Architectural and Engineering Specifications

GV-VMS for Video Management System

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The document is written using industry standard formatting and language, and is designed for use by architects, consultants, and specifying engineers who are preparing bid specifications for security cameras, surveillance systems and access control systems.

The electronic version of these specifications may be copied into the appropriate sections of a complete bid specification by using the "cut and paste" method. They are written to highlight the features and specifications of GeoVision products. Section headings mention specific models only for clarity – these may be deleted after insertion into the complete specification.

Product covered in this document includes:

- *GV-VMS (version 16.10.3.0)*

The GV-VMS described in the document shall be GeoVision's video management system for IP cameras.

- GV-VMS will be referred to as "VMS" throughout the document.
- GV-VMS shall be a software-based system which runs without requiring a video capture card and provide up to 64 IP channels.

For more information on GeoVision products, please visit www.geovision.com.tw.

Contents

GV-VMS Video Management System

A. Live Viewing

1. It shall provide the following display modes:
   a. Full screen
   b. Screen rotation view (with customized time interval)
   c. Customizable multi-channel view (1, 4, 6, 8, 9, 10, 12, 16, 25, 64 channels)
   d. PIP (Picture in Picture) view
   e. PAP (Picture and Picture) view
   f. 7 Focus Views
   g. QView to display full-screen live view of a camera on a separate monitor
2. Users shall be able to set up any panel resolution not smaller than 1024 x 768.
3. Users shall be able to drag and drop cameras from the Content List to live view grid for live viewing.

4. Motion, 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)
5. 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.
6. Video attributes, like sharpness, saturation, brightness and contrast, can be modified to match the environment, providing the best optimal recording quality.
7. VMS shall support smart streaming on compatible GV-IP cameras in which the birates in static scenes can be significantly reduced.
8. VMS shall support on-demand display with which the live view automatically switches between the higher-resolution and the lower-resolution streams depending on requirement.
9. 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
    d. Results for Object Counting
    e. Access Control data
10. The system date/time and the remaining hard disk space shall be shown on the main screen.
11. Multi-tasking support.
    a. Recording
    b. Playback
    c. Network Server services
    d. Remote Operation
12. Instant playback of a specific camera shall be available during live viewing.

a. Playback duration of 10, 30, 60 and 300 seconds

b. Any recording operation shall not be interrupted.

13. Users shall be able to take a snapshot of live scene.
14. Users shall be able to talk on the live scene of the surveillance site using push-to-talk.
15. It shall enhance live view with DirectDraw Scale to provide a sharper and crisp clear quality.
16. It shall support GV-Joystick, GV-Keyboard V3, and IR remote control without the need of conventional keyboard or mouse.
17. It shall support (limited) shortcut keys.
18. It shall support desktop lockup to prevent unauthorized applications other than VMS launch.
19. It shall support multiple monitors to display multiple live views (of different division and/or layout), and playback.
20. It shall Support for simultaneously listening to audio of all the connected cameras.
21. Alerts like Video Loss or Connection Loss shall be displayed on inactive camera channel.

    a. An alarm sound shall be played when the video or connection is lost.

    b. An associated alarm shall be triggered.

22. It shall automatically start recording and other server services, and/or switch to user-defined account when system has idled over the specified period of time.
23. It shall support 32 kHz / 16 bit audio codec
24. VMS shall support a panel resolution of up to 4K.

B. Video Compression & Recording

1. VMS shall support dual-streaming where one is used for live viewing and the other for recording.
2. It shall support encoding resolution from CIF to megapixels.
3. It shall support GPU decoding to lower the CPU loading and increase the total frame rate supported by VMS. GPU decoding can be performed on on-board VGA, external VGA, or both.
    a. It shall support H.264 and H.265 GPU decoding.
    b. GPU decoding shall be performed on compatible Intel on-board VGA.
    c. H.264 GPU decoding shall be supported when using external NVIDIA graphics cards with compute capability 3.0 or above and memory 2 GB or above.
4. 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.
5. It shall utilize the following compression codec: Geo H.265, Geo H.264, Geo MJPEG, Standard H.264, and Standard MJPEG.
6. It shall support the following recording modes: round-the-clock, upon motion detection, by schedule, or upon input trigger.
7. It shall support Pre and Post-Recording on motion or alarm events.
    d. Pre-recording buffer shall utilize the hard disk. Users shall be able to pre-record up to 45 minutes to the hard disk.
    e. Users shall be able to post-record up to 15 minutes.
8. It shall support audio denoise in which users shall be able to specify the audio channel to remove noise and improve the audio quality.
9. It shall support Automatic Snapshot for taking consecutive snapshots as monitoring starts.
    a. Snapshots shall be saved in JPEG as an alternative for AVI video format which requires much more storage space.

b. The snapshot frequency shall be user-defined.

