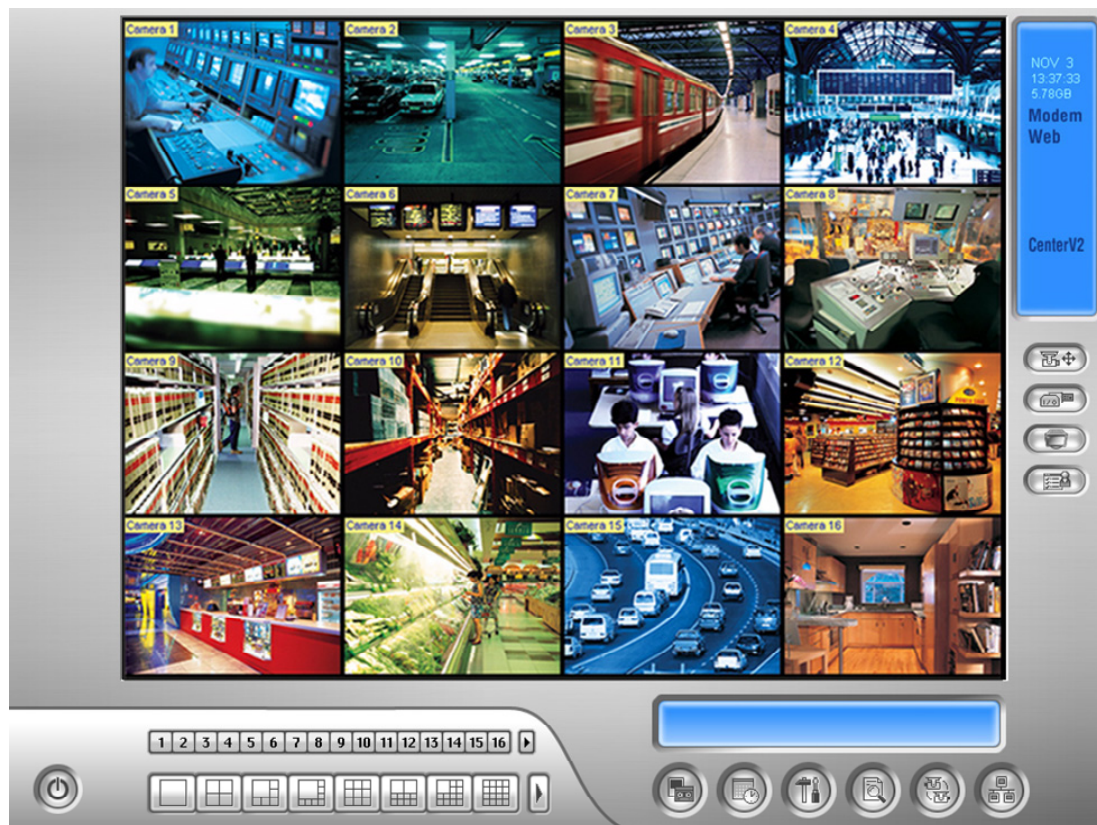


Architectural and Engineering Specifications

GV-NVR for Video Surveillance

Revision Date: 11/28/2012



Definitions

The GV-NVR described in the document shall be the GeoVision's video surveillance software.

- The GV-NVR will be referred to as "NVR" throughout the document.
- The GV-NVR shall be a software-based system which runs without requiring a GV-Video Capture Card and provide up to 32 IP channels.
- The specifications described in this document are based on GV-NVR version 8.5.6.0.

