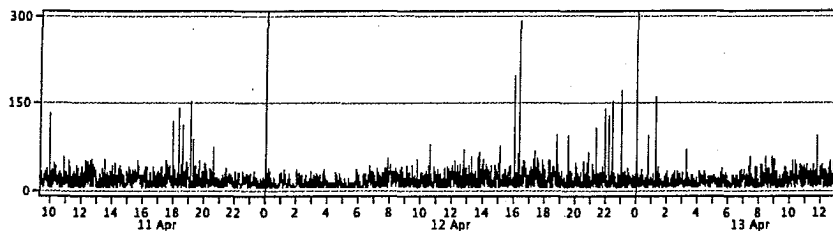
Figure 40: NMS graph round-trip ping times reporting health of wireless link.
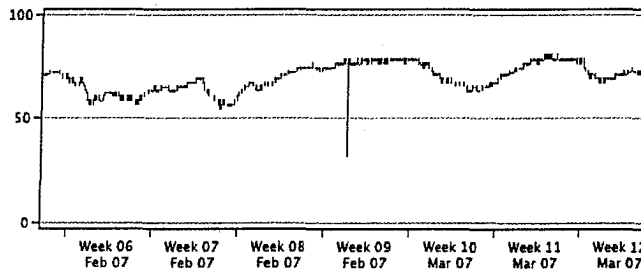
Figure 41: NMS showing room temperature at Core Node.

Thresholds for specific measurements will be set and when crossed will trigger reporting to the Team's network manager.
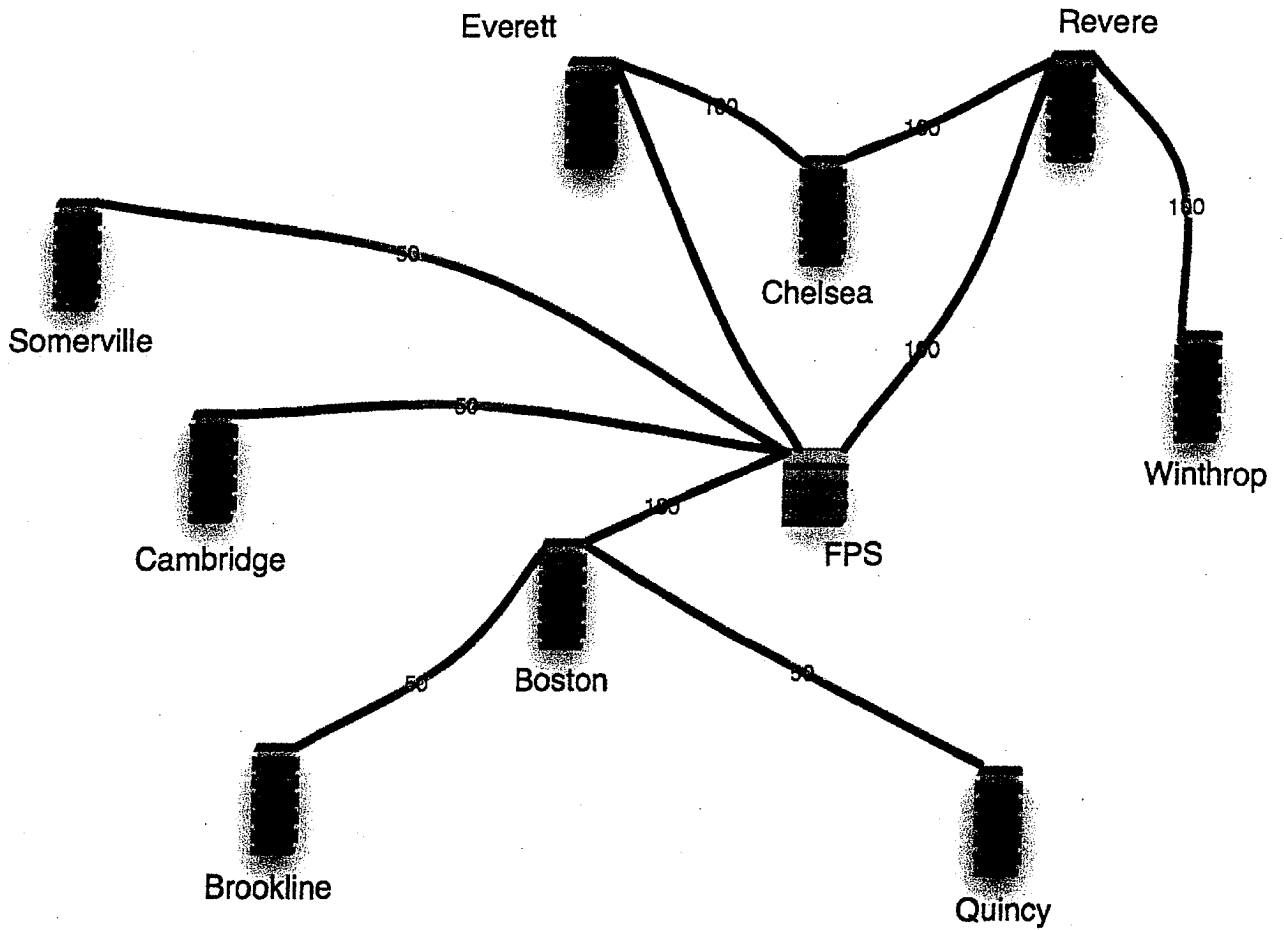
Figure 42 – Phase I and II Backbone
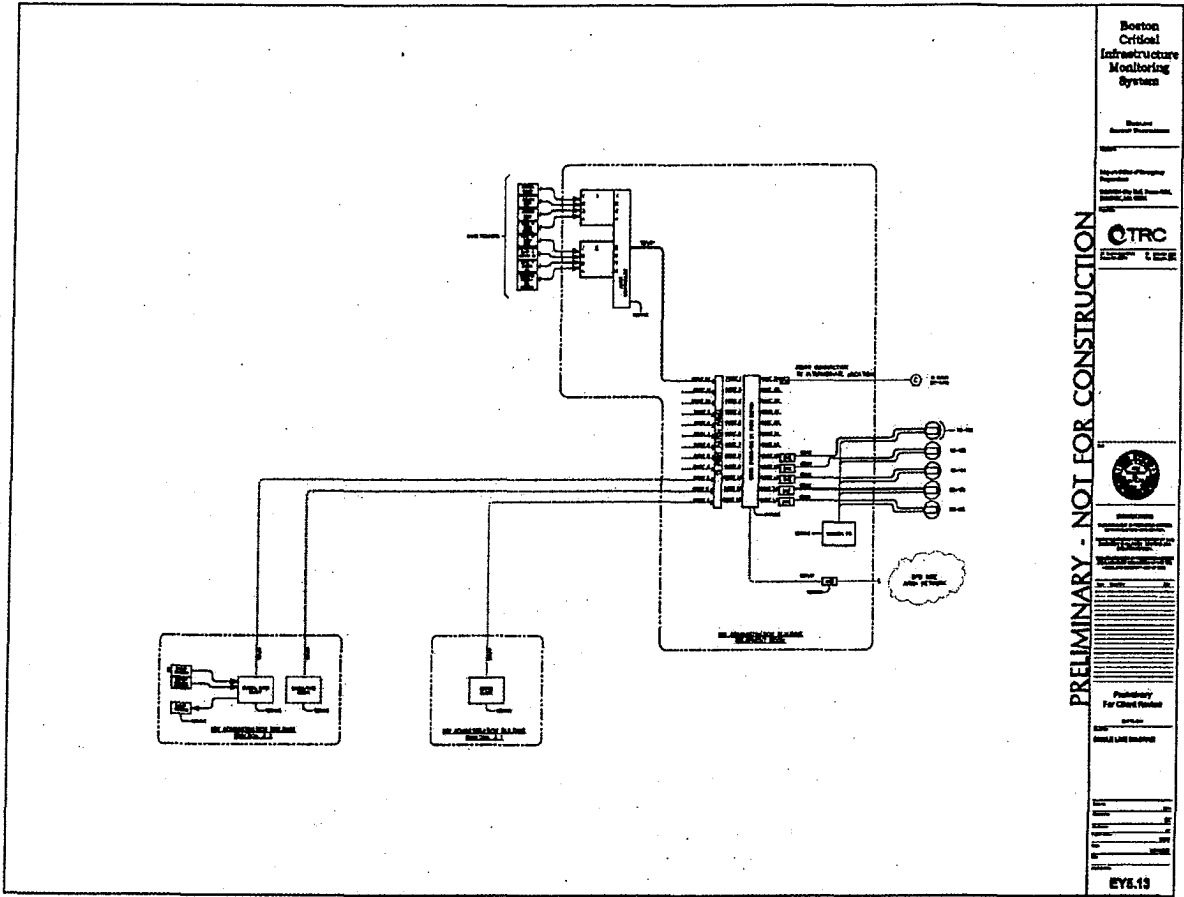
Figure 43: Draft Print, See Drawings Tube for full size views

Figure 44:  Draft Print, See Drawings Tube for full size views

Figure 45: Draft Print, See Drawings Tube for full size views

Figure 46: Draft Print, See Drawings Tube for full size views.

