OMNICAST

GENETEC OMNICAST ENTERPRISE 3.5
MANAGED VIDEO SERVICES SOFTWARE

A&E SPECIFICATIONS

1. MANAGED VIDEO SERVICES SOFTWARE (MVS)

A. The MVS shall be a highly scalable enterprise level software solution

B. The MVS will offer a complete video surveillance solution that will be scalable from one to hundreds of cameras that can be added on a unit-by-unit basis.

C. The MVS shall include the following applications:

i. Server Software Modules (SSM)
   a. Directory (System Server)
   b. Failover Directory
   c. Federation
   d. Internet Video broadcasting Server (IVS)
   e. Archiver
   f. Restore Archiver
   g. Redundant Archiver
   h. Failover Archiver
   i. Remote Redundant Archiver
   j. Virtual Matrix
   k. Media Gateway
   l. Watchdog
   m. Resource Administration Tool

ii. Client Software Applications (CSA)
   a. Configuration Tool
   b. Live Viewer
   c. Archive Player
   d. Mobile Live Viewer (Pocket PC)
   e. Web Live Viewer
   f. Web Archive Player
   g. Macro Editor
   h. Report Viewer

iii. Software Development Kit (SDK)

D. All video streams supplied from analog cameras or IP cameras shall be digitally encoded in MPEG-4, MPEG-2 or M-JPEG compression formats and recorded simultaneously in real time. The MVS shall interface with analog to digital video encoders and IP cameras, hereafter referred to as digital video servers (DVS). The MVS shall support DVS from various manufacturers.

   i. Bandwidth for MPEG-4 video streams using VSIP controlled DVS shall range from 8 Kbits/sec to 4 Mbits/sec, frame rates ranging from 1fps to 30fps for NTSC and 1fps to 25fps for PAL at resolutions ranging from ¼ CIF (176X128 NTSC, 176X144 PAL) to 4CIF (704X480 NTSC, 704X576 PAL). The system shall transmit video at 30fps at CIF (352X240 NTSC, 352X288 PAL) resolution using 512kbits. Other available resolutions include 2CIF (352X384 NTSC, 352X448 PAL), 2CIF-L (352X480 NTSC, 352x576 PAL), VGA (480x480 NTSC, 480x576 PAL), 2CIF-H (704x240 NTSC, 704x288 PAL).

   ii. Bandwidth for MPEG-4 video streams using RCP+ controlled DVS shall range from 9 Kbits/sec to 4 Mbits/sec, frame rates ranging from 1fps to 30fps for NTSC and 1fps to 25fps for PAL at resolutions ranging from ¼ CIF (176X120 NTSC, 176X144 PAL) to 4CIF (704X480 NTSC, 704X576 PAL).

   iii. Bandwidth for MPEG-4 video streams using Axis HTTP controlled DVS shall range from 128 Kbits/sec to 1 Mbits/sec for Advanced Simple Profile Level 3 and from 1Mbit/sec to 8Mbit/sec for Advanced Simple Profile Level 5, frame rates ranging from 1fps to 30fps at resolutions ranging from 160X120 to 640X480.

   iv. Bandwidth for MPEG-2 video streams using RCP+ controlled DVS shall range from 1 Mbit/sec to 5 Mbits/sec, frame rates ranging from 1fps to 30fps for NTSC and 1fps to 25fps for PAL at resolutions CIF (352x240 NTSC, 352X288 PAL) and 4CIF (704X480 NTSC, 704X576 PAL).

   v. Frame rates for M-JPEG video streams using Axis HTTP controlled DVS shall range 1fps to 30fps at resolutions ranging from 160X120 to 640X480.

E. The MVS shall comply with the VSIP Open Technical Framework for video services over IP, an open standard definition freely published by Genetec Information Systems Inc. and SmartSight Networks Inc. and enabling third parties to develop applications such as digital video servers (DVS) that can communicate with and integrate with VSIP compliant MVS software.

F. The MVS shall comply with the RCP+ framework for video services over IP, a protocol defined by Video Communications Systems AG that permits to interface RCP+ DVS with RCP+ compliant MVS software.

G. The MVS shall comply with the Axis HTTP framework for video services over IP, a protocol defined by Axis Communications that permits to interface Axis HTTP DVS with Axis HTTP compliant MVS software.

H. Each camera's bit rate, frame rate and resolution will be set independently from other cameras in the system, and altering these settings will not affect the recording and display settings of other cameras.

I. The MVS shall require no proprietary recording hardware, no hardware multiplexer or time-division technology for video or audio recording and monitoring.

J. The MVS shall be based on a true open architecture that shall allow for use of non-proprietary PC storage hardware that shall not limit the storage capacity and shall allow for gradual upgrades of recording capacity.

K. The MVS shall be able to use multiple CCTV keyboards to operate the entire set of cameras throughout the system, including cameras of various manufacturer's brands, including their PTZ functionalities (i.e.: Pelco keyboard controls Panasonic dome or vice-versa).

    i. The MVS shall support the following list of PTZ camera protocols:
        a. Bosch TC8650 & TC700 Series
        b. Canon VC-C1
        c. Canon VC-C4
        d. Cohu CCR communication protocol revision 1.0 including iDOME series
        e. Creco Black Box V2.4 Protocol
        f. DynaColor Speed Dome
        g. Guardall Dome
        h. GYYR Vortex V6 Series Cameras, VM Series Cameras and VDN Series Cameras
        i. Hytec HYTEC DTR 100 Z ADF NTSC
        j. Javelin J0308ACU, J0308ACULV, J0308ACUX
        k. JVC TK-676 PTZ
        l. Kalatel ASCII
        m. Merit Li-Lin Fastdome Protocol including PIH-7625 Series, PIH-7000 and PIH-7600 Series
        n. Panasonic Conventional
        o. Pelco D Protocol
        p. Pelco P
        q. Philips