A. Live Viewing

1. It shall provide the following display modes:
 - a. Full screen
 - b. Screen rotation view (with customized time interval)
 - c. Multi-channel view (1, 4, 6, 8, 9, 10, 12, 16, 25, 32-channel views)
 - d. PIP (Picture in Picture) view
 - e. PAP (Picture and Picture) view
2. The main screen shall be compatible to wide screen format such as 1920x1200.
 - a. The following aspect ratio shall be available: 3:2, 4:3 and 5:4.
3. Motion, alarm events, digital input-triggered cameras shall be highlighted instantly with the following methods:
 - a. Pop up the video in full screen or in a central window
 - b. Trigger related digital output relay(s)
4. It shall have a covert camera feature, which removes the selected camera from live display but allows it to be recorded and viewed during playback by an authorized user.
5. Video attributes, like sharpness, saturation, brightness and contrast, can be modified to match the environment, providing the best optimal recording quality.
6. The following text overlay on the video shall be available with configurable position and font.
 - a. Camera name
 - b. Date and time
 - c. Triggered digital input's name
7. The system date/time, remaining hard disk space and active server information shall be shown on the main screen.
8. Multi-tasking support.
 - a. Recording

- b. Playback
 - c. Network Server services
 - d. Remote Operation
9. Instant playback of a specific camera shall be available during live viewing.
 - a. Playback duration of 10, 30, 60 and 300 seconds
 - b. Recording operation shall not be stopped
10. Users shall be able to take a snapshot of live scene.
11. It shall enhance live view with DirectDraw Scale and De-Interlace Render techniques to provide a sharper and crisp clear quality.
12. It shall support touch panel, virtual keyboard, surveillance keyboard, joystick and IR remote control without the need of conventional keyboard or mouse.
13. It shall support (limited) shortcut keys.
14. It shall support desktop lockup to prevent unauthorized applications other than NVR launch.
15. It shall support dual monitors, one for live viewing and the other for playback or other operation without obstructing surveillance scene.
16. Alerts like Video Loss or Connection Loss shall be displayed on inactive camera channel.
 - a. An acoustic tone shall play when video is lost.
17. It shall automatically start recording and other server services, and/or switch to user-defined account when system is in idle.
18. It shall support automatic reboot on the user-defined time to maintain system integrity.
19. It shall support 32kHz / 16 bit audio codec

B. Video Compression & Recording

1. It shall support encoding resolution from CIF to 5 MP.
2. Users shall be able to set up the maximum recording frame rate for motion and non-motion scene on each camera to save storage space.
3. It shall utilize the following compression codec: MPEG4, H.264, MJPEG, Standard MEPEG4, Standard H.264 and Standard MJPEG.
4. It shall support the following recording modes: round-the-clock, upon motion detection, by schedule, upon alarm events or upon input trigger.
5. For Motion Detection recording:
 - a. Up to 10 levels of motion detection sensitivities shall be available to minimize false alarm.
 - b. Users shall be able to define masked areas where motion will be ignored.
 - c. Users shall be able to set up to 3 levels of Noise Tolerance to ignore video noise under different illumination changes.
6. It shall support Pre and Post-Recording on motion or alarm events.
 - a. Pre-recording buffer shall use the hard disk. The pre-recording on the hard disk shall be up to 45 minutes.
 - b. Post-recording time shall be up to 15 minutes.
7. It shall support Noise Filter in which users shall be able to specify the video and audio channel to remove noise, and improve the image and audio quality.
8. It shall support Associate Recording in which one camera starts recording when any of associated cameras begin recording.
9. It shall support Automatic Snapshot to continue taking snapshots under monitoring.
 - a. The snapshots shall be saved in JPEG to be an alternative for AVI video format which needs much more storage space.
 - b. The snapshot frequency shall be user-defined.

10. Each archive shall contain no more than five minutes to reduce maintenance efforts and prevent data corruption.
11. It shall overwrite the older archives when the free storage space reaches the specified threshold or when the old archives reach the defined period of time, to keep continuous recording.
 - a. The video files shall be stored up to 999 days.
 - b. The threshold of free storage space shall be up to 99999 MB.
 - c. Users shall be able to enable the Never Recycle function to certain events to avoid overwriting.
12. It shall support watermark to avoid data manipulation and the watermarked video shall be used as evidence in court of law.