# Bandwidth Calculations for the Base 65

| No. Camera | Network Bandwidth (Mbps) | | DVR Storage (GB/Month) | |
|---|---|---|---|---|
| | MPEG-4: 7.5fps - 4CIF | MPEG-4: 15fps - 4CIF | MPEG-4: 7.5fps - 4CIF | MPEG-4: 15fps - 4CIF |
| 1 | 0.75 | 1.5 | 124.5 | 474.5 |
| 2 | 1.5 | 3 | 249 | 949 |
| 3 | 2.25 | 4.5 | 373.5 | 1423.5 |
| 4 | 3 | 6 | 498 | 1898 |
| 5 | 3.75 | 7.5 | 622.5 | 2372.5 |
| 6 | 4.5 | 9 | 747 | 2847 |
| 7 | 5.25 | 10.5 | 871.5 | 3321.5 |
| 8 | 6 | 12 | 996 | 3796 |
| 9 | 6.75 | 13.5 | 1120.5 | 4270.5 |
| 10 | 7.5 | 15 | 1245 | 4745 |
| 11 | 8.25 | 16.5 | 1369.5 | 5219.5 |
| 12 | 9 | 18 | 1494 | 5694 |
| 13 | 9.75 | 19.5 | 1618.5 | 6168.5 |
| 14 | 10.5 | 21 | 1743 | 6643 |
| 15 | 11.25 | 22.5 | 1867.5 | 7117.5 |
| 16 | 12 | 24 | 1992 | 7592 |
| 17 | 12.75 | 25.5 | 2116.5 | 8066.5 |
| 18 | 13.5 | 27 | 2241 | 8541 |
| 19 | 14.25 | 28.5 | 2365.5 | 9015.5 |
| 20 | 15 | 30 | 2490 | 9490 |
| 21 | 15.75 | 31.5 | 2614.5 | 9964.5 |
| 22 | 16.5 | 33 | 2739 | 10439 |
| 23 | 17.25 | 34.5 | 2863.5 | 10913.5 |
| 24 | 18 | 36 | 2988 | 11388 |
| 25 | 18.75 | 37.5 | 3112.5 | 11862.5 |
| 26 | 19.5 | 39 | 3237 | 12337 |
| 27 | 20.25 | 40.5 | 3361.5 | 12811.5 |
| 28 | 21 | 42 | 3486 | 13286 |
| 29 | 21.75 | 43.5 | 3610.5 | 13760.5 |
| 30 | 22.5 | 45 | 3735 | 14235 |
| 31 | 23.25 | 46.5 | 3859.5 | 14709.5 |
| 32 | 24 | 48 | 3984 | 15184 |
| 33 | 24.75 | 49.5 | 4108.5 | 15658.5 |
| 34 | 25.5 | 51 | 4233 | 16133 |
| 35 | 26.25 | 52.5 | 4357.5 | 16607.5 |
| 36 | 27 | 54 | 4482 | 17082 |
| 37 | 27.75 | 55.5 | 4606.5 | 17556.5 |
| 38 | 28.5 | 57 | 4731 | 18031 |
| 39 | 29.25 | 58.5 | 4855.5 | 18505.5 |
| 40 | 30 | 60 | 4980 | 18980 |
| 41 | 30.75 | 61.5 | 5104.5 | 19454.5 |
| 42 | 31.5 | 63 | 5229 | 19929 |
| 43 | 32.25 | 64.5 | 5353.5 | 20403.5 |
| 44 | 33 | 66 | 5478 | 20878 |
| 45 | 33.75 | 67.5 | 5602.5 | 21352.5 |
| 46 | 34.5 | 69 | 5727 | 21827 |
| 47 | 35.25 | 70.5 | 5851.5 | 22301.5 |
| 48 | 36 | 72 | 5976 | 22776 |
| 49 | 36.75 | 73.5 | 6100.5 | 23250.5 |
| 50 | 37.5 | 75 | 6225 | 23725 |
| 51 | 38.25 | 76.5 | 6349.5 | 24199.5 |
| 52 | 39 | 78 | 6474 | 24674 |
| 53 | 39.75 | 79.5 | 6598.5 | 25148.5 |
| 54 | 40.5 | 81 | 6723 | 25623 |
| 55 | 41.25 | 82.5 | 6847.5 | 26097.5 |
| 56 | 42 | 84 | 6972 | 26572 |
| 57 | 42.75 | 85.5 | 7096.5 | 27046.5 |
| 58 | 43.5 | 87 | 7221 | 27521 |
| 59 | 44.25 | 88.5 | 7345.5 | 27995.5 |
| 60 | 45 | 90 | 7470 | 28470 |
| 61 | 45.75 | 91.5 | 7594.5 | 28944.5 |
| 62 | 46.5 | 93 | 7719 | 29419 |
| 63 | 47.25 | 94.5 | 7843.5 | 29893.5 |
| 64 | 48 | 96 | 7968 | 30368 |
| 65 | 48.75 | 97.5 | 8092.5 | 30842.5 |

## Maintenance and Warranty

All installed components are covered by the Smiths Detection-LiveWave plan. If a component should fail in any year covered by the maintenance and warranty agreement, Smiths Detection shall replace or repair the component. All replacement and repair services include the labor to remove, repair, and install the affected component.

This maintenance agreement includes the installed Smiths Detection software and provides for free upgrades in the year that the maintenance agreement is in effect.

<center>FORM 9</center>

## SOFTWARE LICENSE

*Attach copies of any and all proposed software license and maintenance agreements that may be applicable to any software offered by Proposer.*

## SOFTWARE LICENSE AGREEMENT

Smiths Detection LiveWave (SDLW)
Tech Plaza IV
88 Silva Lane, Suite 250
Middletown, RI 02842
Phone: 401.848.7678
Fax: 401.846.7077
http://www.smithsdetection-livewave.com/

SOFTWARE LICENSE AGREEMENT ("AGREEMENT")
REDISTRIBUTION NOT PERMITTED

IMPORTANT-READ CAREFULLY BEFORE USING THIS SOFTWARE: This License Agreement for certain Smiths Detection LiveWave ("SDLW") Products ("License Agreement") is a legal agreement between you (either an individual or an entity and SDLW and its suppliers and licensors (collectively "SDLW") for the SDLW FirstView® Software ("Software"). By using this Software, you agree to be bound by the terms of this License Agreement.

CUSTOMER AGREES THAT ITS USE OF THE SOFTWARE ACKNOWLEDGES THAT IT HAS READ THIS LICENSE, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS.

1. SOFTWARE LICENSE
a) Subject to the terms and conditions of this Agreement, SDLW hereby grants to Customer a nonexclusive, nontransferable license to use the FirstView Software, solely for Customer's own business purposes in connection with the transmission of images and camera control from SDLW FirstView Software ("FirstView'). The license granted herein is limited to use of the FirstView Software purchased by Customer. Customer may not use the Software on additional SDLW Server systems or any computer PC, server, workstation or CPU, or on any other audio/video system without the prior written consent of SDLW, which shall be at the sole discretion of SDLW, and payment of additional license fees as determined by SDLW.

b) Customer shall not, and shall not permit any third party, to modify, reverse engineer, de-compile, disassemble, translate, or convert the Software, or apply any procedure or process to the Software in order to ascertain or derive the source code in the Software.

c) The term "Software" as used in this Agreement shall include all software, interfaces and documentation provided by SDLW to Customer. SDLW and its licensors reserve all right, title

and interest in and to the Software and Customer's rights in the Software are limited to those expressly granted in this Agreement.

## 2. PROPRIETARY MATERIAL; SECURITY OF THE SOFTWARE

a) Definition. "Proprietary Material" means all information and materials that are not generally known to the public and in which either party, or its suppliers, customers or other persons (to the extent such party owes a duty of confidence to any such person) has rights, which is marked confidential, restricted or proprietary, or which, under all of the circumstances, ought reasonably to be treated as confidential and/or proprietary, including this Agreement. SDLW's Proprietary Material shall include, without limitation, the Software and all documentation and information provided to Customer by SDLW pertaining to the operation of the Software and/or the SDLW FirstView® software and system.

b) Restrictions. Each party agrees that with respect to any Proprietary Material that is disclosed by one party to the other party that, except as expressly specified in this Agreement, the party receiving such Proprietary Material shall: (i) maintain in confidence such Proprietary Material, using the same degree of care as it uses to protect its own confidential information of like nature, but not less than a reasonable degree of care; (ii) not disclose any such Proprietary Material to any person outside that party's business organization; and (iii) use such Proprietary Material only for the purposes set forth in this Agreement, subject to the terms and conditions of this Agreement.

c) Further Customer Obligations. Customer shall limit the use of and access to the Software and all other Proprietary Material provided by SDLW hereunder to its employees whose use of or access to the Software is necessary for Customer's business and who are bound to keep such Proprietary Material confidential. Customer shall immediately notify SDLW in writing of any unauthorized use of or access to SDLW's Proprietary Material. Customer shall not copy any of SDLW's Software. Customer shall not remove any copyright, proprietary rights or confidentiality notices included in or affixed to any Proprietary Material, and shall reproduce all such notices on any copies of Proprietary Material made by Customer. Customer is solely responsible for the supervision, management and control of its exercise of the processes of the Software, including providing all reasonable checkpoints, control techniques, and other measures for detecting promptly and minimizing the effects of any errors, failures, or interruptions that might occur in the use or exercise of the Software.

d) Exceptions. Nothing in this Agreement shall limit the ability of a party in possession of the Proprietary Material ("Receiving Party") of the other ("Owning Party") to disclose such Proprietary Material, and such party shall have no liability for such disclosure, if such disclosure is: (i) required to be made pursuant to law or regulation, government authority, duly authorized subpoena or court order, whereupon the Receiving Party will provide prompt notice to the Owning Party and give such Owning Party an opportunity to respond prior to such disclosure and seek a protective order or other appropriate remedy; (ii) required to be made to a court or other tribunal in connection with the enforcement of such party's rights under this Agreement to the extent allowed by such court or tribunal, whereupon the Receiving Party will provide prompt notice to the Owning Party and give such Owning Party an opportunity to respond prior to such

disclosure and seek a protective order or other appropriate remedy; or (iii) is approved by the prior written consent of the Owning Party.

## 3. LIMITED WARRANTY

a) SDLW warrants that (i) for 1 year after delivered to Customer, the Software will be capable of functioning substantially in accordance with the user documentation provided by SDLW for use with the specific version or release of the Software licensed hereunder; and (ii) the digital or electronic media on which the Software is provided will be free of defects in materials and workmanship. Notwithstanding any other provisions of this Agreement, SDLW and Customer acknowledge that Customer's use of the Software may not be uninterrupted or error-free. Customer's sole and exclusive remedy and SDLW's entire liability for any breach of the foregoing warranty is that SDLW shall, at its sole option and expense, either (i) repair or replace the portion of the Software that is nonconforming; (ii) advise Customer how to achieve substantially the same functionality with the Software as described in the documentation through a procedure different from that set forth in the documentation; or (iii) if the above remedies are impracticable, terminate the license granted herein and refund the license fee, if any Customer paid for the Software.

b) Customer will be deemed to have accepted the Software upon receipt thereof. SDLW shall have no liability under the foregoing warranty to the extent that: (i) Customer has failed to report in writing to SDLW any nonconformance claimed to be a breach of warranty promptly after becoming aware of such nonconformance; (ii) Customer has modified the Software without the prior written consent of SDLW; (iii) the Software has been misused or exposed to environmental or operating conditions beyond those specified by SDLW; (iv) the Software has been damaged, altered by accident, neglect, misuse or other abuse; (v) the claimed defect or error has been caused, in whole or in part, by a person or persons other than SDLW; (vi) the Customer has loaded any 3rd party hardware or software in the system or altered any system configuration files, system registry, operating system, dll's or any related files required for the SDLW software and OS to perform properly; or (vii) Customer fails to incorporate in the Software any update, enhancement or revision thereto that SDLW, at SDLW's sole discretion, has provided to Customer.

## 4. WARRANTY DISCLAIMER

EXCEPT AS SPECIFICALLY PROVIDED HEREIN, SDLW MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, RELATING TO THE SOFTWARE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE. LIVEWAVE'S EXPRESS WARRANTIES SHALL NOT BE ENLARGED, DIMINISHED OR AFFECTED BY, AND NO OBLIGATION OR LIABILITY SHALL ARISE OUT OF, SDLW'S RENDERING OF ADVICE OR SERVICES IN CONNECTION WITH THE SOFTWARE.