10. Each recording shall be of 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. Recycle Threshold shall be supported for recycling the stored files when it reaches a user-defined size.
    c. The threshold of free storage space shall be up to 999 GB.
    d. Users shall be able to enable the Never Recycle function to certain events to avoid overwriting.
12. It shall automate the configuration of recording paths for multiple camera channels.
13. It shall support storyline recording in which users can record a sequence of short video clips of a specific incident from a connected camera.
14. 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 reduce false alarm.
    c. The detected people or objects shall be highlighted with a box on live view.

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 for different time slots.

e. Up to 32 cameras shall be supported to lower CPU loading.

f. Users shall be able to include counting results to recorded videos.

g. Users shall be able to use the GV-3D People Counter to count and analyze the number of people passing by the designated detection area.

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 32 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. The recorded video shall be played back by double-clicking the corresponding snapshot without the need for entering the 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. The recorded video shall be played back by double-clicking the corresponding snapshot without the need for 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 Advanced 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 5 levels of motion sensitivities shall be available to avoid false alarm.

   d. Live camera shall contain visual effect (bounding box) to highlight the area where the defined object is missing.

   e. The computer alarm and output device shall be triggered when the defined object is missing.

   f. 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.

   g. Up to 16 cameras shall be supported to lower CPU loading.

6. It shall support Advanced 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 5 levels of motion sensitivities shall be available to avoid false alarm.

d. Live camera shall contain visual effect (bounding box) to highlight the unidentified object.

e. Users shall be able to set up a computer alarm and/or an output device which are triggered when an unidentified object is placed.

f. 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.

g. 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. The masked regions shall be retrievable with the correct password.

   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 Advanced 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.

9. It shall support Panorama View to combine multiple live views into a continuous scene. Up to 4 sets of Panorama Views shall be created.
10. It shall support Video Defogging to enhance foggy images.
    a. The function shall enhance the live images but not change the recorded video.
    b. 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.
11. It shall support Video Stabilization to enhance blurry image caused by shaky camera.
    a. The function shall enhance the live images but not change the recorded video.
    b. 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.
    c. Up to 4 cameras shall be supported to lower CPU loading.
12. 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.
13. 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 10 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.

14. 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 period of time.

    d. The function shall work effectively even under sudden illumination changes.

15. It shall support Fisheye View to watch video of a fisheye camera

    a. Fisheye dewarping shall be supported only by using the graphic card with DirectX 10.1 or above.

    b. Four view modes shall be available: quad view (4 PTZ views), 360 Degree view (two PTZ views and one 360° view), Dual 180 Degree view and Single view (PTZ view).

    c. Users shall be able to digitally rotate, zoom in and zoom out the camera view.

    d. Users shall be able to enable object tracking to track a moving subject.

    e. VMS shall support Guard Tour which is a virtual PTZ tour function that monitors user-defined spots on live views.

16. It shall support Heat Map to detect motion intensity in live view and recordings.

a. Users shall be able to define regions on the live view.

b. Users shall be able to select either the full-spectral color mode or the single hue progression mode under Color Scheme.

c. Users shall be able to specify the number of seconds for motions to be detected in the specific region before the Heat Map analysis starts on the live view.

d. Users shall be able to specify the start time and end time in recordings to see the heat map analysis.

D. Notifications

1. It shall support alert notification by e-mail 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, Crowd Detection, Advanced Unattended Object, Advanced Scene Change Detection, Advanced Missing Object, Face Detection and USB dongle removal.
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 VMS.
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. Users shall be able to enable and disable I/O devices without interrupting the monitoring or recording.
5. It shall support I/O Control Panel with the following functions:
   a. Real-time I/O status shall be indicated.
   b. Uses shall be able to trigger alarms manually from the control panel.
6. It shall support access control systems of momentary and maintained modes.
7. It shall support Virtual I/O Control to control I/O devices connected on video servers, compact DVRs and IP cameras through network.
8. 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 VMS and remotely through the network.
3. It shall support controlling high speed domes of various third-party manufactures through ONVIF and PSIA protocols.
4. 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.

5. Moving PTZ camera to a preset location upon input trigger shall be supported.
6. It shall support Advanced Single Camera Tracking to track a moving object using only one PTZ camera.
7. It shall support Object Tracking using one PTZ camera and one standard fix 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 VMS using Authentication Server.
6. Users shall be able to log into their accounts by inserting their cards into the GV-PCR310 Enrollment Reader.

