Architectural and Engineering Specifications for GV-VMS V20 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.

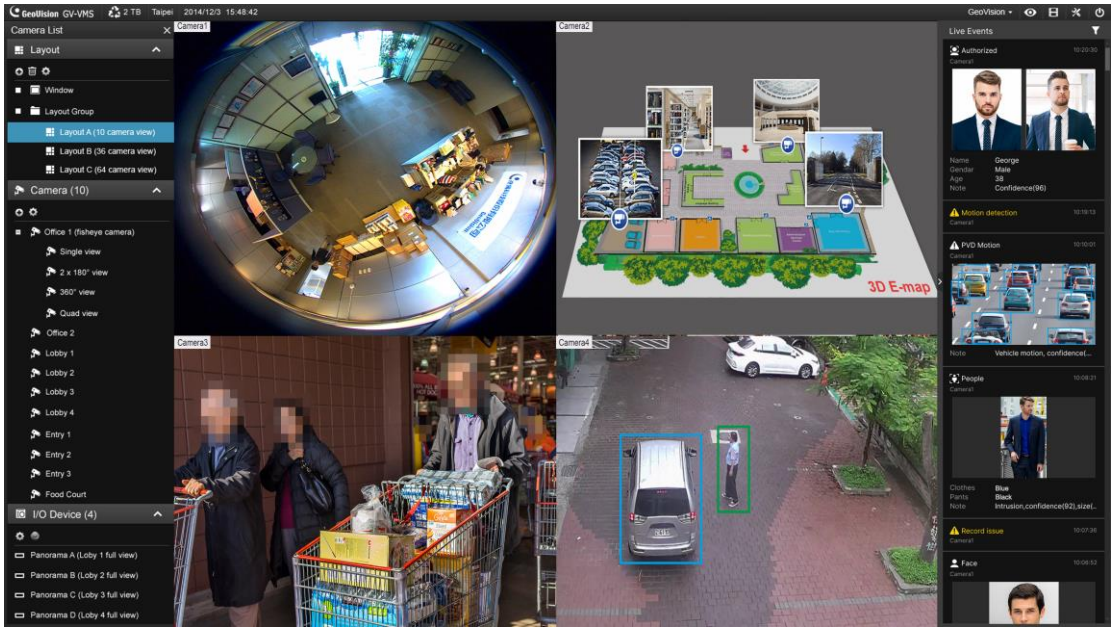
Product covered in this document:

- **GV-VMS V20 (version V20.0.0.0)**: GeoVision's video management system for IP cameras.

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

Contents

GV-VMS V20 Video Management System



A. Naming and Definitions

The following terms and abbreviations are used throughout this specification:

- **LPR**: License Plate Recognition
- **FR:** Face Recognition
- **PVD:** People and Vehicle Detection

B. Live View and Monitoring

1. The VMS shall provide the following **display modes**:
   a. Full Screen View
   b. Customizable Multi-Channel Layout, supporting configurations from 1×1 to 16×16
   c. Picture-in-Picture (PIP) View

   d. Focus Views, allowing prioritized display of up to seven selected areas within a single camera's field of view to enhance situational awareness
   e. QView, enabling full-screen live view of a selected camera on a separate monitor

2. Users shall be able to configure panel resolution, with a minimum supported resolution of **1024 × 720**.
3. Users shall be able to **drag and drop cameras** from the camera list into the live view grid to initiate immediate live viewing.
4. Cameras triggered by motion or digital input shall be highlighted instantly using the following methods:
   a. Pop-up video display in full screen
   b. Activation of related digital output relay(s)
5. The VMS shall support a **covert camera** feature, allowing selected cameras to be hidden from live display while continuing to record. Playback of covert camera footage shall be accessible only to authorized users.
6. Users shall be able to adjust **video attributes**—including brightness, contrast, saturation, sharpness, and gamma—to optimize recording quality based on environmental conditions.
7. The VMS shall support **smart streaming** on compatible GV-IP cameras, enabling significant bitrate reduction in static scenes to optimize bandwidth and storage usage.
8. The VMS shall support **on-demand display**, allowing automatic switching between high-resolution and low-resolution live streams based on system or user-defined requirements.
9. The VMS shall support **video text overlay** with configurable position and font. The following overlay elements shall be available:
   a. Camera name
   b. Date and time
   c. Triggered digital input name
   d. Object Counting results
   e. Access Control data