## 5. LIMITATION OF LIABILITY

a) IN NO EVENT WILL SDLW OR ITS LICENSORS BE RESPONSIBLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, DAMAGES RESULTING FROM LOSS OF USE, LOSS OF DATA, LOSS OF PROFITS OR LOSS OF BUSINESS ARISING OUT OF OR IN CONNECTION WITH THE

SOFTWARE OR THIS AGREEMENT, EVEN IF SDLW HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

b) SDLW's and its licensors' aggregate liability, whether in contract, tort, or otherwise, arising out of or in connection with the Software or this Agreement shall not exceed the amount of License Fees paid to SDLW by Customer hereunder.

c) The provisions of this Agreement allocate the risks between Customer and SDLW. SDLW's pricing reflects this allocation of risks and the limitations of liability set forth herein.

## 6. INDEMNIFICATION

This Software is intended for use only with properly licensed media and content. It is the Customer's responsibility to ascertain whether any copyright, patent, other licenses or releases are necessary. Customer agrees to record, play back and transmit only those materials for which it has the necessary patent, copyright and other permissions, licenses and/or clearances. Customer agrees to hold harmless indemnify and defend, SDLW, its officers, directors and employees, from and against any losses, damages, fines and expenses (including attorneys' fees and costs) arising out of or relating to any claims that Customer has (i) viewed, or transmitted any materials in violation of any other party's rights or in violation of any law, or (ii) violated any terms of this License Agreement. If Customer is importing the Software from the United States, Customer shall indemnify and hold LiveWave harmless from and against any import and export duties or other claims arising from such importation or (iii) damage based on the use of the product produced, used, and/or sold by Customer containing or in any way relating to the Software.

## 7. TERM AND TERMINATION

a) This Agreement shall be effective from the date hereof and shall remain in effect unless terminated as provided herein.

b) If Customer shall (i) violate any provision of Section 1 or 2 hereof; (ii) fail to make any payment required hereunder when due, or (iii) materially fail to perform or be in material breach of any other of its obligations hereunder and fail to remedy said failure or breach within thirty (30) days after receipt of notice from SDLW with respect thereto, SDLW may terminate this Agreement and the license granted hereunder by giving written notice of termination to Customer, effective immediately upon its sending.

c) Within five (5) days after the termination of this Agreement for any reason, Customer shall return to SDLW all Proprietary Material of SDLW and all copies thereof in the possession, custody or control of Customer and shall destroy or render unusable all other Proprietary Material and all copies thereof which for any reason cannot be delivered to SDLW. The provisions of Sections 2(a), 2(b), 2(d), 4-7 and 10 shall survive any termination of this Agreement.

## 8. GENERAL TERMS

a) This Agreement may only be modified by a written document signed by SDLW and Customer, and no waiver, alteration, modification or cancellation of any of the provisions of this

Agreement shall be binding unless made in writing and signed by the parties. Nothing in this Agreement shall be construed to place the parties in the relationship of partners or joint venturers, and the parties shall have no power to obligate or bind the other in any manner whatsoever. If any provision of this Agreement (or any portion thereof) shall be held to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remainder of this Agreement shall not in any way be affected or impaired thereby.

b) SDLW shall not be liable or deemed to be in default for any delay or failure to perform under this Agreement resulting, directly or indirectly, from any force majeure event, including any acts of God, war, fire, flood, strike, labor dispute, action of any governmental authority or other cause beyond SDLW's reasonable control.

c) Customer acknowledges that a breach of any provision of this Agreement by Customer relating to the Software or SDLW's intellectual property rights therein will cause SDLW immediate and irreparable injury as to which there may be no adequate remedy at law. Customer acknowledges that SDLW shall be entitled to injunctive relief, in addition to any other rights or remedies which may be available to SDLW. The remedies in this Agreement are cumulative and in addition to all other rights and remedies available to SDLW by operation of law or otherwise.

d) All notices or demands under this Agreement shall be deemed to have been duly given if in writing and delivered in person or mailed with postage prepaid to the address of the party being notified set forth in the front page of this Agreement, or to such other address as such party shall have specified in writing to the other party.

e) This Agreement shall not be assignable by Customer without prior written consent of SDLW, and any attempt to assign any rights, duties or obligations that arise under this Agreement without such consent will be void. This Agreement shall be binding upon and inure to the benefit of the parties hereto, their successors and permitted assigns.

f) This Agreement shall be governed by, and construed in accordance with, the laws of the State of Rhode Island, without regard to its conflicts of laws principles. Any dispute, controversy or claim arising out of or relating to this Agreement shall be finally settled by compulsory arbitration in accordance with the commercial arbitration rules of the American Arbitration Association ("AAA"), including the AAA's emergency interim relief procedures. Such arbitration shall be conducted in Providence, Rhode Island before a panel of three arbitrators. Each party hereby waives any right to jury trial in any forum. The arbitrators shall have no authority to amend this Agreement, or to award damages in excess of the limitations set forth herein. The arbitrators shall have no authority to award punitive damages. Judgment on the award rendered by the arbitrators may be entered in any court of competent jurisdiction.

g) No waiver, alteration, modification or cancellation of any of the provisions of this Agreement shall be binding unless made in writing and signed by the parties.

h) Customer agrees to pay all taxes, however designated, levied or based on the License Fees payable by Customer pursuant to this Agreement (other than taxes based upon SDLW's income),

including state and local sales, use or equivalent taxes or amounts in lieu thereof paid or payable by SDLW in respect thereto.

Smiths Detection-LiveWave
Phone: 401.848.7678
Tech Plaza IV
88 Silva Lane, Suite 250
Middletown, RI 02842

Tech Support: 1.800.510.5795

*Statement of*

*Maintenance and Support Services*

*Prepared by*

*Smiths Detection*
*Tech Plaza IV*
*88 Silva Lane, Suite 250*
*Middletown, RI 02842*
*401-848-7678 (ph) / 401-846-7077 (fax)*

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## 1. Understanding

**Licensee,** for the benefit of the Customer project with Smiths Detection, may purchase maintenance and support services for the **Smiths Detection FirstView® Hardware and Software ("FirstView")** for subsequent twelve (12) month periods in which Smiths Detection is offering maintenance and support services, at Smith Detection's then current prices (a "Maintenance Period"). Licensee may obtain such services **only if** Licensee has paid the fee for all prior Maintenance Periods and the upcoming period to Smiths Detection. Smiths Detection will provide maintenance and support only for the then-current Software release and the two (2) immediately preceding releases of the Software (or for all preceding releases up to eighteen (18) months prior), unless a different period is agreed to, in writing, prior to entering the maintenance period. (A "release" is indicated after the milestone or M designation and is numerical, such as Milestone 219 or M219. Smiths Detection may change these maintenance and support services for future Maintenance Periods.

## 2. Maintenance Services to be Provided

The maintenance services provided during the Maintenance Period and referred to in Section 1 above are as follows:

- Smiths Detection will supply computer program code as available to correct any demonstrable and repeatable Software errors (generally indicated as, for example, MXXX); and

- Smiths Detection will provide Licensee with all enhancements as available to the Software which Smiths Detection develops and generally makes available at no charge to other licensees of the Software ("Enhancements"). Major releases (indicated as an "MXXX" release) and releases with new generally available functionality for which Smiths Detection separately charges other licensees are not included as part of Maintenance Services.

**3.    Travel Expenses (Applies only if Maintenance Contract was not purchased)**

Smiths Detection will investigate and correct suspected errors at Smiths Detection's offices in Middletown, Rhode Island to the extent possible. If Licensee requests Smiths Detection to travel to Customer's facility to perform maintenance/support services, Licensee will reimburse Smiths Detection for the reasonable travel time and travel and other Smiths Detection out-of-pocket travel-related expenses. If Licensee requests that Smiths Detection dedicate resources to a suspected error that is attributable to a cause other than the Software as delivered by Smiths Detection, then Licensee will pay for Smiths Detection's work at $225.00 (commercial) or $192.70 (GSA) per man-hour. If the Software containing the error has been modified by non-Smiths Detection personnel, Smiths Detection will charge Licensee and Licensee will pay Smiths Detection at the rate of $225.00 (commercial) or $192.70 (GSA) per man-hour for analyzing and correcting the error, and for any installation assistance Licensee requires.

**4.    Enhancements**

All Enhancements and corrections to the Software and Documentation provided by Smiths Detection under this Statement of Maintenance and Support Services will become a part of the Software and Documentation for the purposes of the Licensee Agreement at the time they are provided to Licensee and are hereby licensed to Licensee as part of the Software and Documentation pursuant to the terms and conditions of this Statement of Maintenance and Support Services.

**5.    Support**

5.1.    Available Support Packages

Two (2) Support Packages are available: Standard and Extended.

a.   Under the Standard Support package, access to support personnel via phone, web or email is available Monday through Friday, 9:00 a.m. through 5:00 p.m. Eastern time (excluding Smiths Detection Holidays for support provided by Smiths Detection).

b.   Under the Extended Support package, access to support personnel via telephone, web or email is available 24 hours/day, seven (7) days/week, 365 days/year.

5.2.    Support Obligations

Licensee shall provide Tier 1 and Tier 2 Support to Customer. (See below for Tier descriptions). Licensee shall notify Smiths Detection of all problems, errors, issues, suggestions, and other information useful to Smiths Detection's ongoing mission to improve its products and services that Licensee has received from Customer. Smiths Detection shall provide Tier 3 support to Licensee.

- **Tier 1 Support** includes accepting the initial request for assistance from the Customer, logging the call into a call handling system, classifying the call according to Licensee's standard priority classifications (as described in the Licensee Product Support Service Priority Guidelines below), and providing telephone support for Customer in operation of the Software. Tier 1 Support staff will have the responsibility and ability to:

  - provide general product information;

  - provide installation and configuration support;

  - collect relevant technical problem identification information; and

  - filter training issues and user errors from real technical problems.

- **Tier 2 Support** includes all of the responsibilities of Tier 1 Support. Additionally, Tier 2 support staff will have the responsibility and ability to:

  - identify the problem (hardware, operating system, installation/ configuration, documentation, program extension, software) and isolate Software defects from other types of technical problems;

  - troubleshoot problems that Tier 1 Support is unable to resolve;

  - perform lab simulation and interoperability testing;

  - define an action plan for problem resolution;

  - resolve all hardware, operating system, installation/configuration, and documentation problems; and

  - resolve lower and mid-complexity program extension problems.

If the Licensee Tier 2 Support staff cannot resolve the Customer's issue, Licensee will escalate this issue to Smiths Detection's Tier 3 Support personnel via telephone or e-mail. Tier 3 Support Staff shall be available eight (8) hours (9 a.m.-5 p.m. Eastern Time) a day, five (5) days (Monday-Friday) a week for standard support.