H. Playback

1. It shall support the following display modes:

a. Single view

b. Quad view

c. Multi-channel view

d. PIP (Picture in Picture) view

e. Focus View

f. Panorama view

g. Various Fisheye views (for the videos recorded by a compatible fisheye camera)

2. Users shall be able to drag and drop cameras from the Content List to playback grid for playback.
3. It shall support the following playback modes:
   a. Frame by frame playback
   b. Continuous playback in real-time
4. The recorded videos shall be displayed on a timeline basis.
5. It shall support playback in 1/8x, 1/4x, 1/2x, 1x, 2x, 4x, 8x, 16x, 32x of original speed.
6. It shall support forward or reverse playback.
7. It shall support A to B Mode to repeatedly play back the recorded video between point A and point B.
8. Users shall be able to specify a playback time limit for each camera channel, from one minute to up to one month.
9. Users shall be able to bookmark video events on the live view and recorded videos.
10. Users shall be able to apply De-interlace and Scaling Render to enhance image quality during playback.
11. Users shall be able to perform digital zooming of the entire image or specific areas on the recorded video.
12. Users shall be able to apply Wide Angle Lens Dewarping to correct image distortion near the edges of the recorded videos.
13. Users shall be able to apply object tracking to the video recorded by compatible fisheye cameras.

14. Users shall be able to apply defog to enhance object visibility of videos recorded in foggy environment.
15. Users shall be able to apply Video Stabilization to enhance blurry image in videos recorded by shaky camera.

I. 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 Advanced Log Browser to search events in the system log including recorded events, system activities, user activities, and people/object counting events
    a. Users shall be able to define search criteria such as device, event type and date.

J. 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.
4. It shall support Compact Mode to compact video files by only exporting key frames.

5. Users shall be able to export videos in AVI or EXE format.
6. 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
7. Users shall be able to remain the empty frames (non-recording periods) in exported videos to accurately reflect the recording status.
8. The exported videos shall be encoded with either Geo H.264 or WMV9.
9. Users shall be able to combine and export camera views, in the way it is laid out, for an easy overview.
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.
12. It shall support the printing of recorded images using the built-in printer.

K. Remote Monitoring

1. The WebCam Server shall be built in to allow remote access to the VMS.
    a. It shall support up to 200 concurrent connections.
    b. It shall support secure socket layer (SSL).

c. It shall support UPnP to allow automatic port configuration to the router.

d. It shall support Bandwidth Control to monitor the network traffic, and to perform IP filter.

e. Users shall be able to set time limitation on Guest User and User accounts for accessing the WebCam Server.

f. 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 and 2-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, Focus View
      - Remote PTZ control: PTZ Control Panel and Visual Automation
      - Remote I/O control
      - De-Interlace, De-Block and DirectX for image enhancement

   b. Event List Query to search the events in system log including recording events, system activities, user activities, and object/people counting 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 Remote ViewLog software to remotely play back recorded files.
5. It shall support Remote E-Map (electronic map) software 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.
6. It shall support GV-Edge Recording Manager software for remote monitoring.
   a. Users shall be able to view up to 32 channels (free) or 64 channels (license required).
   b. On-demand display for dual channels shall be supported.
   c. Users shall be able to monitor dewarped Fisheye Camera live views.
   d. Users shall be able to monitor channels in PIP and PAP view.
   e. The software shall support live view snapshot.
   f. Users shall be able to remotely play back recorded videos.
   g. Users shall be able to adjust the view angle of VMS channels using the PTZ control function (for IP cameras that support PTZ).

L. Mobile Applications

1. VMS shall support smart device access using GV-Eye mobile app. for live view display and remote playback.
   a. Android smartphones and tablets
   b. iPhone, iPod Touch, and iPad
2. The mobile app. shall support the following functions:
   a. Live view, live view snapshot
   b. Remote playback
   c. PTZ control
   d. Address book to store connection information
   e. Audio out
   f. Fisheye Dewarping (optional)

M. POS Integration

1. It shall be able to capture and store the transaction data of retail Point-of-Sale (POS) using serial RS-232 port or TCP/IP connection.
   a. Up to 4 POS devices shall be able to be connected to VMS via a RS-232 serial cable.
   b. Up to 32 POS devices shall be able to be connected to VMS via TCP/IP connection.
2. Users shall have 3 integration methods to choose from:
   a. Windows-based direct POS integration if the user's POS device shall be Windows-based, generating TXT, INI or JNL files and compatible with Internet, or OPOS Printer Driver protocols.
   b. POS Capture Box integration if the user's POS system shall match with the following conditions:
      - It shall be in text mode, generating TXT, INI or JNL files.