10. The **system date/time** and **remaining hard disk space** shall be displayed on the main screen.
11. The VMS shall support **multi-tasking operations**, including:
    a. Recording
    b. Playback
    c. Network server services
    d. Remote operation
12. The VMS shall support **instant playback** of a specific camera during live monitoring.
    a. Recording operations shall remain uninterrupted during instant playback.
    b. Users shall have direct access to playback video and timeline controls within the same user interface, enabling simultaneous **live view and playback on a unified screen**. Full playback functionality shall be supported without disrupting ongoing live monitoring.
    c. Instant playback shall be supported across layouts distributed on secondary monitors.
13. Users shall be able to **capture snapshots** of the live scene for documentation or review purposes.
14. Users shall be able to communicate via **push-to-talk** directly to the camera, enabling two-way audio interaction with the surveillance site during live monitoring.
15. The VMS shall enhance live view quality using **DirectDraw Scale**, providing sharper and clearer image rendering.
16. The VMS shall support a set of (limited) **shortcut keys** to streamline user operations.
17. The VMS shall support **desktop lockup**, preventing unauthorized applications from launching while the VMS is active.
18. The VMS shall support for simultaneously **listening to audio** of all the connected cameras.
19. Alerts such as **Video Loss** or **Connection Loss** shall be displayed on inactive camera channels.

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

b. An associated alarm shall be triggered automatically.

20. The VMS shall automatically initiate recording, server services, and/or switch to a user-defined account when the **system remains idle** beyond a specified time period.
21. The VMS shall support **32 kHz / 16-bit audio codec** for high-quality audio recording and playback.
22. The VMS shall support **panel resolutions up to 4K**, ensuring optimal display clarity.
23. Users shall be able to zoom in/out, adjust focus, and control camera movements directly from the live view interface, provided the linked cameras support PTZ functionality.
24. The main screen shall include the following three sections to facilitate monitoring:

    a. **Live View Layout:** Displays selected camera views in user-defined layouts for real-time surveillance.

    b. **Content List:** Pinned to the left side of the main screen, providing quick access to live view layouts, e-maps, and lists of cameras, I/O devices, POS systems, IP speakers, and SIP devices.

    c. **Event List:** Pinned to the right side of the main screen, displaying real-time general, system, AI, and PVD events in a cascading view. Event type filters shall be pre-applied to support timely monitoring and response.

25. The VMS shall allow the main screen to be **resized** by dragging its corners or side borders, and repositioned to a user-defined location.
26. The VMS shall support integration with a **GV-IP Decoder Box**, allowing users to assign selected VMS camera channels to the decoder box's monitor for remote display. This configuration shall significantly reduce the VMS system's PC processing load by offloading video rendering tasks.

C. Video Compression & Recording

1. The VMS shall support **dual-streaming** for simultaneous live monitoring and recording.
2. The VMS shall support **encoding resolutions** ranging from CIF to multi-megapixel formats.
3. The VMS shall support **GPU decoding** to reduce CPU load and improve overall frame rate performance. GPU decoding shall be performed using onboard GPU, external GPU, or both.
    a. The VMS shall support GPU decoding for both H.264 and H.265 video formats.
    b. **Onboard GPU:** GPU decoding shall be supported on compatible Intel onboard GPU.
    c. **External GPU:** GPU decoding shall be supported when using external NVIDIA graphics cards with compute capability 3.0 or above and a minimum of 2 GB memory. One or multiple external NVIDIA graphics cards shall be supported, with decoding capability up to **8 MP**.
4. Users shall be able to configure the maximum recording frame rate for both motion and non-motion scenes on each camera to optimize storage usage.
5. The VMS shall support the following compression codecs:
    a. Geo H.265
    b. Geo H.264
    c. Geo MJPEG
    d. Standard H.264
    e. Standard H.265
6. The VMS shall support the following recording modes:
    a. Round-the-clock recording
    b. Recording upon motion or event detection
    c. Scheduled recording
    d. Recording upon input trigger