**Smiths Detection Tier 3 Support** shall include accepting the call and related information from Licensee, logging the call in the call handling system, reviewing, responding and resolving the issue. Smiths Detection Tier 3 Support staff will have the ability to:

- troubleshoot problems that Tier 2 Support is unable to resolve; and

- develop patches, work-arounds, bug fixes and other Smiths Detection software modifications required to address or fix the Smiths Detection software support issue.

Smiths Detection will respond and resolve issues in accordance with the guidelines as defined in the following Licensee Product Support Service Priority Guidelines.

## 6. Licensee Product Support Service Priority Guidelines

### A. Call Response and Resolution Times

To ensure that all Software problems and technical inquiries are reported in a standard format, Licensee and Smiths Detection will use and comply with the problem priority definitions and guidelines herein; and Licensee and Smiths Detection jointly shall assign a priority to all problems submitted to Smiths Detection. Based on the priority of a Software problem, Smiths Detection agrees to respond to Licensee with acknowledgement and status of resolution in the following time frames:

- Tier 3 (Emergency): Response within two (2) hours if contact received by Smiths Detection during standard support call-in hours.

- Tier 3 (High): Response within four (4) hours if contact received by Smiths Detection during standard support call-in hours.

- Tier 2 (Medium): Response within one (1) business day.

- Tier 1 (Low): Response within three (3) business days.

### B. Responsibilities

Both Smiths Detection and Licensee shall respond to and use commercially reasonable efforts to resolve issues in a prompt manner.

### C. Problem Priorities, Definitions

Problem priorities shall be classified as follows:

**Tier 3 (Emergency):** The Software is not functioning in accordance with the specifications, and production or mission-critical business operations cannot be performed if service is not restored quickly. No work-around is available. Smiths Detection and Licensee are willing to commit full-time resources to resolve the situation.

**Tier 3 (High):** The Software is not functioning in accordance with the specifications, impacting significant aspects of business operations. Smiths Detection and Licensee are willing to commit full-time resources during normal business hours to resolve the situation.

**Tier 2 (Medium):** The Software is not functioning in accordance with the specifications, but most business operations continue. A known work-around exists and Licensee is able to implement the work-around without severe interruption of production processing.

**Tier 1 (Low):** Licensee requires information or assistance on Software capabilities, installation or configuration; Licensee reports a cosmetic or documentation problem that has no material impact on current productivity; or Licensee reports a problem

## D. Example of a Priority Response Table

The following is an example of a priority response table.

| Tier Priority Levels | Customer Impact | Notify | Escalate | Customer Response/ Update Required | Expected Response | Resolution Time |
|---|---|---|---|---|---|---|
| **Tier 3 Emergency** | Major global service interruption (Server Failure/No Connectivity to NVRs) | Customer notifies the Licensee Project Manager/ Customer Support | Licensee Tier 2 Customer Support notifies the Smiths Detection Customer Care Manager for Tier 3 Support | Within 2 hours/Once resolution times are determined | All parties including Licensee are expected to work continuously until problem resolved or work-around available | As soon as possible Target of 5 working days of notification. If resolution cannot be realized within the timeframe, a working plan will be submitted |
| **Tier 3 High** | Hardware subset impacted/cannot work due to Software All other sites functional | Customer notifies the Licensee Project Manager/ Customer Support | Licensee Tier 2 Customer Support notifies the Smiths Detection Customer Care Manager for Tier 3 Support | Within 2 hours/Once resolution times are determined | Develop "work-around" temporary if possible; work is expected to continue on a workday basis until a resolution has been reached | As soon as possible Target of 5 working days of notification. If resolution cannot be realized within the timeframe, a working plan will be submitted |
| **Tier 2 Medium** | Individual Hardware Impacted/cannot work due to Software | Customer notifies the Licensee Project Manager/ Customer | Licensee Tier 1 Support notifies Tier 2 and Licensee | Within 48 hours/Once resolution times are determined | Work is expected to be scheduled during regular workday | Develop workaround if possible; work expected to continue on a workday basic |

| | (Camera/ Rule/Client Workstation issue) | Support | Engineer | | | until a resolution is reached |
|---|---|---|---|---|---|---|
| **Tier 1 Low** | Individual impacted/c an work (Change request for nice to have) | Customer notifies Licensee Project Manager/ Customer Support | Licensee Project Manager/ Tier 1 Customer Support coordinates with Licensee Engineer | Set reasonable expectation for timeframe and update accordingly | When cycle allows | When priorities allow/ Follow up for Customer notification |

# Smiths Detection

# Implementation and Control Plan

# Project: Critical Infrastructure Monitoring System (CIMS)

Document History:

| Rev. # | Description |
|---|---|
| ██ August 28, 2006 | ██████ICP |

Special Notes:

| |
|---|

## Purpose and Overview

This implementation and control plan (ICP) provides Smiths Detection a means to monitor, test and rectify any issues that arise with the effective deployment of the Critical Infrastructure Monitoring System (CIMS). This ICP is segmented into sections relative to the actions and testing procedures required to ensure a proper installation between nodes, aggregation points and control centers. This control plan will be reviewed by all project stakeholders prior to live system deployment.

Review items include:
- Shipping & Receiving (if applicable)
- Testing
- Hardware
- Network
- Software/Application

## Shipping & Receiving

This section contains all relevant shipping information and can be used as a reference to track and rectify damaged and/or lost equipment. *Note: For this project, all shipping and handling will be handled by the Prime Contractor. Shipping information, equipment lead times and effects on the project schedule will be distributed to the key stakeholders.*

Please note: Damaged items must be returned to Smiths Detection as soon as possible. Smiths Detection will process returned materials via the Smiths Detection returned material authorization (RMA) process. Blank RMA forms are located in the appendix of this document. To obtain an RMA number, please contact Kirsten Robillard at 401-848-6601.

### *Insert destination name here*

| Item # | Model # | QTY | Description | Value ($) | Serial # | Weight (lb) |
|--------|---------|-----|-------------|-----------|----------|-------------|
|        |         |     |             |           |          |             |
|        |         |     |             |           |          |             |
|        |         |     |             |           |          |             |
|        |         |     |             |           |          |             |
|        |         |     |             |           |          |             |
|        |         |     |             |           |          |             |
|        |         |     |             |           |          |             |

## Item Details
Item #: Insert item description
Ship Date: _____/_____/_____     Target Delivery Date: _____/_____/_____
Shipper: _____
     Contact Number: (    ) _____-_____
     Tracking #:_____
Q1: Was the package received on time? (Yes or No)
     Notes: _____
Q2: Was there any damage to the package (Yes or No)
     Notes: _____

*** *(Repeat above information as necessary)*

## Testing

This section details the planned testing procedures to after installation. The first test phase, hardware, will identify if any internal hardware components are damaged. The second phase, network, will test the LAN/WAN infrastructure. The third and final phase, software/application, will involve simulating a mock trial.

Phase I – Hardware

Each system component MUST be individually tested and inspected for any abnormal issues once powered up. When shipping custom built servers it is possible to have PC cards come loose and/or break within a machine.

Location, City/State:

Test Engineer: _____          License (if applicable): _____

1. Equipment Description          □ Pass □ Fail
Notes:

_____

_____

2. Equipment Description          □ Pass □ Fail
Notes:

_____

_____

3. Equipment Description          □ Pass □ Fail
Notes:

_____

_____

*** *(Repeat as necessary)*

***Note: Insert diagram, rack layout or other detail for each site.

Phase II - Network
Network testing, autonomous of the system applications, will provide insight on stability, reliability, and speed prior to deploying the system. Documenting the network performance will provide a baseline for network (LAN/WAN) requirements.

**Note: This Phase may be conducted by an authorized subcontractor when applicable. If performed by a sub contractor Smiths Detection will validate the procedures used.*

[Insert network topology drawing here]

Local Area Network: Extended ping test
Step 1: Plug network cable from the rack into customers' network.

Step 2: Log into FirstView® encoder/server/channel 1-8 Operating System.

Step 3: Open DOS command prompt.

Step 4: Perform 20 packet extended PING tests (I.e. ping 192.168.1.200 –n 20) to the following system components:

A.) FirstView® Encoder – channel 9-12: (IP: ___.___.___.___)
Packet Loss            _____%
Average Latency        _____mS

B.) FirstView® NVR (IP: ___.___.___.___)
Packet Loss            _____%
Average Latency        _____mS

Step 5: Perform 20 packet extended PING tests (I.e. ping 192.168.1.1 –n 20) to LAN gateway.
Packet Loss            _____%
Average Latency        _____mS
Test Gate 1: If Ping test display results with packet loss <100% and/or network latency above 10 mS, please ensure all network cables are properly plugged in to switch and the switch ports do not have any speed or duplex issues with connected equipment.

Step 6: Perform 20 packet extended PING tests (I.e. ping 192.168.X.X –n 20) across WAN to FirstView® Client WorkStation.
Packet Loss            _____%
Average Latency        _____mS
Test Gate 2: If Ping test display results with packet loss <100% and/or network latency above 70 mS, perform a trace route command (tracert 192.168.X.X) to see which network hop is causing performance issues. Work with local network administrators to achieve optimal WAN performance levels.

Phase III – Software/Application:
The third and final test phase is the most critical test. These tests will ensure the software will operate as designed and meet customer expectations. Customer standard operation procedures (SOP's) on how end users are to operate the system shall be taken into account during this phase. This test phase will not only determine if the system works, but if the SOP's need to be adjust to better fit the customers needs.

Performance objective will be subject to interpretation. For example one person may find the video feeds resolution and frame rate acceptable and others may not. To ensure continuity it is important to document names, test conditions and any other pertinent info.