r. Radian
s. Rvision Dome
t. Samsung SCC-641/643 SpeedDome
u. Sensormatic SpeedDome Ultra IV and AD DeltaDome
v. Sony Rvision
w. Sony Visca
x. VCL VCLTP protocol
y. Vicon V15UVS
z. Vicon V1x00R-PVP
aa. VideoAlarm VLPT400 EIA485/EIA 422 communication protocol

ii. The MVS shall support the following list of PTZ keyboard protocols:
   a. American Dynamics 2088 ASCII
   b. Bosch
   c. Panasonic
   d. Pelco ASCII
   e. Pelco P
   f. Radionics
   g. Samsung
   h. VideoAlarm Keyboard

iii. The MVS shall support the following CCTV matrix switches:
   a. American Dynamics 2150 series and MegaPower 1024 series matrix switchers
   b. Pelco 9760 and 9740 series matrix switches

iv. The MVS shall also support the following protocols:
   a. ISS thermal imaging cameras
   b. ISAP infra red camera
   c. FLIR ThermoVision Sentry series infra red cameras
   d. Quickset PTZ mount
   e. Astel PTZ Controller

v. The MVS shall support the following access control systems and access control system communication protocols:
   a. Pelco 9760-Data Translator
   b. iSecurePro by SimplexGrinnell
   c. Summit NT by Edwards ISS
   d. Cardax FT version 4.0 with OPC bridge interface

vi. The MVS shall support the following object recognition systems:
   a. ObjectVideo VEW 1.5 and 2.0
   b. IntelliVision Intelligent Video and Intelligent VMD

vii. The MVS shall support the following analog video walls:
   a. Barco

L. The MVS shall allow for a CCTV keyboard to be attachable directly to a encoder/decoder via its serial port and shall be able to control a Live Viewer application with the use of a PC.

M. The MVS shall allow users to activate all live viewing controls using a standard PC keyboard. All standard camera switching and automation functions of a CCTV keyboard shall be available using a PC keyboard.

N. The MVS shall have long-term storage capabilities on any Windows supported tape backup

O. The MVS shall digitally sign recorded video using 248-bit RSA public/private key cryptography. The user shall have the capability of changing the encryption key.

P. The MVS shall encrypt the VSIP control channel with SSL.

Q. The SSM shall transmit all command and control messages using TCP/IP protocol and use cryptographic keys based on SSL V.3.0 protocol when communicating with digital video servers (DVS) to prevent eavesdropping, tampering or message forgery.

R. The MVS shall allow for the configuration of a time zone for each camera connected to a DVS and for each SSM. For playback review, users shall have the ability to search for video based on the following options:

   i. local time of camera
   ii. local time of the SSM
   iii. local time of user's workstation
   iv. GMT Time
   v. other time zone

S. The MVS shall consist of server software modules (SSM) and client software applications (CSA)

T. Both the SSM and CSA shall run on Windows® 2000 with Service Pack 4 or Windows® XP Professional with Service Pack 1 or Windows® 2003 Server operating systems.

U. It shall be possible to install both the SSM and CSA on a single workstation or on separate workstations.

V. SSM and CSA shall be able to operate on separate networks.

W. The minimum configuration of the PC or PCs running the SSM shall be:

   i. The PC shall be based on a Pentium III ® CPU operating with a minimum speed of 1 GHz with 512 MB of RAM, 10/100Base T LAN card, and have two hard drives. The operating system and the database must reside on separate media (drives). The hard drive running the database must have a minimum size of 40GB.

X. The recommended configuration of PCs running the SSM to support management of 50 or more video/audio streams at 800 kbps each shall be:

i. The PC shall be a Pentium IV ® CPU operating with a minimum speed of 2 GHz with 1 GB of RAM, 10/100/1000 Base T LAN card. The operating system and the database must reside on separate media (drives). The hard drive running the database must have a minimum size of 40GB. The system supports SCSI and IDE hard drives. In the case of SCSI drives, the disk must be Ultra 160 SCSI or better. In the case of IDE drives, the HD speed must be 7200 RPM, Ultra ATA/66 or better. The hard drives must be purchased from one of the following manufacturers:
    a. IBM
    b. Maxtor
    c. Quantum
    d. Western Digital
    e. Seagate

Y. Audio and Video storage configuration for the SSM shall either be:
    i. Internal or external IDE organized or not in a RAID configuration;
    ii. Internal or external SCSI/Fibre Channel organized or not in a RAID configuration;
    iii. It shall be possible to include within the overall storage system disks located on external PCs on a LAN or WAN as well as;
    iv. Network Attached Servers (NAS) on a LAN or WAN as well as;
    v. Storage Area Networks (SAN);

Z. The SSM shall not limit the actual storage capacity configured per server

AA. MVS shall be upgraded from one version to another without the user having to uninstall the previous version.

BB. The recommended configuration of a PC running CSA to support simultaneous viewing of 16 cameras at an average bit rate of 600 kbps at CIF resolution shall be:

    i. The PC shall be a Pentium 4 ® CPU operating with a minimum speed of 2 GHz with 512 MB of RAM, 10/100 Base T LAN card, and 10 GB or larger hard drive.

    ii. The PC shall have a XGA (1024 x 768) graphics card with a minimum of 32MB of memory and with a hardware based YUV to RGB conversion support.

    iii. The CSA requires one of the following video cards for dual screen operation:
        a. nVidia GeForce 4 or better

2. SERVER SOFTWARE MODULES (SSM)

A. The SSM shall consist of the Directory, the Failover Directory, the Federation, the Archiver, the Virtual Matrix, the Internet Video broadcasting Server, the Restore Archiver, the Redundant Archiver, the Fail-Over Archiver, the Remote Redundant

Archiver, the Media Gateway, the Watchdog modules and the Resource Administration Tool.

B. The SSM shall offer the capability to be installed on several PCs to enable distributed archiving in a LAN or WAN environment. The SSM shall not limit the number of PCs which can be networked together to form a distributed archive server system.