C. Object Management

1. It shall support People/Object Counting to count the number of people or objects entering and/or exiting an area.
 - a. Detection zone and object size shall be definable.
 - b. Up to 5 levels of motion sensitivities shall be available to avoid false alarm.
 - c. Recorded and/or live camera shall contain visual effect (bounding box) to highlight the counted people or object.
 - d. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - e. Up to 16 cameras shall be supported to lower CPU loading.
2. It shall support Intrusion Alarm. The computer alarm and output device should be triggered when any object crosses or is inside a defined area.
 - a. Detection zone and object size shall be definable.
 - b. Up to 5 levels of motion sensitivities shall be available to avoid false alarm.

- c. 2 types of intrusion alarms shall be available. The alarm shall be triggered when an object crosses the border of the defined zone slightly, or when an object is inside the defined zone fully.
 - d. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - e. Up to 16 cameras shall be supported to lower CPU loading.
 3. It shall support Object Index. Snapshots shall be taken from motion detection, which work as bookmarks in a separate window for later retrieval.
 - a. Users shall be able to define masked areas where motion detection will be ignored.
 - b. Clicking on the snapshot shall play back the specific scenario without entering date/time/camera.
 - c. Users shall be able to set up to 3 levels of Noise Tolerance to ignore video noise under different illumination changes.
 - d. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - e. Up to 16 cameras shall be supported to lower CPU loading.
 4. It shall support Face Detection. Human face shall be extracted and snapshot from motion detection.
 - a. Clicking on the snapshot shall play back the specific scenario without entering date/time/camera.
 - b. Users shall be able to set up to 3 levels of Noise Tolerance to ignore video noise under different illumination changes.
 - c. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - d. Up to 16 cameras shall be supported to lower CPU loading.
 5. It shall support Missing Object Detection for asset protection.
 - a. The object size shall be definable.

- b. Users shall be able to define masked areas where motion detection will be ignored.
 - c. Up to 4 levels of motion sensitivities shall be available to avoid false alarm.
 - d. Up to 4 levels of luminance changes shall be available to avoid false alarm.
 - e. Recorded and/or live camera shall contain visual effect (bounding box) to highlight the area where the defined object is missing.
 - f. The computer alarm and output device shall be triggered when the defined object is missing.
 - g. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - h. Up to 16 cameras shall be supported to lower CPU loading.
 - i. It shall support Advanced Version of Missing Object Detection.
 - 1. The advanced version shall be able to apply for the outdoors.
 - 2. Up to 16 cameras shall be supported to lower CPU loading.
6. It shall support Unattended Object Detection to detect any unidentified object appeared in the camera view.
- a. The object size shall be definable.
 - b. Users shall be able to define masked areas where motion detection will be ignored.
 - c. Up to 4 levels of motion sensitivities shall be available to avoid false alarm.
 - d. Up to 4 levels of luminance changes shall be available to avoid false alarm.
 - e. Recorded and/or live camera shall contain visual effect (bounding box) to highlight the unidentified object.
 - f. The computer alarm and output device shall be triggered when an unidentified object is placed.

- g. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - h. Up to 16 cameras shall be supported to lower CPU loading.
 - i. It shall support Advanced Version of Unattended Object Detection.
 - 1. The advanced version shall be able to apply for the outdoors.
 - 2. Up to 16 cameras shall be supported to lower CPU loading.
7. It shall support Privacy Mask to block out sensitive regions on the camera view.
- a. Users shall be able to set regions
 - b. Users shall be able to set password and use it to recover the blocked-out regions.
 - c. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
8. It shall support Digital Object Tracking to track up to 7 moving objects on the camera view using a standard camera.
- a. The object size shall be definable.
 - b. Users shall be able to define masked areas where motion detection will be ignored.
 - c. Users shall be able to enable automatic magnification of the targeted object.
 - d. The tracking shall be displayed in PIP (Picture in Picture) view or PAP (Picture and Picture) view to track multiple moving objects at the same time.
 - e. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
9. It shall support Face Count to count the number of faces detected in the camera view.
- a. Up to 16 cameras shall be supported to lower CPU loading.