- Did the FirstView® Software load properly?                □ Yes □ No

- Can you log in as the administrator?                    ᴶ □ Yes □ No

- Are all the "Collectives" properly set up?              □ Yes □ No

- Does Video display within the applications preview window?  □ Yes □ No

- Are you able to pan, tilt, and zoom the camera's?        □ Yes □ No

- Are you able to retrieve archived video?                □ Yes □ No

- Estimate bandwidth utilization (per camera) by opening the Windows Task Manager (cnt+alt+del) and select network tab:

    - In the FirstView® software systematically add cameras to a multiplex view. At the same time relate the additional network utilization. Below is an example of a five camera multiplex view and the associated bandwidth.
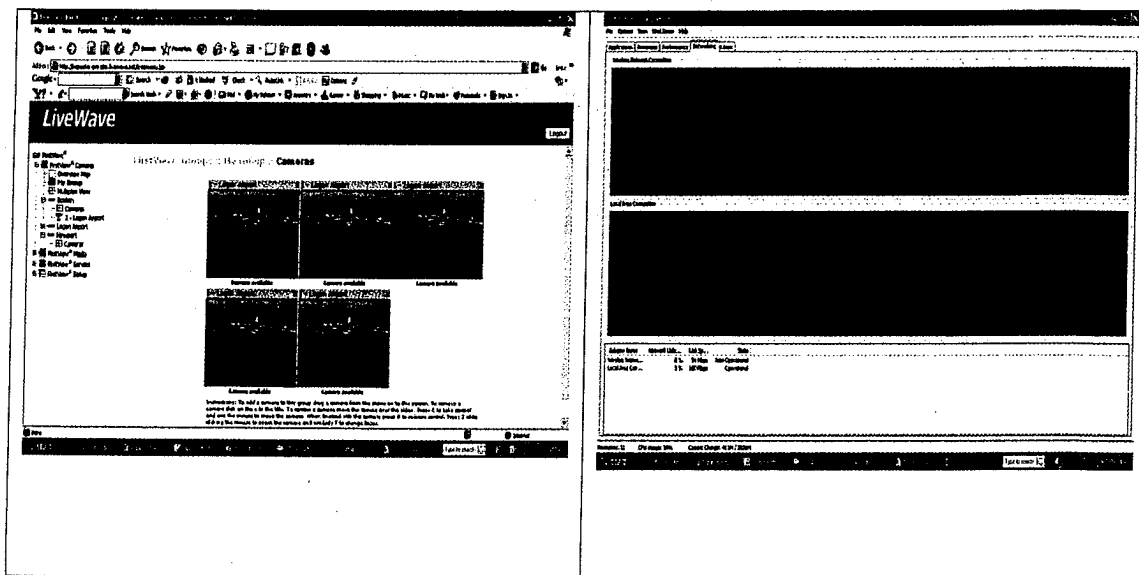
# Appendix A

## System Topology

*(Insert Drawing Here)*

# Appendix B
## Sample RMA Form

| CUSTOMER SERVICE RMA REQUEST | | | |
|---|---|---|---|
| RMA No. *(Received from Smiths Detection)* | Date: | | |
| Customer Name & Contact Person: | | | |
| Address: | | | |
| City: | State: | | ZIP Code: |
| Type of Service Requested:<br>*(Please circle one)*<br><br>Return for Credit*   Warranty  Exchange | Amount to be issued to customer:<br><br>Reason for credit: | | |
| If 3<sup>rd</sup> Party is responsible for shipping product back to Smiths Detection please fill out the following information to the left: | 3<sup>rd</sup> Party Responsible for return of product to SDLW<br><br><br>Signature:<br><br>_____ | | |
| Equipment Inspected on site by<br><br>_____<br><br>And found to be in the following condition: | | | |
| Nature of Problem | | | |
| Problem Reported: | | | |
| Equipment: | | | |
| Barcode: | Serial No.: | | |
| RMA requested by: | Date: | | |
| Date of original purchase: | Purchase Order #: | | |
| Engineer responsible for equipment when returned: | | | |
| Service Details | | | |

**CUSTOMER SERVICE RMA REQUEST**

| Service Rendered: | |
|---|---|
| Engineer' s Remarks: | Status after Service:<br>*(Please circle)*<br>Complete/ Incomplete/<br>Pending for spares/ Under<br>Observation/ Working<br>solution provided |
| Defects found upon inspection: | |

| Is customer to be charged additional fees for service:<br>*(Please circle one)*<br><br>No               Yes (if yes, provide charges in next box) | Additional fees to be invoiced to customer: |
|---|---|
| Start of Service: | End of service: |

Authorization

| RMA Requested By: | Date: |
|---|---|
| RMA Approved By: | Date: |
| Serviced By: | Date: |
| Sent By: | Date: |
| Shipping Method: | Tracking #: |

# Smiths Detection

# Project Risk Plan
# Critical Infrastructure Monitoring System (CIMS)

## Document Control

|  | Name |
|---|---|
| Document/Information Document Owner | Patrick Hay |
| Issue Date | 4-16-07 |
| Last Saved Date | 4-16-07 |
| File Name | CIMS Risk Plan |

## Document History

| Version | Issue Date | Changes |
|---|---|---|
| [1.0] | 4-16-07 | Rev 0 |
|  |  |  |
|  |  |  |
|  |  |  |

## Document Approvals

| Role | Name | Signature | Date |
|---|---|---|---|
| Project Sponsor |  |  |  |
| Project Review Group |  |  |  |
| Project Manager |  |  |  |
| Quality Manager |  |  |  |
| Project Office Manager (if applicable) |  |  |  |

## RISK MANAGEMENT

Proper management of risk is very important to the success of the project. Risk management is a "process." That is, risk management is a progression or series of actions that are taken with the purpose of minimizing events that would have a negative impact on the project schedule.

### Risk Management Approach

*Introduction*

All projects have risk associated with them; it is what you do about the risks that separate successful projects from not so successful ones. Risk mitigation is used to reduce (but typically not eliminate) the potential or possibility that a risk element will impact the project.

Risk contingency planning is used to plan for what tasks and activities need to take place should that risk element occur (in spite of the mitigation) and impact the project.

Risk Management processes focus on the following four critical areas of risk management:

1. Risk Identification and Monitoring
2. Risk Assessment and Evaluation
3. Risk Mitigation Strategies and Tasks
4. Risk Contingency Planning

### Risk Management Process

For this project, the following Risk Management steps (or processes) will be followed:

### 1. Identify the initial risks

This will be done at the beginning of each project, typically in a meeting specifically focused on risk identification. Meeting participants will include representatives from each key stakeholder group and sub-group. Each risk identified will also have the potential impact on the project qualified to some degree and quantified as well as defining the timeframe in which the risk factor could occur.

### 2. Define the initial priority of risk mitigation based upon the probability of the risk occurring and impact if/when it occurs

The Risk Assessment Spreadsheet contains an algorithm that prioritizes risks based on potential impact and timing of impact. Other factors may come into play and should be included. Consider that it would be unusual (and costly) for all risks to be mitigated and/or have contingency plans developed.

### 3. Define mitigation strategies/actions to reduce the probability of the risk occurring

This includes assigning responsibility for enactment of the mitigation action.

Upon evaluation, risks typically fall into four categories:
- Those for which little or nothing to mitigate the potential that they will occur (other than to acknowledge their existence and track them)
- Those for which the key stakeholders choose to do little or nothing to mitigate the potential that they will occur

- Those for which mitigation strategies, activities, and tasks are warranted, and;
- Those for which contingency planning is also warranted.

For the third and fourth categories, Smiths Detection will identify what can be done to reduce the risk potential, assign action items to individuals, and track them to closure as you would any other project task.

**4. Developing contingencies for those risks that have a high probability of occurring even with mitigating activities.** Mitigation reduces risk potential – but doesn't eliminate it. Some risks will still occur, and those that have a potential to significantly impact the project will have contingency plans developed for such occasions.

**5. Monitoring progress of the risk mitigation strategies and risk elements.**
Risks will be reviewed during the weekly Project Status Meeting at least monthly. The opportunity will be afforded to:

(a) close out a risk that no longer has a potential to impact the project, and

(b) identify and add new risks to the mix.

All project risks (whether mitigated or not) will be tracked using the Risk Assessment Spreadsheet.

**When to use a Risk Plan**
A Risk Plan should be documented early in the project, during the Planning phase. The plan is undertaken prior to the Execution phase to ensure that any risks identified are addressed during the Execution phase itself. Immediately after the plan has been documented, the Risk Management Process will be engaged to monitor and control the likelihood and impact of risks on the project.

The Risk Management Process is terminated only when the Execution phase of the project is completed (i.e. just prior to Project Closure).

**Risk Identification**
All likely risks will be identified that have the potential to affect the project. A series of risk categories will be identified and for each category a suite of potential risks will be listed. This may take place during our 'Risk Planning' workshop, involving each of the key project stakeholders who are involved in / affected by the project. Each of the risks identified will be described in detail and documented within the Risk Plan.

**Definition**
"A risk is defined as any event which is likely to adversely affect the ability of the project to achieve the defined objectives in the specified time period".

**Categories**

Smiths Detection will identify the likely categories of risks for this project. Each risk category is a particular aspect of the project which is likely to experience a risk during the lifecycle of the project. Examples of typical risk categories include:

- Requirements
- Benefits
- Schedule
- Budget
- Deliverable
- Scope
- Issues
- Supplier
- Acceptance
- Communication
- Resource

**Risks**

Risks for each category provided above, and those included later, will be identified by completing the following table. Each risk identified will be allocated a unique identifier (id) number.

| Category | Description | ID |
|---|---|---|
| Requirements | The requirements have not been clearly specified | 1.1 |
| | The requirements specified do not match the customer's needs | 1.2 |
| | The requirements specified are not measurable | 1.3 |
| Benefits | The business benefits have not been identified | 2.1 |
| | The business benefits are not quantifiable | 2.2 |
| | The final solution delivered does not achieve the required benefits | 2.3 |
| Schedule | The schedule doesn't provide enough time to complete the project | 3.1 |
| | The schedule doesn't list all of the activities and tasks required | 3.2 |
| | The schedule doesn't provide accurate dependencies | 3.3 |
| Budget | The project exceeds the budget allocated | 4.1 |
| | There is unaccounted expenditure on the project | 4.2 |
| | There is no single resource accountable for recording budgeted spending | 4.3 |
| Deliverables | The deliverables required by the project are not clearly defined | 5.1 |
| | Clear quality criteria for each deliverable have not been defined | 5.2 |
| | The deliverable produced doesn't meet the quality criteria defined | 5.3 |
| Scope | The scope of the project is not clearly outlined | 6.1 |
| | The project is not undertaken within the agreed scope | 6.2 |
| | Project changes negatively impact on the project | 6.3 |
| Issues | Project issues are not resolved within an appropriate timescale | 7.1 |
| | Similar issues continually reappear throughout the project | 7.2 |
| | Unresolved issues become new risks to the project | 7.3 |
| Suppliers | The expectations for supplier delivery are not defined | 8.1 |
| | Suppliers do not meet the expectations defined | 8.2 |
| | Supplier issues negatively impact on the project | 8.3 |
| Acceptance | The criteria for accepting project deliverables aren't clearly defined | 9.1 |
| | Customers do not accept the final deliverables of the project | 9.2 |
| | The acceptance process leaves the customer dissatisfied | 9.3 |
| Communication | Lack of controlled communication causes project issues | 10.1 |
| | Key project stakeholders are 'left in the dark' about progress | 10.2 |
| | | 10.3 |
| Resource | Staff allocated to the project are not suitably skilled | 11.1 |
| | Insufficient equipment is available to undertake the project | 11.2 |
| | There is a shortage of materials available when required | 11.3 |

## Risk Quantification

Each risk is prioritized according to the likelihood and impact rating and the low, medium and high priority risks are clearly marked for attention.