2.1 Directory

A. The Directory shall maintain a catalogue of settings for all CSA, SSM and DVS in the system.

B. The Directory shall enable CSA to dynamically create connections between different DVS in the entire network and this on individual streams (audio, video, serial ports and digital I/Os)

C. The Directory shall give the capacity to view all DVS in a network even if the DVS are assigned to different archive servers.

D. The Directory, in the case that a camera signal is lost, shall detect the video loss and have the capability to alert the systems administrator.

E. The Directory shall receive all incoming events (motion detection and triggered digital input and relay output) in the system and take appropriate actions based on user-defined event/action relationships.

F. The Directory shall create an audit trail of events and user activities.

G. The Directory shall perform dynamic bandwidth management.

H. The Directory shall authenticate users and give access to the MVS based on predefined user access rights.

I. The Directory shall receive and log all of the following events:

   i. Alarm Events
      a. Active
      b. Forward
      c. Snooze
      d. Ack

   ii. Application Events
      a. Application Lost

   iii. Archiver Events
      a. Another VSIP Archiver
      b. Archiving stopped
      c. Backup started
      d. Backup success
      e. Backup failed
      f. Cannot write to any drive

g. Cannot write on a specified location
h. Database lost
i. Disk(s) full
j. Disk load is over 80%
k. Invalid custom encryption values

iv. Camera Events

a. Auto-Start Recording
b. Auto-Stop Recording
c. File Deleted
d. Motion on
e. Motion off
f. Signal Lost
g. Signal Recovered
h. User Start Recording
i. User Stop Recording
j. Digital Input Events
k. Digital input opening
l. Digital input closing

v. Macro Events

a. Macro Error
b. Macro Started
c. Macro Stopped
d. PTZ Events
e. PTZ Locked

vi. DVS Events

a. Signal lost
b. Signal recovered
c. Unit discovered
d. Unit lost

vii. User events

a. User Logon
b. User Logoff

viii. User-defined Events

a. User-defined events

J. The Directory shall have the capability to execute any of the following actions in response to any of the events listed above:

i. Archiving Actions

a. Start recording
b. Stop recording
c. Add a bookmark
d. Override with manual recording quality
e. Override with motion recording quality

f. Recording quality as standard configuration

ii. Monitoring Actions
   a. View a camera on an analog monitor
   b. View a camera in the Live Viewer
   c. View a camera in a free window in the Live Viewer
   d. View a map in the Live Viewer
   e. Display a URL address in a Live Viewer

iii. PTZ Actions
   a. Go to preset
   b. Run a pattern
   c. Set PTZ auxiliary
   d. Clear PTZ auxiliary

iv. User Notification Actions
   a. Send a message
   b. Send an alert sound
   c. Send an email
   d. Trigger Alarm

v. Output Relay Actions
   a. Set the output relay to inverse of the default state
   b. Set the output relay to its default state
   c. Set the output relay to on
   d. Set the output relay to off
   e. Set the output relay to pulse (pulse is configurable)

vi. Device Control Actions
   a. Send a string on the serial port

vii. Macro Actions
   a. Execute a macro

2.2 Failover Directory

A. The Failover Directory shall synchronize its configuration database with the Directory.

B. The Failover Directory shall take over as the MVS's Directory in the case that the primary directory fails.

C. The MVS shall support multiple Directory failovers.

D. Each part of the system that contains a Failover Directory can operate independently.

2.3 Federation

A. The MVS shall allow users to connect to multiple directories. Their access rights will be determined on a per directory basis.

2.4 Archiver

A. The Archiver shall use an event and timestamp database for advanced search of audio/video archives. This database shall be a Microsoft MSDE 2000 with Service Pack 3 or alternatively, shall be an Microsoft SQL 2000 Enterprise server with Service Pack 3.

B. The Archiver shall protect archived audio/video files and the system database against network access and non-administrative user access.

C. The Archiver shall digitally sign recorded video using 248-bit RSA public/private key cryptography. The user shall have the capability of changing the encryption key.

D. The Archiver shall offer a plug and play type hardware discovery service with the following functionalities:

   i. Automatically discover DVS units as they are attached to the network.

   ii. Discover DVS units on different network segments including the Internet and across routers with or without network address translation (NAT) capabilities.

E. The VSIP Archiver shall provide a pre-alarm and post-alarm recording option that can be set between one second and 5 minutes on a per cameras basis.

F. Shall provide the functionality of storing of video and audio streams based on triggering events such as:

   i. Digital motion detection
   ii. Digital input activation
   iii. Macros
   iv. Through SDK application recording

G. The Archiver shall perform Video Motion detection on each individual camera based on a grid of 1320 motion detection blocks. All of the video motion detection settings are configurable on schedule. A global sensitivity threshold is available to reduce motion detection sensitivity where video signal is noisy or a lot of false hits are incurred. Video motion detection itself can be set into four different modes:

   i. Full Screen: All 1320 blocks on screen are activated, a general threshold for the overall motion in the entire image can be set and when reached it can trigger recording and a motion event or a custom event.

   ii. Full Screen Unit: This is the same as the Full Screen but the motion detection takes place in the DVS

   iii. Detection Zone: Six overlapping zones can be defined in the 1320 blocks on screen, each of these zones has its own threshold and when reached each one of them can trigger recording and a motion event or a custom event. Each zone triggering its own event allows for the configuration of directional motion detection events and other complex motion detection logic.

iv. Detection Zone Unit: This is the same as the Detection Zone but the motion detection takes place in the DVS and only one zone is supported.

v. Disabled: No motion detection is made on this camera

H. The Archiver shall allow for multiple recording schedules to be assigned to a single camera, each schedule shall be created with the following parameters:

i. Video quality settings:
   a. Resolution
   b. Frame Rate
   c. Bit Rate

ii. Recording mode:
   a. Continuous
   b. On Alarm/Manual
   c. Manual
   d. Disabled

iii. Time and date settings
   a. Daily
   b. Weekly
   c. One Shot

I. The Archiver shall have the ability to dynamically change recording quality settings on alarm.

J. The Archiver shall have the capacity to communicate with DVS using 128 bits SSL encryption.

K. For network topologies that restrict the DVS from sending multicast UDP streams, the SSM shall act as a gateway and redirect audio/video streams to active viewing clients on the network using multicast UDP.