- b. The face size shall be definable.
 - c. Users shall be able to define masked areas where motion detection will be ignored.
 - d. Up to 3 levels of detection sensitivities shall be available to avoid false alarm.
 - e. Recorded and/or live camera shall contain visual effect (bounding box) to highlight the detected face.
 - f. Users shall be able to set computer alarm and output device to trigger when a face is detected or not detected.
 - g. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
10. It shall support Scene Change Detection to detect when a camera has been physically tampered with.
- a. The computer alarm and output device shall be triggered when camera is covered, moved, and/or out of focus.
 - b. Up to 5 levels of detection sensitivities shall be available to avoid false alarm.
 - c. Users shall be able to define masked areas where scene change will be ignored.
 - d. The function shall work effectively even under sudden illumination changes.
 - e. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - f. It shall support Advanced Version of Scene Change:
 - The advanced version shall be able to apply for the outdoors.
 - Up to 16 cameras shall be supported to lower CPU loading.
11. It shall support Panorama View to combine multiple live views into a continuous scene. Up to 4 sets of Panorama Views shall be created.
12. It shall support Video Defogging to enhance foggy images.

- a. The minimum of 1 GB RAM shall be required for this function to work.
 - b. Users shall be able to adjust the image color and the level of image enhancement.
 - c. The function shall enhance the live images but not change the recorded video.
 - d. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
13. It shall support Video Stabilization to enhance blurry image caused by shaky camera.
- a. The minimum of 1 GB RAM shall be required for this function to work.
 - b. The function shall enhance the live images but not change the recorded video.
 - c. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.
 - d. Up to 4 cameras shall be supported to lower CPU loading.
14. It shall support Wide Angle Lens Dewarping to correct distortion towards the edge of the camera view.
- a. Users shall be able to adjust the degree of warping.
 - b. The function shall enhance the live images but not change the recorded video.
15. It shall support Advanced Motion Detection to detect motion in camera view.
- a. Users shall be able to choose the motion detection determined by either object size or motion sensitivity.
 - Users shall be able to define the maximum and minimum object size to detect the objects only within the size range.
 - Up to 5 levels of motion sensitivities shall be available to avoid false alarm.

- b. Users shall be able to set up to 3 levels of Noise Tolerance to ignore video noise under different illumination changes.
 - c. Users shall be able to define masked areas where motion will be ignored.
 - d. Users shall be able to enable the ignorance of environmental change such as rain or snow.
 - e. Users shall be able to specify minimum duration in seconds for motions to be detected.
16. It shall support Crowd Detection to generate an alert when a crowd of people gathers in the specified area past the defined period of time.
- a. Up to 16 cameras shall be supported to lower CPU loading.
 - b. Users shall be able to adjust up to 5 levels of sensitivities and the ratio of changes to avoid false trigger.
 - c. The computer alarm and output device shall be triggered when a crowd of people gathered longer than the specified time period.
 - d. The function shall work effectively even under sudden illumination changes.
17. It shall support Fisheye View to watch video of a fisheye camera
- a. Four view modes shall be available: Quad, 360 Degree, Dual 180 Degree and Single views.
 - b. Users shall be able to digitally rotate, zoom in and zoom out the camera view.
 - c. Users shall be able to enable object tracking to track a moving subject.
 - d. Users shall be able to enable hardware acceleration to support GPU de-warping of fisheye view.
 - e. Schedule settings shall be available. Users shall be able to maximize the use of cameras by setting up multiple video analysis effects on each camera at different time.