- It shall not be installed with any software.
- It shall be of Linux system, or have a DB9/DB25 interface.

c. Graphic Mode POS integration if the user's POS device shall be Windows-based, generating RAW or EMF files.

3. All transaction data shall be logged in database for later retrieval and users shall be able to search for transaction results based on keywords.
4. The text overlay of transaction data on the video shall be available with configurable position and font.
5. It shall support Abnormal Transaction Alerts to trigger the output device and send out the E-Mail 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.

N. Languages

1. It shall support 22languages: Bulgarian, Czech, Danish, English, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Persian, Polish, Portuguese, Russian, Serbian, Simplified Chinese, Slovakian, Slovenian, Spanish, Traditional Chinese, Turkish.

O. Others

1. Users shall be able to save the system database as Microsoft Office Access Database or Microsoft SQL Server.
2. VMS shall support automatic search of IP cameras under the same LAN.

3. VMS shall support IPv4 and IPv6 addressing with the following function and central monitoring stations.
   a. Live View
   b. Control Center
   c. Center V2
   d. Vital Sign Monitor

P. Utilities

VMS 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 VMS to be connected via a dynamic IP address.
   a. Users shall be able to set up a login name and a password.
   b. E-mail notification shall be supported to report IP change or IP update failure.
2. The licensing of VMS Pro and third-party cameras shall be available for processing directly through the software.
   a. Users shall be able to activate the camera license on VMS regardless of the network connection status.
   b. Users shall be able to retrieve their license back to VMS.
   c. Users shall be able to replace the third-party cameras attached to the license.
3. 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.

4. Users shall be able to create 3D E-Maps to monitor the surveillance area on an electronic map. When any camera or I/O device is triggered, its corresponding icon on the map shall blink as an alert.
5. Authentication Server shall be available to support remote and centralized account management of multiple VMS.
    a. Users shall be able to assign different sets of account privileges to each VMS or a group of VMS.
6. Fast Backup and Restore shall be available for adding programs, and customization of interface skin and features to be displayed at system startup.
7. VMS shall be able to back up recorded files to any connected hard disk drives, as well as GV-Backup Center over the Internet.
8. Bandwidth Control Application shall be available to control and monitor the network traffic of up to 20 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. 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 VMS and import the channel settings to the VMS.
10. MCamCtrl Utility shall be available to allow controlling PTZ movement of compatible PTZ cameras using a Joystick.
11. Users shall be able to watch VMS live view and play back its recording using GV-Edge Recording Manager, which is a tool designed for centralized recording management of remote GV-IP

Cameras and GV-Target Cameras using compatible firmware versions.

12. VMS shall support GV-Mobile Server to encode and stream its channels for display on GV-IP Decoder Box. GV-Mobile Server allows for live view access from GV-IP Decoder Box, GV-Pad, smart phones (installed with GV-Eye), third-party surveillance software, and non-IE browers.
13. Medial Man Tool shall be available to support hot-swap recording.
    a. Users shall be able to add and remove a hot-swap or portable hard drive to the VMS without interrupting the monitoring.

Q. CMS Integration

1. VMS shall allow remote access from central management stations, such as GV-Control Center, GV-Center V2 and GV-Vital Sign Monitor.

R. System Requirements

1. VMS shall adhere to the following rules regarding the maximum number of display channels:

   a. Additional charge is required when displaying more than 32 channels (from either GV or third-party IP devices), any channel from third-party IP devices, or both. This can be summarized below:

Supported Devices	Channels	License Required
GV IP Devices Only	32	No license required.
	64	**GV-VMS Pro** license required, 32 ch per license.
GV + 3rd-Party IP Devices	32	**Trial Version:** 16 channels of 3rd party IP devices.
	64	2 licenses required: **GV-VMS Pro** license, 32 ch per license. **3rd-Party** license, in increments of 1 ch.

   b. The license shall come in the form of an internal or external USB dongle at user's choice.

2. To display 32 or 64 GeoVision and third-party (dual-stream) IP channels, VMS shall require PCs of the following specifications at least:

	GV-VMS (Up to 32 Channels)	GV-VMS Pro (Up to 64 Channels)
OS	64-bit Windows 7 / 8 / 8.1 / 10 / Server 2008 R2 / Server 2012 R2	
CPU	4th Generation i3-4130, 3.4 GHz	4th Generation i7-4770, 3.4 GHz
Memory	8 GB RAM	16 GB RAM
Graphic Card	See *B. Video Compression and Recording*	