L. The Archiver shall keep a log and compile statistics on disk space usage.

M. The Archiver shall have the capacity to schedule backups of the video archives, with associated database events, to either a tape drive or mapped network drive.

N. The Archiver shall have the capacity to down-sample video streams for storage. The down-sampling options available are the following:

i. For MPEG-2 streams the down-sampling options are: 5 frame/s, 2 frames/s, 1 frame/s, 2 sec/frame, 5 sec/frame, 10 sec/frame, 15 sec/frame, 30 sec/frame, 60 sec/frame 120 sec/frame

ii. For MJPEG streams the down-sampling options are: 15 frames/s, 10 frames/s, 5 frames/s, 2 frames/s, 1 frame/s, 2 sec/frame, 5 sec/frame, 10 sec/frame, 15 sec/frame, 30 sec/frame, 60 sec/frame 120 sec/frame

iii. For MPEG-4 streams the down-sampling options are: 1 frames/s, 2 sec/frame, 5 sec/frame, 10 sec/frame, 15 sec/frame, 30 sec/frame. 60 sec/frame 120 sec/frame

2.5 The Redundant Archiver

A. The Redundant Archiver shall maintain a redundant copy of the data associated with the video, such as events, bookmarks and alarms.

B. The Redundant Archiver shall act as a hot standby, ready to take over the functions of a primary Archiver. Archiver Failover will occur in less than 1 minute. No action from the user will be required.

C. The Redundant Archiver shall support a 1 to N architecture. Redundancy is made on a camera by camera basis. Cameras from multiple Archivers can be assigned to the Redundant Archiver.

D. The Redundant Archiver shall maintain redundant copies of video and audio feeds from specific cameras from one or multiple archiving servers.

E. The Redundant Archiver shall use a multicast video stream from the DVS and shall not require an additional connection to any DVS

F. The MVS shall allow for multiple layers of Redundant Archivers, whereby if one Archiver fails, another will automatically assume command and control and recording on the Redundant Archiver will continue without interruption. Any Archiver in the system can be assigned Redundant Archiving duties.

2.6 Failover Archiver

A. The Failover Archiver shall act as a hot standby, ready to take over the functions of a primary Archiver. Archiver Failover will occur in less than 1 minute. No action from the user will be required.

B. The Failover Archiver shall support a 1 to N architecture. Cameras from multiple Archivers can be assigned to the Failover Archiver.

C. The MVS shall allow for multiple layers of Failover Archivers, whereby if one Archiver fails, another will automatically assume command and control of the DVS and start recording feeds and all associated events from that point. Any Archiver in the system can be assigned Failover Archiving duties.

2.7 Remote Redundant Archiver

A. The Remote Redundant Archiver shall have the ability to archive camera feeds through a public network (through internet, WAN, MAN).

B. The Remote Redundant Archiver shall use the DVS's live stream for recording.

C. The Remote Redundant Archiver shall use the IVS network stream redirection and load balancing capabilities.

2.8 Virtual Matrix

A. The Virtual Matrix shall have the capability of creating camera sequences with the following functionality:
    i. Each Sequence shall have a maximum of 500 cameras.
    ii. Each camera in the sequence shall have its own individual dwell time, from 1 to 60 seconds.
    iii. Each entry in a sequence shall have the capacity to trigger camera presets, patterns or auxiliaries.
    iv. Multiple users shall be able to view the same camera sequence simultaneously, users are able to pause the sequence without affecting other viewers.

B. The Virtual Matrix shall have the capability to create and execute VBScript Macros (or other scripting languages) on events or on schedules. Macros will give the MVS the capability to perform the following:
    i. Interface with Access Control Systems
    ii. Interface with Point of Sale Systems
    iii. Interface with Alarm Systems
    iv. Interface with Process Control Systems
    v. Interface with Building Management Systems
    vi. Interface with License Plate Recognition systems
    vii. Interface with Object Recognition Software
    viii. Interface with Facial Recognition Software
    ix. Interface with Heat, Ventilation and Air Conditioning systems
    x. Automate MVS operations

C. The Virtual Matrix shall have the capability to interface with video walls via a CCTV keyboard connected to a DVS decoder.

D. Shall support Advanced Alarm Management, which shall have the ability:
    i. To assign alarms and procedures to specific users or user groups
    ii. To escalate alarms to other users after a configurable time that an alarm has not been acknowledged
    iii. To allow a user to queue alarms, and view alarm history
    iv. To display on a workstation or an analog monitor an alarm composed of live video streams, playback video streams, or a set of still images of the alarm. A combination of these alarm display options can be configured for each alarm.
    v. To configure multiple cameras to display upon an alarm.
    vi. To display alarms in block or salvo mode.
    vii. To allow the user to configure priorities to alarms ranging from 1-255
    viii. To display an alarm pane with past alarms and associated data

E. The MVS shall have the ability to playback a video sequence on an analog monitor upon activation of an alarm or event. The length of the playback sequence shall be configurable, and may include pre and post video.

2.9 Internet Video broadcasting Server (IVS)

A. The IVS shall act as a proxy for a CSA or SSM connecting to the Directory via the Internet.

B. For network topologies that restrict a CSA from receiving multicast video and audio streams directly, the IVS shall act as a Gateway, to transform the streams in UDP or TCP streams.

2.10 Restore Archiver

A. The Restore Archiver shall have the capability to restore a previously backed up video archive and its associated event database, and make all information in the backup set available to the original or other MVS system.

2.11 Media Gateway

A. The Media Gateway shall enable the streaming of video from the MVS to an external media server, allowing for broadcasting of video in a standard format. The Media Gateway shall convert the video streams in a format supported by Windows Media Server.