D. Notifications

1. It shall support alert notification by e-mail, SMS, telephone, and pager upon alarm events.
 - a. The alarm events shall include Video Lost, Recording Error, Disk Full, Motion Detection, I/O Trigger, Scene Change, Intrusion Event, Missing Object, Unattended Object. POS Loss Prevention, Scene Change, Crowd Detection, Advanced Unattended Object, Advanced Scene Change Detection, Advanced Missing Object and Face Detection.
2. For e-mail alert notification:
 - a. It shall support email authentication and alternative SMTP port.
 - b. Users shall be able to set time interval between each notifications.
3. It shall support sending e-mail notification with a hyperlink for users to link back to the NVR.
4. It shall include snapshots in e-mail notification.

E. Digital I/O – Sensor and Alarms

1. Up to 144 input and 144 output devices shall be supported.
2. The digital input can be configured as normal open (N/O), normal close (N/C) with/out latch mode and digital output can be configured as N/O, N/C with/out toggle or, pulse in seconds.
3. Starting recording, alarm activation, alert notification and output trigger upon input trigger shall be supported.
4. Cascade triggering shall be supported.
5. Users shall be able to enable and disable I/O devices without interrupting the monitoring or recording.
6. It shall support I/O Control Panel with the following functions:
 - a. Real-time I/O status shall be indicated.
 - b. Users shall be able to trigger alarms manually from the control panel.

7. It shall support Advanced I/O Control Panel to manage I/O devices across the wide area centrally.
8. It shall support access control systems of momentary and maintained modes.
9. It shall support Virtual I/O Control to control I/O devices connected on video servers, compact DVRs and IP cameras through network.
10. It shall support Visual Automation to trigger the connected output device when a set region on the camera view is clicked.
 - a. Users shall be able to set colored regions on the camera view.
 - b. Users shall be able to click a colored region on the camera view to trigger an associated digital output relay.

F. PTZ Control

1. It shall support PTZ control to pan, tilt and zoom PTZ cameras.
2. PTZ control shall be available locally on the NVR and remotely through the network.
3. It shall support built-in protocols to control high speed domes of various third-party manufactures including Pelco, Lilin, Sony, Panasonic, Bosch, JVC.
4. It shall support controlling high speed domes of various third-party manufactures through ONVIF and PSIA protocols.
5. It shall support Idle Protection. When the PTZ camera remains stationary for a specified time period, the camera shall automatically activate the protection mode: the scan mode, move to the designated preset point, or start the preset tour.
 - a. Up to 256 preset points shall be supported.
6. Moving PTZ camera to a preset location upon input trigger shall be supported.
7. It shall support Advanced Single Camera Tracking to track a moving object using only one PTZ camera.
8. It shall support Object Tracking using one PTZ camera and one standard fix camera.

9. It shall support Object Zooming that allows users to watch 4 zoomed-in views configured from one PTZ camera.

G. User Right Management

1. The System shall support up to 1000 user accounts.
2. It shall support four account levels: Supervisor, power user, normal user and guest.
3. Users shall be able to define account privileges to meet different security needs or scenarios.
4. The following account and password management shall be supported: password change, password retrieval by e-mail, account activation / deactivation and account expiration.
5. It shall support remote and centralized account management of multiple NVRs using Authentication Server.

H. POS / ATM Integration

1. It shall be able to capture and store the transaction data of banking ATM/Teller or retail Point-of-Sale (POS) using serial RS-232 port or TCP/IP connection.
 - a. A software protection dongle shall be inserted to the NVR.
 - b. The integration shall support Windows-based POS devices that can generate TXT, INI or JNL files.
 - c. The integration shall support the POS devices that are compatible with Internet or OPOS Printer Driver protocols.
 - d. The serial RS-232 port connection shall support up to 4 POS devices.
 - e. The TCP/IP connection shall support up to 16 POS devices.
2. All transaction data shall be logged in database for later retrieval and users shall be able to search for transaction results based on keywords.