## Percent Chance of the Risk Occurring

The levels and scores below are used on this project to rank the chance of the risk happening.

| Level | Score | Description |
|---|---|---|
| Very Low | 20 | Highly unlikely to occur; however, still needs to be monitored as certain circumstances could result in this risk becoming more likely to occur during the project |
| Low | 40 | Unlikely to occur, based on current information, as the circumstances likely to trigger the risk are also unlikely to occur |
| Medium | 60 | Likely to occur as it is clear that the risk will probably eventuate |
| High | 80 | Very likely to occur, based on the circumstances of the project |
| Very High | 100 | Highly likely to occur as the circumstances which will cause this risk to eventuate are also very likely to be created |

## Impact

Similar to the chart above, this impact chart is used to rank the impact of the risk on the project irrespective of the chance it will occur.

| Level | Score | Description |
|---|---|---|
| Very Low | 20 | Insignificant impact on the project. It is not possible to measure the impact on the project as it is minimal |
| Low | 40 | Minor impact on the project, e.g. < 5% deviation in scope, scheduled end-date or project budget |
| Medium | 60 | Measurable impact on the project, e.g. 5-10% deviation in scope, scheduled end-date or project budget |
| High | 80 | Significant impact on the project, e.g. 10-25% deviation in scope, scheduled end-date or project budget |
| Very High | 100 | Major impact on the project, e.g. >25%% deviation in scope, scheduled end-date or project budget |

**Priority**

Smiths Detection will establish the priority of each risk by identifying the likelihood of the risk's eventuating and its impact on the project. Once the likelihood and impact scores have been allocated, the priority score is calculated as follows:

Priority equals the average percent chance and the impact score
This is calculated as Priority = (%P + Impact) / 2

| ID | % Chance | Impact | Score | Rating |
|-----|-----|-----|-----|-----|
| 1.1 | 20 | 80 | 50 | Medium |
| 1.2 | 80 | 60 | 70 | High |
| 1.3 | 100 | 40 | 70 | High |
| 2.1 | 40 | 20 | 30 | |
| 2.2 | 80 | 100 | 80 | |
| 2.3 | 20 | 80 | 50 | Medium |

The rating is based on the calculated priority score. Use the following system to determine the rating:

| Priority Score | Priority Rating |
|-----|-----|
| 0 – 20 | Very low |
| 21 – 40 | Low |
| 41 – 60 | Medium |
| 61 – 80 | High |
| 81 – 100 | Very High |

Finally, it is worth color-coding the above final ratings to highlight the risks which require the most attention. The following system is used to color-code the risks identified:

| Priority Rating | Color |
|-----|-----|
| Very low | Blue |
| Low | Green |
| Medium | Yellow |
| High | Orange |
| Very High | Red |

**Risk Plan**

Once the risk, impact and percent chance have been calculated Smiths Detection will produce a risk plan, shown below, to identify measures to correct or mitigate the risk.

For each risk action identified, assign a resource responsible for undertaking the action and a date within which the action must be completed. For example, using the schedule risk:

| Level | ID | Preventative Actions | Resource | Action Date | Contingent Actions | Action Resource | Action Date |
|---|---|---|---|---|---|---|---|
| | 2.2 | Clearly quantify the expected business benefits in the Business Case document | Project Sponsor | | Measure the actual business benefits achieved by the project | Project Manager | |
| High | 1.2 | Clearly specify the customer requirements in the Quality Plan | Project Manager | | Reconsider the requirements after the deliverable has been produced, measure any deviation and enhance the deliverable to meet the requirements | Project Manager | |
| High | 1.3 | Clearly specify the quality criteria used to determine that the stated requirements for each deliverable have been met within the Quality Plan | Quality Manager | | Reconsider the quality criteria after the deliverable has been produced, measure any deviation and enhance the deliverable to meet the quality criteria set | Quality Manager | |

The above table will be completed for every risk identified. Higher priority risks will be assigned more comprehensive actions where possible.

# Section E

**Please See the Drawing Tubes for the Draft Design**

**Section F**

**Please See the Drawing Tubes for the Draft Schedule**

City of Boston – Critical Infrastructure Monitoring System (CIMS)
Smiths Detection Inc.  Security Sensitive Information – For Official Use Only

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# Section G




**Proposed Integration Procedures are Explained in the Technical Approach**

City of Boston – Critical Infrastructure Monitoring System (CIMS)
Smiths Detection Inc. Security Sensitive Information – For Official Use Only

p. 176

Attachment A
Contract Documents

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## CITY OF BOSTON /COUNTY OF SUFFOLK

## CONTRACTOR CERTIFICATION*

To the Official, acting in the name and behalf of the City of Boston/County of Suffolk:

A.    The undersigned agrees to furnish all labor and materials and to perform all work required for:

**The Critical Infrastructure Monitoring System, as described in the RFP dated March 19, 2007 as amended.**

in accordance with the terms of the accompanying contract documents.

B.    The Contractor is a/an    **Corporation**
(Individual-Partnership-Corporation-Joint Venture-Trust)

1.  If the Contractor is a <u>Partnership</u>, state name and residential address of all partners:

**N/A**

2.  If the Contractor is a <u>Corporation</u>, state the following:

Corporation is incorporated in the State of    **Nevada**

President is    **Tim Picciotti**

Treasurer is    **Charisse Chel**

Place of business is    **88 Silva Lane, Suite 250
Middletown, RI 02842**

3.  If the Contractor is a <u>Joint Venture</u>, state the name and business address of each person, firm or company that is party to this joint venture:

**N/A**

A copy of the joint venture agreement is on file at and will be delivered to the Official on request.

**N/A**

**[*NOTE: This form should be included with all contracts awarded without advertising.]**

4.  If the Contractor is a <u>Trust</u>, state the name and residential address of all Trustees:

**N/A**

The trust document(s) are on file at _    **N/A**
and will be delivered to the Official on request.

C.   If the business is conducted under any title other than the real name of the owner, state the time when, and place where, the certificate required by General Laws, c.110, §5, was filed:

<p align="center">N/A</p>

D.   The Taxpayer Identification Number* of the contractor (the number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941) is:

<p align="center">22-3552023</p>

*If individual use Social Security Number:

E.   Pursuant to M.G.L. c.60, §93, the undersigned certifies that the Collector-Treasurer of the City of Boston may withhold from amounts owing and payable to the Contractor under this contract any sums owed to any department or agency of the City of Boston which remain wholly or partially unpaid. This shall include but not be limited to unpaid taxes and assessments, police details, and any other fees and charges until such sums owed have been paid in full, and the Collector-Treasurer further may apply any amount owing and payable to the Contractor to satisfy any monies owed to the City.

F.   Pursuant to M.G.L. c.62C, §49A, the undersigned certifies under the penalties of perjury that to the best of his/her knowledge and belief all state tax returns have been filed and all state taxes required under law have been paid. (NOTE: The Taxpayer Identification Number will be furnished to the Massachusetts Department of Revenue to determine compliance with the above-referenced law).

Contractor:     **Smiths Detection-LiveWave**

By: X _____
                           (Sign Here)

Business Address:

**88 Silva Lane, Suite 250**
**Middletown, RI 02842**

NOTE: This statement must bear the written signature of the contractor.

If the Contractor is an individual doing business under a name other than his own name this statement must so state, giving the address of the individual.

If the Contractor is a partnership this statement must be signed by a general partner designated as such.

If the Contractor is a corporation, trust or joint venture this statement must be signed by a duly authorized officer or agent of such corporation, trust or joint venture.

APPROVED AS TO FORM BY CORPORATION COUNSEL FEBRUARY, 1998
THIS FORM IS VOID AND WITHOUT LEGAL EFFECT IF ALTERED IN ANY WAY
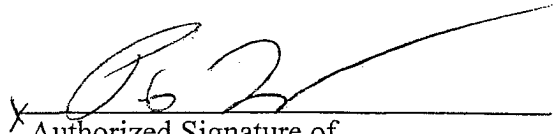
# STATE TAX RETURN CERTIFICATE

The City of Boston is subject to Section 49A of Chapter 62C of the Massachusetts General Laws which provides, in subsection (b), "[t]hat no contract or other agreement for the purposes of providing goods, services or real estate space ... shall be entered into, renewed or extended with any person unless such person certifies in writing, under the penalties of perjury, that had complied with all laws of the commonwealth relating to taxes."

## CERTIFICATION

Pursuant to M.G.L. Chapter 62C, Section 49A, I certify under the penalties of perjury, that to my best knowledge and belief, I have filed all state tax returns and paid all state taxes required under law.

Smiths Detection-LiveWave (Peter Mottur)
_____
Name of Bidder or Proposer

X _____
Authorized Signature of
Bidder of Proposer

22-3552023
_____
Social Security #
Federal Identification #

_____ 4/25/2007 _____
Date

Approval of a contract or other agreement will not be granted unless this certificate is signed by the bidder.

Social Security number or Federal Identification number, as applicable, will be furnished to the Massachusetts Department of Revenue to determine compliance with the above-referenced law.

# SMITHS DETECTION INC.

## UNANIMOUS WRITTEN CONSENT OF DIRECTORS

### January 6, 2006

THE UNDERSIGNED, being all the members of the Board of Directors (the "Board") of SMITHS DETECTION INC., a Nevada corporation (the "Company"), pursuant to Section 78.315 of the Nevada Business Corporation Act, by unanimous written consent in lieu of a meeting, as evidenced by the signatures set forth below, hereby adopt the following resolutions and agree that adoption of such resolutions shall be valid and binding with the same force and effect as though such resolutions had been adopted at a meeting of the Board duly noticed, called and held:

## APPOINTMENT OF PETER MOTTUR AS AUTHORIZED REPRESENTATIVE

RESOLVED, that Peter Mottur be, and he hereby is, authorized to act as an authorized representative of the Company (the "Authorized Representative") with respect to all matters arising from or relating only to the Company's Newport, Rhode Island site and as such he is authorized, empowered and directed, for and on behalf of the Company, to execute and deliver contracts, proposals, bids, solicitations and any documents in connection therewith, with such changes to the documents as the Authorized Representative shall deem necessary or appropriate, such judgment to be conclusively evidenced by the execution thereof by the Authorized Representative.
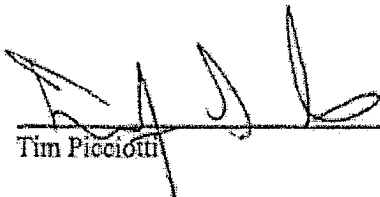
## GENERAL AUTHORITY

RESOLVED, that this Consent may be (1) executed in counterparts and all such counterparts shall constitute one consent, notwithstanding that all directors may not be signatories to the same counterpart; and (2) executed and delivered by facsimile and upon such delivery the facsimile signature will be deemed to have the same effect as if the original signature had been delivered.