B. The Media Gateway shall allow for the configuration of resolution and text overlay.

2.12 Watchdog

A. The Watchdog shall monitor operation of all SSM services and restarts them if they are malfunctioning. As a last resort, in the case where the watchdog is unable to restart the MVS, it will restart the PC.

2.13 Resource Administration Tool

A. The resource administration tool provides the capability to configure the running environment of the SSM modules such as:

i. Database Server
ii. Storage Disks
iii. Storage File Size
iv. SSL certificates
v. Encryption Keys
vi. DVS Discovery Options
vii. Network Connection Modes
viii. Network Connection Addresses and Ports

3. CLIENT SOFTWARE APPLICATIONS (CSA)

A. CSA shall consist of a Configuration Tool application, a Live Viewer application, an Archive Player application, a Web Live Viewer application, a Web Archive Player application, a Mobile Live Viewer application and an Event Report generating application.

B. The CSA shall perform the following applications simultaneously without interfering with any of the SSM operations (Recording, Alarms, etc.):

    i. Live display of cameras on a workstation
    ii. Live display of cameras on an analog monitor
    iii. Live display of camera sequences on a workstation
    iv. Live display of camera sequences on an analog monitor
    v. Control of PTZ cameras
    vi. Playback of archived video on a workstation
    vii. Playback of archived video on an analog monitor
    viii. Retrieval of archived video
    ix. Instant Replay of live video on a workstation
    x. Instant replay of live video on an analog monitor
    xi. Use of maps
    xii. Use of procedures
    xiii. Configuration of system settings
    xiv. Execution of system macros
    xv. Display and management of alarms on a workstation
    xvi. Display and management of alarms on an analog monitor
    xvii. Create and print snapshots of live video feeds
    xviii. Create and print snapshots of archived video feeds

C. All applications shall support any form of IP network connectivity, including: LAN, WAN, VPN, Internet, and Wireless (WiFi and Cellular) technologies.

D. All applications shall support IP Multicast (UDP) and Unicast (TCP or UDP)s video streaming.

E. All applications shall automatically adapt to the network topology and use the best available method to receive streaming video.

F. All applications shall provide an authentication mechanism, which verifies the validity of the user. As such, the administrator can define specific access-rights for each user in the system which include:

    i. Admin, or basic user
        a. Admin possesses all access-rights
        b. Each user can be assigned any access rights

    ii. Access or not to sites
    iii. Access or not to type of applications
    iv. List of privileges
        a. Applications:
            1. Live Viewer
            2. Archive Player
            3. Config Tool
            4. Macro Editor
            5. Web Live Viewer

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6. Web Archive Player
7. SDK
8. Pocket PC

v. Power Users:
   a. Sites Configuration
   b. Cameras Configuration
      1. Recording Settings
      2. View Settings
      3. Motion Mask Settings
      4. Deletion

   c. Analog Monitors Configuration Creation and Deletion
   d. Audio Configuration Creation and Deletion
   e. Serial ports Configuration Creation and Deletion
   f. PTZ Configuration Creation and Deletion
   g. Input Pins Configuration Deletion
   h. Output Pins Configuration Deletion
   i. Units Configuration
      1. Firmware upgrade
      2. Creation and Deletion

   j. Hardware Matrix Configuration Creation and Deletion
   k. Schedules and Coverages Configuration Creation and Deletion
   l. User-defined Events and Actions Configuration Creation and Deletion
   m. Alarms Configuration Creation and Deletion
   n. Macros Configuration Creation and Deletion
   o. Camera Sequences Configuration Creation and Deletion
   p. CCTV Keyboards Configuration Creation and Deletion
   q. Live Viewer Groups Configuration Creation and Deletion
   r. Camera Groups Configuration Creation and Deletion
   s. Viewer Layouts Configuration and Deletion
   t. Backup Operator
   u. Modify Logical Ids

vi. Archive Player privileges
   a. Export video files

vii. Live Viewer privileges
   a. Change the displayed entities
   b. Change the tile pattern
   c. Edit/Save the layout configuration
   d. Start/Stop guard tour
   e. Edit Guard Tour Dwell Time
   f. Audio (listen/talk)
   g. Access Digital Zoom
   h. Do Instant Replay
   i. Control Camera Sequences
   j. Execute Macros
   k. Change Macro Hot Key

viii. PTZ controls

a. Do basic operations
b. Change focus and iris settings
c. Use presets
d. Edit presets
e. Use patters
f. Edit patterns
g. Use auxiliaries
h. Edit auxiliaries
i. Use menu
j. Lock PTZ
    1. Override PTZ lock

ix. Other privileges
    a. Record Manually
    b. Add bookmarks
    c. View Camera on an analog monitor
    d. Send messages
    e. Send sounds
    f. Send emails
    g. Send on serial ports
    h. Execute custom actions
    i. Save and Print snapshots
    j. PTZ priority (for camera control)
    k. Camera blocking
    l. Local Recording

G. User groups shall be allowed to designate sub administrators that shall have the authority over a subset of users

H. Each workstation running the CSA shall be able to use a CCTV keyboard or PC Keyboard that can control the entire set of cameras throughout the system, even if the system consists of motorized cameras produced by different manufacturers.

I. All CSA applications shall allow for multiple instances to run simultaneously, by one or multiple users. The number of instances of the Live Viewer, Archive Player, Web Live Viewer, Web Archive Player and Mobile Live Viewer applications shall only be limited by the number of available application licenses.

J. The CSA applications shall provide administrators with the ability to block video streams to lower level users. The CSA provide the ability to set 10 different user levels. Higher priority users can block live video feeds to lower priority users.