3. The text overlay of transaction data on the video shall be available with configurable position and font.
4. It shall support a separate display window to display transaction data instead of overlaying data on the live view.
5. It shall support Abnormal Transaction Alerts to trigger the output device and send out the assigned E-Mail/SMS/Pager alerts. The abnormal transaction conditions shall include:
 - a. A pre-defined price amount occurs.
 - b. A pre-set keyword occurs during the specified transaction time
6. It shall support codepage mapping to display special characters or symbols from different languages.

I. Playback

1. It shall support the following display modes:
 - a. Single view
 - b. Quad view
 - c. Multi-channel view
 - d. 25 consecutive preview thumbnails.
 - e. PIP (Picture in Picture) view
 - f. PAP (Picture and Picture) view
 - g. Panorama view
 - h. Various Fisheye views (for the videos recorded by a compatible fisheye camera)
2. It shall support the following playback modes:
 - a. Frame by frame playback
 - b. Continuous playback in real-time
 - c. Key frame only playback
 - d. Smooth playback to distribute each frame evenly apart
3. The recorded videos shall be displayed in timeline or time-tree basis.

- a. Users shall be able to sort out and display videos based on the event type, such as Video Resumed, Motion Detection, Missing Object, Unattended Object, Scene Change and POS items.
4. It shall support playback in 1/8x, 1/4x, 1/2x, 1x, 2x, 4x, 8x, 16x, 32x of original speed.
5. It shall support forward or reverse playback.
6. It shall support A to B Mode to repeatedly play back the recorded video between point A and point B.
7. Users shall be able to apply DirectX, De-interlace, Scaling Render, Color Mode, De-noise and De-Blocking effects to enhance image quality during playback.
8. Users shall be able to perform digital zooming of the entire image or specific areas on the recorded video.
9. Users shall be able to replace empty frames during playback with the user-defined image.
10. Users shall be able to bookmark a frame during playback and later retrieve that frame and video quickly.
11. It shall support Face Mask to detect and blur human faces during playback for privacy purposes.
12. Users shall be able to enable GPS data display to see the coordinates and the average speed of the vehicle in the recorded videos.
13. Users shall be able to apply Wide Angle Lens Dewarping to correct image distortion near the edges of the recorded videos.
14. Users shall be able to apply object tracking to the video recorded by compatible fisheye cameras.
15. Users shall be able to apply defog to enhance object visibility of videos recorded in foggy environment.
16. Users shall be able to apply Video Stabilization to enhance blurry image in videos recorded by shaky camera.
17. It shall support Idle Protection, by which the system exits ViewLog when the user remains inactive over the specified time period.

J. Smart Search

It shall provide various search methods to retrieve events, but not be limited to the following:

1. It shall support Object Search.
 - a. Users shall be able to search the videos of alarm events, Motion Detection, Missing Object and Unattended Object from several recorded files.
 - b. Users shall be able to count the total number of people/objects entering and/or exiting a defined area from several recorded files.
2. It shall support Quick Search to search POS transaction events.
 - a. Users shall be able to quickly search the desired POS events based on keyword and/or transaction time.
3. It shall support Advanced Log Browser to search events in the system log including recorded events, system activities, user activities, people/object counting events, and POS events
 - a. Users shall be able to define search criteria such as device, event type and date.

K. Exporting Video

1. Users shall be able to export a still image from videos in multiple formats including JPEG, BMP, GIF, PNG and TIF.
2. Users shall be able to define time frames of videos to export.
3. Users shall be able to merge multiple video files into a single file, or merge multiple video files into several files of a specified duration.
4. Users shall be able to export videos in AVI or EXE format.
5. User shall be able to apply the following settings to exported videos:
 - a. Date and time stamps
 - b. Camera name
 - c. Digital watermark