IN WITNESS WHEREOF, the undersigned have caused this Unanimous Written Consent of Directors to be duly executed as of day first set forth above.

_____          _____
Charisse Chel                        David J. Kuckelman

_____
Tim Picciotti

IN WITNESS WHEREOF, the undersigned have caused this Unanimous Written Consent of Directors to be duly executed as of day first set forth above.

_____
Charisse Chel

_____
David J. Kuckelman

_____
Tim Picciotti

ARTICLE 1 -- DEFINITION OF TERMS:

1.1 The following terms or pronouns used in their stead wherever they appear in these Contract documents shall be construed as follows:

1.1.1 "City" shall mean the City of Boston or the County of Suffolk.

1.1.2 "Contract" and "Contract Documents" shall include, as applicable, all Advertisements, Invitations for Bids, Requests for Proposals, Proposals, Applications, Purchase Description/Specifications, Evaluation Criteria, Performance Bonds, General Conditions/Special Agreements/Requirements Contract General Provisions, letter to the Mayor of Boston concerning the award of the Contract, and all amendments thereto, which documents are incorporated herein by reference.

1.1.3 "Contractor" shall mean the individual, partnership, corporation or other entity to whom this Contract is awarded.

1.1.4 "Official" shall mean the awarding authority/officer acting on behalf of the City in the execution of the Contract.

ARTICLE 2 – PERFORMANCE:

2.1 The Contractor shall conform to all determinations and directions, in accordance with provisions of this Contract, of the Official concerning all questions which may arise relating to the performance of services under this Contract.

2.2 The Contractor shall, upon written request of the Official, remove from City premises and replace all individuals in the Contractor's employ whom the Official determines to be disorderly, careless or incompetent or to be employed in violation of the terms of this Contract.

2.3 All work papers, reports, questionnaires and other written materials prepared or collected by the Contractor in the course of completing the work to be performed under this Contract shall at all times be the exclusive property of the City. The Contractor shall not use such materials for any purposes other than the purpose of this Contract without the prior written consent of the Official.

ARTICLE 3 – ACCEPTANCE OF SERVICE:

3.1 The City shall have a reasonable opportunity to inspect all service performed by and work product of the Contractor and accept or reject such service or work product.

ARTICLE 4 -- TIME:

4.1 It is understood and agreed that all specified times or periods of performance are of the essence of this Contract.

ARTICLE 5 – COMPENSATION:

5.1 The Contractor may, in the absence of a payment schedule, periodically submit to the Official invoices, itemizing service, labor and expenses for which compensation is due and requesting payment for services rendered by the Contractor during the period covered by the invoice.

5.2 Thereupon the Official shall estimate the value of services accepted by the City, and City shall pay to the Contractor such amount less sums retained under the provisions of Article 8 of these General Conditions.

5.3 The City shall pay in full and complete compensation for services performed under this Contract in an amount not to exceed the amount shown on the face of this Contract paid in accordance with the rate indicated or in accordance with a prescribed scheduled.

5.4 In the event that this Contract provides for reimbursement by the City to the Contractor for travel or other expenses, the Contractor shall submit such proposed expenses to the Official for approval prior to the incurrence of such expenses, unless the Contract specifically provides otherwise.

5.5 The Contractor shall furnish such information, estimate or vouchers relating to the services or to documentation of labor or expenses as may be requested by the Official.

ARTICLE 6 -- RELATIONSHIP WITH THE CITY

6.1 The Contractor is retained solely for the proposes of and to the extent set forth in this Contract. Contractor's relationship to the City during the term of this Contract shall be that of an independent Contractor. The Contractor shall have no capacity to involve the City in any contract nor to incur any liability on the part of the City. The Contractor, its agents or employees shall not be considered as having the status or pension rights of an employee; provided that the Contractor shall be considered an employee for the purpose of General Laws c. 268A (the Conflict of Interest Law). The City shall not be liable for any personal injury to or death of the Contractor, its agents or employees.

6.2 Unless all the terms and conditions for the delivery or provision of goods or services by the Contractor to the City specified by this Contract are expressly set forth in a writing incorporated herein by reference, such delivery of goods or services shall require written approval of or direction by the Official prior to the incurrence of any liability by the City.

6.3 All alterations or additions, material or otherwise, to the terms and conditions of this Contract must be in writing and signed by the Official and Contractor and filed with the City Auditor.

6.4 Any waiver, expressed or implied, by the City or the Official of any rights, terms or conditions of this Contract shall not operate to waive such rights, terms or conditions or any other rights, terms or conditions, beyond the specific instance of waiver.

ARTICLE 7 – ASSUMPTION OF LOSS AND LIABILITY:

7.1 The Contractor shall pay and be exclusively responsible for all debts for labor and material contracted for by Contractor for the rental of any appliance or equipment hired by Contractor and/or for any expense incurred on account of services to be performed under this Contract.

7.2 The Contractor shall bear all loss resulting from any cause before performance of services is completed and after performance of services if the service or work product fails to conform to specifications.

7.3 The Contractor shall assume the defense of and hold the City, its officers, agents or employees, harmless from all suits and claims against them or any of them arising from any act or omission of the Contractor, its agents or employees in any way connected with performance under this Contract.

ARTICLE 8 - REMEDIES OF THE CITY:

8.1 If the Contractor shall provide services in a manner which is not to the satisfaction of the Official, the Official may request that the Contract refurnish services at no additional cost to the City until approved by the Official. If the Contractor shall fail to provide services or shall provide services which are not satisfactory to the Official, the Official, in the alternative, may make any reasonable purchase or Contract to purchase services in substitution for those due from the Contractor. The City may deduct the cost of any substitute Contract or nonperformance of services together with incidental and consequential damages from the Contract price and shall withhold such damages from sums due or to become due to the Contractor.

8.2 If the damages sustained by the City as determined by the Official exceed sums due or to become due, the Contractor shall pay the difference to the City upon demand.

8.3 The Contractor shall not be liable for any damages sustained by the City due to the Contractor's failure to furnish services under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurence of which was a basic assumption under which this Contract was made, including but not necessarily limited to a state of war, act of enemies, embargoes, expropriation or labor strike or any unanticipated federal, state, or municipal governmental regulation or order, provided that the Contractor has notified the Official in writing of such cause within fourteen (14) days after its occurrence.

8.4 This Contract may be terminated at any time for the convenience of the City at the option of the Official by delivering or mailing to the Contractor at the Contractor's business address a written notice of termination setting forth the date, not less than seven (7) days after the date of such delivery or mailing, when such termination shall be effective. In the event of such termination for convenience, the Contractor shall be compensated for services rendered to the effective date of said termination in accordance with the rates of compensation specified in this Contract.

ARTICLE 9 – REMEDIES OF CONTRACTOR:

9.1 If damages, other than loss on nonconforming services or on services not performed, are actually sustained by the Contractor due to any act or material omission for which the City is legally responsible, the City may allow a sum equal to the amount of such damages sustained by the Contractor as determined by the Official in writing, provided the Contractor shall have delivered to the Official a detailed written statement of such damages and cause thereof within thirty (30) days after the act or material omission by the City.

ARTICLE 10 - PROHIBITION AGAINST ASSIGNMENT:

10.1 The Contractor shall not assign, delegate, subcontract or in any way transfer any interest in this Contract without prior written consent of the Official.

ARTICLE 11 - COMPLIANCE WITH LAWS AND PUBLIC POLICY:

11.1 This Contract is made subject to all laws of the Commonwealth of Massachusetts.

11.2 The Contractor shall provide, at its sole expense, all necessary licenses, permits or other authorizations required by the City, the Commonwealth of Massachusetts or any other governmental agency with proper jurisdiction.

11.3 The Contractor shall where applicable take out and maintain during the term of this Contract such Worker's Compensation insurance as may be reasonably necessary to protect the Contractor from claims under General Laws c. 152 (the Worker's Compensation Law).

11.4 The Contractor agrees and shall require any subcontractor to agree not to discriminate in connection with the performance of work under the Contract against any employee or applicant for employment because of sex, race, religious creed, national origin or age. The Contractor agrees and shall require any subcontractor to agree to post in conspicuous places notices to be provided by the Massachusetts Commission Against Discrimination, setting forth provisions of the Fair Employment Practice Law of the Commonwealth.

11.5 The Contractor's attention is called to General Laws c. 268A (the Conflict of Interest Law). The Contractor shall not act in collusion with any City officer, agent, employee or any other party, nor shall the Contractor make gifts regarding this Contract or any other matter in which the City has a direct and substantial interest.

11.6 The Contractor shall keep himself fully informed of all City Ordinances and Regulations, and State and Federal laws, which in any manner affect the work herein specified. The Contractor shall at all times observe and comply with said ordinances, regulations or laws, and shall protect and indemnify the City, its officers, agents and employees against any claim or liability arising from or based on the violations of such ordinances, regulations or laws, caused by the negligent actions of the Contractor, his agents, or employees.

11.7 In furtherance of the Mayor's Executive Order "Minority and Women Business Enterprise Development" dated December 31, 1987 and the Ordinance entitled "Promoting Minority and Women Owned Business Enterprises in the City of Boston" (Ordinances of 1987, Chapter 14), it is understood and agreed by the Contractor, and the Contractor by the execution of this Contract so certifies, as follows: (1) That the contractor shall actively solicit bids for the subcontracting of goods and services from certified minority and women businesses; (2) That in reviewing substantially equal proposals the Contractor shall give additional consideration to the award of subcontracts to certified minority and women bidders.

ARTICLE 12 -- AVAILABLE APPROPRIATION:

12.1 This Contract is subject to the availability of an appropriation therefor.

12.2 If the Contract is funded under a grant with the Federal Government, it is being executed without further appropriation pursuant to General Laws c. 44, s.53A.

12.3 When the amount of the City Auditor's certification of available funds is less than the face amount of the Contract, the City shall not be liable for any claims or requests for payment by the Contractor which would cause total claims or payments under this Contract to exceed the amount so certified.

12.4 Unless otherwise expressly provided in a writing incorporated herein by reference, the amount certified by the City Auditor as available funds under this Contract may be increased or decreased by the Official with the written approval of such change by the City Auditor. In the event of any decrease in the amount certified, the Contractor shall be compensated for services rendered to the effective date of such reduction, in accordance with the rates of compensation specified in this Contract.

ARTICLE 13 – RELEASE OF CITY ON FINAL PAYMENT:

13.1 Acceptance by the Contractor of payment from the City for final services under this Contract shall be deemed to release forever the City from all claims and liabilities, except those which the Contractor notifies the Official in writing within six (6) months after such payment.