3.1 CONFIGURATION TOOL (CSA)

A. The Configuration Tool application allows the administrator or users with appropriate access rights to change system configuration. It shall have the following minimum capabilities:

i. Shall provide decentralized administration of the entire system from anywhere on the network

ii. Camera Layouts shall be available to all users in the MVS and are stored in the directory and applied to all Live Viewer/Archiver Player applications connected to that directory.
iii. Shall provide the ability to change video quality, bandwidth and frame rate parameters on a per camera (stream) basis for both live and recorded video.
iv. Shall have the capability to define access and privileges by user group as well as by individual user from a menu in the CSA
v. Shall provide the ability to configure brightness, contrast and hue settings for each camera on the same DVS.
vi. Shall provide the capability to enable audio recording on DVS units that support audio
vii. Shall provide the ability to change audio parameters, serial port and I/O configuration of individual DVS units
viii. Shall provide the capability to rename all DVS units based on system topology and add descriptive site information to each DVS
ix. Shall provide the capability to regroup specific cameras together and restrict or enable access rights to this group on a per user basis
x. Shall provide the ability to set recording mode for each individual camera based on motion detection, alarm input, scheduled or continuous
xi. Shall provide a wizard to create complex macros that can activate on event. The wizard shall be available from a tab in the configuration Client Application and will allow the user to choose from a variety of common and complex commands:
    a. Go to Step
    b. Hide Sequence
    c. If Block
    d. Listen Audio on viewed Camera
    e. Next sequence
    f. Open serial port
    g. Override with manual recording quality
    h. Override with motion recording quality
    i. Prevent Replacement of connected tiles
    j. Previous Sequence
    k. Record viewed camera
    l. Recording quality as standard configuration
    m. Remove camera from tile
    n. Remove sequence from tile
    o. Remove tile
    p. Remove sequence
    q. Remove macro
    r. Run a macro
    s. Run a pattern
    t. Run script with content
    u. Send a message
    v. Send a message through the Archive Player
    w. Send a message through the Live Viewer
    x. Send an alert sound
    y. Send an e-mail
    z. Send custom action
    aa. Send custom event
    bb. Set callback interface

cc. Set current tile
dd. Set logged on user
ee. Set PTZ auxiliary
ff. Set output relay to its default state
gg. Set tile pattern
hh. Snooze alarm
ii. Start Backup
jj. Start recording
kk. Stop recording
ll. Talk on viewed camera
mm. View a map in the live viewer
nn. Wait
oo. Write serial port

xii. Shall support the creation of schedules to which any of the following parameters can be attached:
   a. Recording
   b. Motion Masks
   c. Events / actions
   d. Brightness, Contrast, Hue
   e. Input Relays
   f. User Logon
   g. Macros
   h. Alarms

xiii. Shall support creation of unlimited recording schedules and assign any camera to any schedules.
xiv. Shall detect and warn user of any conflict within assigned schedules
xv. Shall provide tools to define automatic actions to be taken in response to internal/external events.
xvi. Shall provide the capability to set a pan-tilt-zoom protocol to a specific DVS serial port and allow mixing domes of various manufacturers within a system
xvii. When a new unit is added to the MVS, it shall be assigned a default preset device name.
xviii. User shall have the ability to configure a return to home function after a predefined time of inactivity for PTZ cameras. The inactivity time is configurable from 1 to 7200 seconds.

3.2 LIVE VIEWER (CSA)

A. The Live Viewer application allows live viewing of video and live audio communications with individual DVS units. It shall have the following minimum capabilities:

i. Shall enable live monitoring of 1 to 16 video streams simultaneously on a single SVGA (800x600) monitor.
ii. Shall enable live monitoring of up to 32 video streams simultaneously on a computer supporting dual SVGA (800x600) monitor outputs.
iii. Shall enable operators to choose from a number of possible camera display patterns ranging from 1 tile to 16 tile patterns.
iv. Shall display all cameras attached to the system.
v. Shall display all camera sequences created in the system.

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vi. Shall allow operators to control (Pause/Play, skip forwards, skip backwards) Camera Sequences, without affecting other operators' ability to view and control the same sequence.
vii. Shall display all analog monitors attached to the system.
viii. All cameras, sequences and analog monitors shall be displayed in a logical tree.
ix. The operator shall be able to drag and drop a camera from a tree of cameras into a window or an analog monitor icon for live viewing.
x. The operator shall be able to drag and drop a camera sequence from a tree of cameras into a window or an analog monitor icon for live viewing.
xi. Video streams may be assigned to tiles that are not presently visible in the currently displayed pattern.
xii. Shall support Mapping functionality, where digital maps are used to represent the physical location of cameras and other devices throughout the surveillance system. Maps shall have the ability to contain hyperlinks so as to create a hierarchy of interlinked maps. The mapping functionality shall be able to import maps from any graphical software supporting BMP, JPEG and/or GIF image formats.
xiii. The operator shall be able to drag and drop a camera from a map into a window for live viewing.
xiv. The operator shall be able to click on an icon in a map to initiate a camera preset, run a pattern or send a I/O stream.
xv. Shall support the procedure functionality, where procedures can be triggered to appear during a certain event and can be used to provide detail instructions to the operator as to the actions he should take.
xvi. Shall support touch screen technology
xvii. The operator shall be able to optimize the monitor for touch screen technology
xviii. Shall support digital zoom on live camera video streams
xix. Shall support guard-tour (automatic sequencing of camera layouts) with a pre-assigned dwell time through pre-defined monitor views (for example: rotating views from a quad view to a 16 camera view to a full view at specified intervals)
xx. Shall allow the user to send streaming video to a Mobile Live Viewer
xxi. Each Live Viewer shall have an icon indicating the number of alarms in queue that are assigned to the user under in the Client Application. The alarms shall also be displayed in an alarm pane at the bottom of the screen. The alarm pane shall display the currently active alarms as well as alarms acknowledged, auto-acknowledged, forwarded and snoozed.
xxii. Shall allow for audio communication with DVS units. The operator shall have the option of using full duplex mode (to act as an IP intercom system) or for unidirectional audio. Audio shall be archived in the same relational database as video from cameras.
xxiii. The operator shall easily navigate between this application and the other CSA applications (if he has access rights) by single point and click functionality
xxiv. The operator shall be able to control pan-tilt-zoom, iris, focus, dome relays, dome patterns, dome presets and the dome configuration menus. He/she shall also be able to set an unlimited number of presets and patterns