- d. Privacy mask (to be permanent or removable by password)
 - e. De-interlace
 - f. Video defogging effect
 - g. Stabilizing video effect
 - h. De-noising effect
 - i. POS transaction data
 - j. GPS data
6. Users shall be able to remain the empty frames (non-recording periods) in exported videos to accurately reflect the recording status.
 7. The exported videos shall be encoded with either H.264 or WMV9.
 8. Users shall be able to combine and export 16 camera views into a single 16-division view for an easy overview.
 9. Users shall be able to apply PIP (Picture in Picture) and PAP (Picture and Picture) display mode to exported videos.
 10. Users shall be able to export de-warped fisheye videos
 11. Users shall be able to export recorded videos to internal / external hard disk drives, DVD-RAM, MO, DAT, ZIP, RAID, and FDD.
 12. It shall support the printing of recorded images in single view, quad view or multi view for report purposes using the built-in printer

L. Remote Monitoring

1. The WebCam Server shall be built in to allow remote access to the NVR.
 - a. It shall support up to 200 concurrent connections.
 - b. It shall support secure socket layer (SSL).
 - c. Users shall be able to define TCP/IP, RTSP and RTP/RTCP/UDP connection ports.
 - d. It shall support UPnP to allow automatic port configuration to the router.
 - e. It shall support Bandwidth Control to monitor the network traffic, and to perform IP filter.
 - f. Users shall be able to set time limitation on Guest account to access to the WebCam Server.
 - g. Users shall be able to remotely access recorded images using File Transfer Protocol server with customizable port and upload frequency.
 - h. Users shall be able to set up the maximum image size transmitted over network.
2. Users shall be able to access the Web interface of WebCam Server using web browsers.
 - a. Users using Internet Explorer shall access full functions of WebCam Server.
 - b. Users using non-IE browsers, Chrome, Firefox and Safari, shall access live view, remote PTZ control, remote playback and event list query
3. Users using Internet Explorer shall be able to access:
 - a. Single Window Viewer, 2-Window Viewer and Multi-Window Viewer to watch live view with the following functions:
 - Live view snapshot, video recording
 - two-way audio communication

- Full screen mode, PIP (Picture in Picture) view, PAP (Picture and Picture) view
 - Alert popup upon motion detection and input device triggered
 - Remote PTZ control: PTZ Control Panel and Visual Automation
 - Remote I/O control
 - De-Interlace, De-Block and DirectX for image enhancement
 - Defogging videos and video stabilization
 - Monitoring real-time POS transaction data
- b. Multicast and Audio Broadcast to send video and audio streams to multiple hosts under Local Area Network.
- c. Event List Query to search the events in system log including recording events, system activities, user activities, object/people counting events and POS transaction events.
- Users shall be able to define search criteria such as date, device and event type.
 - Users shall be able to play back any recorded video instantly.
 - The search results shall be displayed in a text form or statistical charts,
 - The search results shall be exportable in TXT, HTML or EXCEL.
4. It shall support Multi View to allow simultaneous access of up 32 cameras.
- Live view snapshot, video recording
 - Two-way audio communication
 - Full screen mode, PIP (Picture in Picture) view, PAP (Picture and Picture) view
 - Alert popup upon motion detection and input device triggered

- Remote PTZ control: PTZ Control Panel and Visual Automation
 - Remote I/O control
 - De-Interlace, De-Block and DirectX for image enhancement
 - Defogging videos and video stabilization
 - Monitoring real-time POS transaction data
 - Automatic search for all hosts under the same Local Area Network shall be supported.
5. It shall support Remote ViewLog to remotely play back recorded files.
 6. It shall support E-Map (electronic map) for an intuitive camera and digital I/O status overview.
 - a. It shall support up to 500 simultaneous host connections.
 - b. Users shall be able to import map images and place icons of devices on the map to indicate the location of the device.
 - c. Users shall be able to see live status of the cameras or I/O devices by connecting through WebCam Server.
 - d. Remote access to live view and playback.