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City of Boston – Critical Infrastructure Monitoring System (CIMS)
Smiths Detection Inc. Security Sensitive Information – For Official Use Only

p. 187

Wednesday, April 18, 2007


City of Boston
Boston City Hall
Room 603, One City Hall Plaza
Boston, MA 02201


RE:   Smiths Detection – LiveWave
      Obligee   :   City of Boston
      Project   :   Critical Infrastructure Monitoring System
      E.C.P.    :   $7,000,000.00
      Bid Date :   4/20/2007


To Whom It May Concern:

This is to advise that **Smiths Detection- LiveWave** is a client of the Westchester Fire Insurance Company. As such, we are willing to consider executing the final bond (s) for the above captioned project, subject to: negotiations of a mutually acceptable contract; confirmation on the adequacy of financing of the project; and full underwriting particulars necessary to finalize this commitment.

We have supported **Smiths Detection- LiveWave** on single projects of this size in the past, and it is our expectation that, subject to the above considerations, we will be in a position to support the bond (s) required for this project.

It is understood, of course, that any arrangements for the performance bond are a matter between ourselves and **Smiths Detection-LiveWave.** We assume no liability to third parties or to you if for any reason we do not execute the said bond (s).

**Westchester Fire Insurance Company**



By: _____
      *Carolyn E. Wheeler*, Attorney-in-Fact

# Power of Attorney

278456

**WESTCHESTER FIRE INSURANCE COMPANY**    1189517

**Know all men by these presents:** That WESTCHESTER FIRE INSURANCE COMPANY, a corporation of the State of New York, having its principal office in the City of Atlanta, Georgia, pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business(each a "Written Commitment"):

(1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.

(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.

(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(4) Each of the Chairman, the President and Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

FURTHER RESOLVED, that the Resolution of the Board of Directors of the Company adopted at the meeting held on November 8, 1999 relating to the authorization of certain persons to execute, for and on behalf of the Company, Written Commitments and appointments and delegations, is hereby rescinded."

Does hereby nominate, constitute and appoint BARBARA A. THOMPSON, CAROLYN E. WHEELER, LESLIE PATTERSON, NOVETTA ANDERSON and KELLIE TURNER all of the City of Knoxville, State of Tennessee each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Ten Million Dollars ($10,000,000) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office.

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the corporate seal of the said WESTCHESTER FIRE INSURANCE COMPANY this 18th day of January, 2007.

**WESTCHESTER FIRE INSURANCE COMPANY**

_Stephen M. Haney_

Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA        ss.

On this 18th day of January, A.D. 2007, before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the WESTCHESTER FIRE INSURANCE COMPANY to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company; that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.
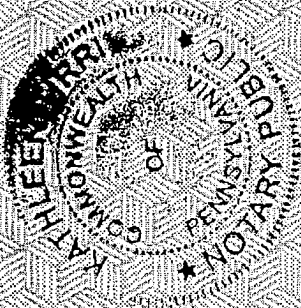
> NOTARIAL SEAL
> Kathleen Tirri, Notary Public
> Philadelphia, Philadelphia County
> My commission expires September 22, 2007

_Kathleen Tirri_

Notary Public

I, the undersigned Assistant Secretary of WESTCHESTER FIRE INSURANCE COMPANY, do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 18 day of April 2007.

_William L. Kelly_

William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER January 18, 2009.
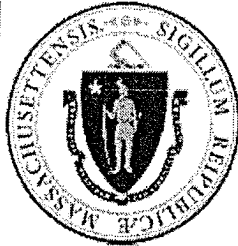
FORM NO. 8800S

Attachment C
TRC Engineers LLC

State of Massachusetts Certificate

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# The Commonwealth of Massachusetts
# William Francis Galvin

Minimium Fee: $500.00

Secretary of the Commonwealth
One Ashburton Place, Boston, Massachusetts 02108-1512
Telephone: (617) 727-9640

## Annual Report
### (General Laws, Chapter )

**Federal Employer Identification Number:** 010526475 *(must be 9 digits)*

**Annual Report Filing Year:** 2006

**1. The exact name of the Foreign Limited Liability Company (LLC) is:** E/PRO ENGINEERING AND ENVIRONMENTAL CONSULTING LLC

**If the exact name is not available for use in the Commonwealth of Massachusetts, state the name the Foreign Limited Liability Company (LLC) *will use* to transact business in the Commonwealth of Massachusetts:** #

**2. The Limited Liability Company is organized under the laws of:** State: ME   Country: USA
**The date of its organization is:** 05/17/1999

**3. The general character of business, and if the limited liability company is organized to render professional service, the service to be rendered:**
RENDER PROFESSIONAL ENGINEERING SERVICES AND ENGINEERING CONSULTING SERVICES.

E/PRO ENGINEERING AND ENVIRONMENTAL CONSULTING LLC WILL ABIDE BY AND BE SUBJECT TO ANY CONDITIONS OR LIMITATIONS ESTABLISHED BY THE BOARD OF REGISTRATION OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS OF THE COMMONWEALTH OF MASSACHUESETTS DIVISION OF REGISTRATION, INCLUDING ANY APPLICABLE PROVISIONS REGARDING LIABILITY INSURANCE. THE FOLLOWING ARE DULY LICENSED TO PRACTICE PROFESSIONAL ENGINEERING SERVICES:
GARY L. BEANE, WILLIAM F. HANLON, MARK A. TESSIER, THOMAS R. BRUNNER, CHARLES E. BROWN, HERBERT T. PALMER, KIEU NGUYEN, ROBERT E. HARVEY.

**4. Location of its principal office:**
No. and Street:          249 WESTERN AVENUE
City or Town:          AUGUSTA          State: ME          Zip: 04330          Country: USA

**5. The location of its local address, if any:**
No. and Street:
City or Town:                    State:          Zip:          Country:

**6. The name and business address of each manager:**

| Title | Individual Name<br>First, Middle, Last, Suffix | Address (no PO Box)<br>Address, City or Town, State, Zip Code |
|---|---|---|
| MANAGER | KERRY SPURLING | 249 WESTERN AVENUE<br>AUGUSTA, ME 04330 USA |
| MANAGER | JEROME REINHARD | 249 WESTERN AVENUE<br>AUGUSTA, ME 04330 USA |
| MANAGER | MICHAEL A MURPHY | 249 WESTERN AVENUE<br>AUGUSTA, ME 04330 USA |
| MANAGER | JAMES MAYER | 249 WESTERN AVENUE<br>AUGUSTA, ME 04330 USA |

**7. The name and business address of the person in addition to the manager, who is authorized to execute documents to be filed with the Corporations Division, and at least one person shall be named if there are no managers.**

| Title | Individual Name<br>First, Middle, Last, Suffix | Address (no PO Box)<br>Address, City or Town, State, Zip Code |
|---|---|---|
| SOC SIGNATORY | MARTIN H DODD | 21 GRIFFIN ROAD NORTH<br>WINDSOR, CT 06095 |

**8. The name and business address of the person(s) authorized to execute, acknowledge, deliver and record any recordable instrument purporting to affect an interest in real property:**

| Title | Individual Name<br>First, Middle, Last, Suffix | Address (no PO Box)<br>Address, City or Town, State, Zip Code |
|---|---|---|
| Prior to August 27, 2001, Records can be obtained on Microfilm | | |

**9. Name and address of the Resident Agent:**
Name: NATIONAL REGISTERED AGENTS, INC.
No. and Street: 303 CONGRESS STREET, 2ND FLOOR
City or Town: BOSTON    State: MA    Zip: 02210    Country: USA

**10. If the foreign limited liability company has a specific date of dissolution, the latest date on which the limited liability company is to dissolve:**

SIGNED UNDER THE PENALTIES OF PERJURY, this 17 Day of January, 2007,
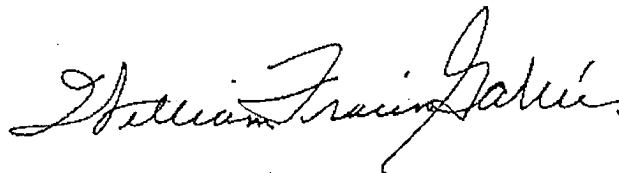MARTIN H. DODD , Signature of Authorized Signatory.

# THE COMMONWEALTH OF MASSACHUSETTS

I hereby certify that, upon examination of this document, duly submitted to me, it appears

that the provisions of the General Laws relative to corporations have been complied with,

and I hereby approve said articles; and the filing fee having been paid, said articles are

deemed to have been filed with me on:

January 17, 2007 9:03 AM

WILLIAM FRANCIS GALVIN

*Secretary of the Commonwealth*

0-9011-0

021

## AMENDMENT TO APPLICATION FOR REGISTRATION
## AS A FOREIGN LIMITED LIABILITY COMPANY
## OF
## E/PRO ENGINEERING AND ENVIRONMENTAL CONSULTING LLC

The Application for Registration as a Foreign Limited Liability Company filed August 8, 2000 pursuant to the provisions of Massachusetts General Laws Chapter 156C on behalf of the limited liability company (the "Company") is hereby amended as follows:

2. The name of the limited liability company is TRC Engineers, LLC. This is the same as the name under which the Company proposes to do business in the Commonwealth of Massachusetts.

This Amendment is signed and sworn to this _5ᵗʰ_ day of February, 2007.

Martin H. Dodd, Secretary and
Authorized Signatory

# State of Maine

## Department of the Secretary of State

*I, the Secretary of State of Maine, certify* that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and of the reports of formation, amendment and cancellation of articles of organization of limited liability companies and annual reports filed by the same.

*I further certify* that TRC ENGINEERS, LLC, formerly EPEC PROFESSIONAL LLC, formerly E/PRO ENGINEERING AND ENVIRONMENTAL CONSULTING LLC is a duly formed limited liability company under the laws of the State of Maine and that the date of formation is May 17, 1999.

*I further certify* that on:

| | |
|---|---|
| *May 17, 1999* | *ARTICLES OF ORGANIZATION were filed.* |
| *June 29, 1999* | *CHANGE OF LEGAL NAME was filed.* |
| *January 11, 2007* | *CHANGE OF LEGAL NAME was filed.* |

*No further amendments have been filed to date.*

*I further certify* that said limited liability company has filed annual reports due to this Department, and that no action is now pending by or on behalf of the State of Maine to forfeit the articles of organization and that according to the records in the Department of the Secretary of State, said limited liability company is a legally existing limited liability company in good standing under the laws of the State of Maine at the present time.

*In testimony whereof,* I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this twenty-fourth day of January 2007.

Check/Voucher # 242643

The Commonwealth of Massachusetts
Limited Liability Company
(General Laws, Chapter 156C)

Filed this ___15___ day ___February___

*[signature]*

1009525

William Francis Galvin
Secretary of the Commonwealth

Name Charlene Schultz

Phone 860 298 9678