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xxv. Each operator shall be assigned a PTZ priority ranging from 1 to 255. This allows a prioritization between operators on who has control over a camera.

xxvi. The system shall allow users to have the ability to lock PTZ control.

xxvii. Shall allow operators to bookmark important events for later retrieval on any archiving camera. Operators can uniquely name each bookmark in order to facilitate future searches.

xxviii. The operator shall be able to start/stop recording on any camera in the system, which is configured to allow manual recording, by clicking on a single button.

xxix. The operator shall have the capability to activate or de-activate viewing of all system events as they occur.

xxx. Shall allow operators to view an instant replay of the video for any archiving camera. The operator will be able to define the amount of time he wishes to go back (unlimited). As well he will be able to control the playback with:

a. Pause
b. Lock Speed
c. Forward Playback at: 1x,2x,4x,10x,20x,40x,100x.
d. Reverse Playback at: -10x, -20x, -40x, -100x.
e. Slow Forward Playback at: Frame by frame, 1/8x,1/4x,1/3x,1/2x,1x.
f. Slow Reverse Playback I-frame by I-frame.

xxxi. The Instant Replay function shall playback video at the time of the alarm when activated in a tile displaying an alarm. With a graphical timeline representation, the user shall be able to control what time he is looking at. The instant replay pane can be undocked to allow video window resizing.

xxxii. Users shall be able to take snapshots of live video feeds in the Live Viewer and be able to save or print the snapshots.

xxxiii. Shall allow operators to add bookmarks or view their instant replay in the Archive Player application by clicking on a single button in the Instant Replay tab.

xxxiv. The operator shall be able to choose and trigger an action from a list of actions. (see Directory Section I for list of events and actions)

xxxv. The user shall have the ability to execute frequently used macros from a pane in the Live Viewer.

xxxvi. The user shall be able to view the same camera multiple times in different tiles.

xxxvii. Users shall be able to archive live video streams locally on the workstation. No SSM need to be installed on the workstation. Recording is activated and terminated manually by the user. Two recording methods are available to the user:

a. Tile archiving: Video displayed within a specific tile is recorded. Cameras can be switched within a tile.
b. Layout archiving: Video streams displayed in all tiles within a specific layout are recorded. Cameras can be switched within the tiles.

xxxviii. Users shall be able to display a layout of video streams within a PC monitor that removes all non-video graphical components. Delimiters between tiles are two pixels wide.

xxxix. Users shall be able to control PTZ functions with a standard PC joystick.

3.3 ARCHIVE PLAYER (CSA)

A. The Archive Player application allows video and audio archive playback. It shall have the following minimum capabilities:

i. Shall support audio and video playback of any time span.
ii. Shall support the display of up to 16 archived video sequences at once.
iii. Shall enable operators to choose from a number of possible camera display patterns ranging from 1 tile to 16 tiles patterns.
iv. Shall allow the operator to select between synchronous playback of all selected video streams, allowing operators to view events from multiple angles or across several camera fields, or non-synchronous playback.
v. Shall allow the operator to simultaneously view the same camera in multiple tiles at different time intervals.
vi. Shall allow the operator to control the playback with:
    a. Pause
    b. Lock Speed
    c. Forward Playback at: 1x,2x,4x,10x,20x,40x,100x.
    d. Reverse Playback at: -10x, -20x, -40x, -100x.
    e. Slow Forward Playback at: Frame by frame, 1/8x,1/4x,1/3x,1/2x,1x.
    f. Slow Reverse Playback I-frame by I-frame.
vii. Shall display a single timeline, or optionally one timeline for each selected video stream, with which the operator can navigate through the video sequence by simply clicking on any point in the timeline.
viii. Shall display the level of motion at any point on a timeline.
ix. Shall clearly display bookmarks on the timeline(s).
x. Shall be able to query archived video from one or multiple archived video servers using various search criteria, including but not limited to, time, date, camera, site and past alarms.
xi. Shall display the drive on which a file is located in a results pane when a query search is performed in the Client Application
xii. Shall provide the tool to search video and associated audio on user-defined events or motion parameters.
xiii. Shall allow operators to define an area of the video field in which to search for motion as well as define the amount of motion that will trigger search results. The Archive Player then retrieves all archived video streams which contain motion which meets the search parameters. There shall be a graphical timeline where the time of each search hit shall be indicated.
xiv. Shall allow operators to browse through a list of all bookmarks created on the system and select any bookmarked even for viewing.
xv. Shall allow operators reviewing video to quickly skip between next and previous bookmarks.
xvi. Shall allow operators to load previously exported video files from their computer or network.
xvii. Shall allow operators to validate if a digitally signed video sequence has been tampered with or not.
xviii. Shall support digital zoom on playback video streams.

xix. Shall provide still image export to JPEG and BMP format with Date and Time stamp on the image.
xx. Shall provide tools to export video sequences and a self contained video player on various media such as a CD-ROM.
xxi. Shall provide tools to export video sequences in standard video formats, such as AVI and ASF.
xxii. Shall support playback of archived video to NTSC analog monitors for viewing or recording on VCR.
xxiii. The operator shall easily navigate between this application and the other CSA applications (if he has access rights) by single point and click functionality
xxiv. Shall allow queries to be saved upon closing the Archive Player Application and reappear when the application is reopened.
xxv. Shall allow the user to add bookmarks to previously archived video for easier searching and retrieval.