M. Mobile Applications

1. Users shall be able to access the NVR using the following handheld mobile devices:
 - a. Android smartphones and tablets
 - b. iPhone, iPod Touch, and iPad
2. The mobile applications shall support the following functions:
 - a. Starting or stopping recording
 - b. Live view, live view snapshot
 - c. Remote playback
 - d. PTZ control
 - e. I/O trigger

- f. Address book to store connection information

N. Languages

1. It shall support 31 languages: Arabic, Bulgarian, Czech, Danish, Dutch, English, Finland, French, German, Greek, Hebrew, Hungarian, Indonesian, Italian, Japanese, Lithuanian, Norwegian, Persian, Polish, Portuguese, Romanian, Russian, Serbian, Simplified Chinese, Slovakian, Slovenian, Spanish, Sweden, Thai, Traditional Chinese, Turkish.

O. Utilities

The NVR shall be bundled with a variety of useful utilities, but not be limited to the following:

1. Dynamic Domain Name Server (DDNS) shall be available to allow the NVR to use dynamic IP address for connection.
 - a. Users shall be able to set up login name and password.
 - b. E-mail notification shall be supported to report IP change or IP update failure.
2. Watermark Viewer shall be available to verify the authenticity of the recorded video.
 - a. After running the watermark test, a check mark shall appear in the Pass or Failed column to indicate whether the recording passed the watermark test or not.
3. Authentication Server shall be available to support remote and centralized account management of multiple NVRs.
 - a. Users shall be able to assign different sets of account privileges to each NVR or group of NVRs.
4. Fast Backup and Restore shall be available to support customization of interface skin, logo, buttons and features to display at system startup.

5. Hot-Swap Recording shall be available to allow adding and removing a hot-swap or portable hard drive to the NVR without interrupting recording.
6. Backup Server shall be available to back up files recorded by the NVR to a storage system over the network.
 - a. Users shall be able to set bandwidth limit and enable recycling of the storage system/device for backup.
 - b. Users shall be able to select to back up files from the specified cameras only.
7. Backup Viewer shall be available to remotely support accessing video recordings and log data backed up at the storage system over the network.
 - a. Users shall be able to search for recordings saved at the storage system based on event category, event type, time period and device.
8. Bandwidth Control Application shall be available to control and monitor the network traffic of up to 10 WebCam servers.
 - a. Users shall be able to block or allow specific IP addresses from connecting to WebCam Server and set bandwidth limit based on IP addresses.
 - b. Manually disconnecting a user from WebCam Server shall be supported.
9. Report Generator shall be available to generate a daily or weekly report of recording data specified by users.
10. Digital Matrix shall be available to support up to 8 monitor displays.
 - a. Users shall be able to customize different screen divisions and display settings for each monitor.
 - b. Additional VGA cards shall be required to support multiple monitors.
11. GIS Recording shall be available to record video with GPS data.

12. IP Device Utility shall be available to allow automatic detection of IP devices in the Local Area Network and quick access to IP device functions.
 - a. Users shall be able to access camera live view, adjust video attributes and monitor camera temperature.
 - b. Users shall be able to set the IP address of the device, upgrade firmware, export/import device settings and reboot the device.
 - c. Users shall be able to map IP cameras to the channels of the NVR and import the channel settings to the NVR.
13. MCamCtrl Utility shall be available to allow controlling PTZ movement of compatible PTZ cameras using a Joystick.
14. Mobile Server shall be available to allow Decoder Box, mobile devices, and third-party surveillance software to access up to 32 cameras connected to the NVR.
 - a. Users shall be able to set different frame rate, codec and resolution for each channel.
 - b. Users shall be able to add up to 32 cameras to a matrix channel and create up to 4 matrixes.
15. GV-Skype Video Utility shall be available to allow users to receive live view or text notifications through a Skype account using a PC or mobile device.
 - a. Users shall be able to receive live view or text notifications upon motion detection or I/O trigger.
 - b. Users shall be able to request for live view from the NVR by sending a text message from a Skype account.
 - c. Users shall be able to create up to 8 Quad Views consisting of four camera views.