3.4 WEB MONITOR CLIENT (CSA)

A. The Web Live Viewer application allows live viewing of video and live audio communications with individual DVS units. It shall have the following minimum capabilities:

i. Shall require Internet Explorer 5.0 or higher.
ii. Shall be graphically identical to Live Viewer application for the functionalities that are available in the Web Live Viewer.
iii. Shall enable live monitoring of 1 to 16 video streams simultaneously on a single SVGA (800x600) monitor.
iv. Shall enable operators to choose from a number of possible camera display patterns ranging from 41 tile patterns to 16 tiles per patterns.
v. Shall display all cameras attached to the system.
vi. Shall display all camera sequences created in the system.
vii. Shall display all analog monitors attached to the system.
viii. All cameras, sequences and analog monitors shall be displayed in a logical tree.
ix. The operator shall be able to drag and drop a camera from a tree of cameras into a window or an analog monitor icon for live viewing.
x. The operator shall be able to drag and drop a camera sequence from a tree of cameras into a window or an analog monitor icon for live viewing.
xi. Shall support digital zoom on live camera video streams
xii. Shall support audio communication with DVS units. The operator shall have the option of using full duplex mode (to act as an IP intercom system) or for unidirectional audio. Audio shall be archived in the same relational database as video from cameras.
xiii. The operator shall easily navigate between this application and the other CSA applications (if he has access rights) by single point and click functionality
xiv. The operator shall be able to control pan-tilt-zoom, iris, focus, dome relays, dome patterns, dome presets and the dome configuration menus. He/she shall also be able to set an unlimited number of presets and patterns

xv. Each operator shall be assigned a PTZ priority ranging from 1 to 255. This allows a prioritization between operators on who has control over a camera.
xvi. The system shall allow users to have the ability to lock PTZ control
xvii. Shall allow operators to bookmark important events for later retrieval on any archiving camera. Operators can uniquely name each bookmark in order to facilitate future searches.
xviii. The operator shall be able to start/stop recording on any camera in the system, which is configured to allow manual recording, by clicking on a single button.

3.5 WEB ARCHIVE PLAYER (CSA)

A. The Web Archive Player application allows video and audio archive viewing. It shall have the following minimum capabilities:

i. Shall require Internet Explorer 5.0 or higher.
ii. Shall be graphically identical to Archive Player application for the functionalities that are available in the Web Archive Player.
iii. Shall support audio and video playback of any time span.
iv. Shall support the display of up to 16 archived video sequences at once.
v. Shall enable operators to choose from a number of possible camera display patterns ranging from 1 tile to 16 tile patterns.
vi. Shall allow the operator to select between synchronous playback of all selected video streams, allowing operators to view events from multiple angles or across several camera fields, or non-synchronous playback.
vii. Shall allow the operator to simultaneously view the same camera in multiple tiles at different time intervals.
viii. Shall allow the operator to control the playback with:
    a. Pause
    b. Lock Speed
    c. Forward Playback at: 1x,2x,4x,10x,20x,40x,100x.
    d. Reverse Playback at: -10x, -20x, -40x, -100x.
    e. Slow Forward Playback at: Frame by frame, 1/8x,1/4x,1/3x,1/2x,1x.
ix. Shall display a single timeline, or optionally one timeline for each selected video stream, with which the operator can navigate through the video sequence by simply clicking on any point in the timeline.
x. Shall display the level of motion at any point on a timeline.
xi. Shall clearly display bookmarks on the timeline(s).
xii. Shall be able to query archived video from one or multiple archived video servers using various search criteria, including but not limited to, time, date, camera, and site.
xiii. Shall provide the tool to search video and associated audio on user-defined events or motion parameters.
xiv. Shall allow operators to define an area of the video field in which to search for motion as well as define the amount of motion that will trigger search results. The Archive Player then retrieves all archived video streams which contain motion which meets the search parameters.
xv. Shall allow operators to browse through a list of all bookmarks created on the system and select any bookmarked even for viewing.

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xvi. Shall allow operators reviewing video to quickly skip between next and previous bookmarks.
xvii. Shall allow operators to load previously exported video files from their computer or network.
xviii. Shall allow operators to validate if a digitally signed video sequence has been tampered with or not.
xix. Shall support digital zoom on playback video streams.
xx. Shall provide still image export to JPEG and BMP format with Date and Time stamp on the image.
xxi. Shall provide tools to export video sequences and a self contained video player on various media such as a CD-ROM.
xxii. Shall provide tools to export video sequences in standard video formats, such as AVI.
xxiii. Shall support the export of archived video to NTSC analog monitors for viewing or recording on VCR.
xxiv. The operator shall easily navigate between this application and the other CSA applications (if he has access rights) by single point and click functionality

3.6 MOBILE LIVE VIEWER (CSA)

A. The Mobile Live Viewer application allows viewing on a handheld PC running Windows PocketPC 2003 OS. It shall have the following minimum capabilities:

i. Shall be compatible with any pocket PCs running PocketPC 2003 OS and with a 206Mhz processor or greater.
ii. Shall provide the ability to view and control live cameras via the following wireless IP networks:
    a. iDEN network: Packet data up to 19.2 kbits/s
    b. GPRS: Packet data up to 56 kbits/s
    c. 1XRTT: Packet data up to 70 kbits/s
    d. 802.11b: Up to 11 Mbit/s
    e. 802.11g: Up to 50 Mbits/s
    f. 802.11a: Up to 55 100 Mbit/s
iii. Shall have the ability to receive events and alarms, and execute macros

3.7 Report Viewer

A. The Event Reporting Application shall provide reports on system activity.

B. System events shall be logged into a Microsoft SQL server

C. The Event Reporting shall be equipped with templates for:
i. User activity Reports
ii. System Health reports
iii. Event/Action report

D. Database schema shall be made available to users for custom report generation.

4. SOFTWARE DEVELOPMENT KIT (SDK)

A. The SDK shall provide the capability to embed the monitor and archive player applications in third party applications. It shall have the following minimum capabilities:

i. Shall support Windows NT/2000/XP
ii. Shall support running in Internet Explorer 5.0 or higher for Web base solutions
iii. Shall support viewing of more than one live camera in the same application
iv. Shall support playback of a recorded camera for a given time span
v. Shall support export of a video sequence for a given time span
vi. Shall support high-level languages such as JScript, VBScript, Visual Basic, Java, C and C++
vii. Shall support different topologies of IP networks such as: LAN, WAN, VPN, Internet, Wireless and Cellular
viii. Shall support multicast streaming on LAN and WAN
ix. Shall support functionality that enables audio and video streams to go through NATs and Firewalls