7. The VMS shall support **Pre-Recording** and **Post-Recording** for motion or alarm-triggered events.
    a. Pre-recording shall utilize the hard disk buffer, allowing up to 45 minutes of pre-recorded footage.
    b. Post-recording shall allow up to 15 minutes of extended footage following the event.
8. The VMS shall support **audio denoise**, enabling users to specify audio channels for noise reduction and improved audio clarity.
9. Each recording file shall be limited to a maximum duration of five minutes to reduce maintenance efforts and minimize the risk of data corruption.
10. The VMS shall support automatic overwriting of **archived video files** when either:
    - The available storage space reaches a user-defined threshold, or
    - The archived files exceed a defined retention period, ensuring continuous recording.

    a. The free storage space threshold shall be configurable up to 999 GB.
    b. Users shall be able to enable the Never Recycle function for specific events to prevent overwriting of critical recordings.
11. The VMS shall **automate the configuration of recording paths** for multiple camera channels.
12. The VMS shall support **Storyline Recording**, enabling users to compile camera footage from multiple channels into a sequential set of short video clips that document a specific incident.
13. The VMS shall support **video watermarking** to prevent data manipulation. Watermarked video shall be admissible as evidence in a court of law.
14. The VMS shall support **Display Sub Stream Priority** to play recorded videos in sub stream for reducing PC processing load.
15. The VMS shall support **Automatic Network Replenishment (ANR)**. When a camera is reconnected to the VMS following a network disconnection, the system shall automatically retrieve and restore recorded files from the camera's onboard SD card to ensure recording continuity.

D. Object Management

1. **Privacy Mask**

   The system shall support a Privacy Mask feature to enhance privacy protection and ensure compliance with applicable regulations, while maintaining effective surveillance.

   a. The VMS shall support mosaic-style privacy masks with adjustable blur intensity.

   b. Users shall be able to define and configure masked regions within the camera's field of view. These regions shall be polygonal in shape, with up to 10 configurable areas per camera channel, and each area supporting up to 50 edges.

   c. Masked regions shall be retrievable with the correct password, ensuring secure access to protected footage.

   d. Schedule settings shall be available, allowing users to apply multiple video analysis effects—including privacy masking—to each camera at different times for optimized usage.

2. **Advanced Scene Change Detection**

   The VMS 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.

3. **Wide Angle Lens Dewarping**

   The VMS 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 dewarping function shall enhance live view images without altering the original recorded video.

4. **Image Orientation.** The VMS shall support image orientation adjustments with the following selectable modes: Normal, Horizontal Mirror, Vertical Flip, Rotate 180 degree, Rotate 90 degree, and Rotate 270 degree (Corridor format).

5. **Advanced Motion Detection**

   The VMS shall support Advanced Motion Detection to identify motion within the camera's field of view..

   a. Users shall be able to configure motion detection based on either object size or motion sensitivity.

      - Users shall be able to define maximum and minimum object size to detect only objects within the specified range.
      - Up to 10 levels of motion sensitivity shall be available to minimize false alarms.

   b. Users shall be able to enable **Noise Tolerance** to ignore video noise caused by illumination changes.

   c. Users shall be able to define **masked areas** where motion detection shall be disabled.

   d. Users shall be able to enable **environmental change filtering** to ignore motion caused by rain, snow, or similar conditions.

   e. Users shall be able to specify a **minimum motion duration** (in seconds) required to trigger detection.

   f. Users shall be able to enable **Process Video in Lower Resolution**, allowing live view compression prior to motion detection to reduce CPU load.

g. Users shall be able to enable **Smart Motion Search** to locate motion events in recorded video by defining regions of interest. Refer to Item 1, in Section J: Smart Search.

h. Users shall be able to enable the **camera's built-in motion detection**, allowing the VMS to utilize the camera's native detection capabilities instead of the VMS-based motion detection.

i. The VMS shall support **People and Vehicle Detection** (PVD). For detailed functionality, refer to Item 3 in Section S: AI Events.

6. **Fisheye View Support**

The VMS shall support Fisheye View to monitor video from fisheye cameras.

a. Four view modes shall be available: Quad View (four PTZ views), 360° View (two PTZ views and one 360° panoramic view), Dual 180° View (two 180° views), and Single view (one PTZ view).

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 follow a moving subject within the fisheye view.

d. It shall support Guard Tour, a virtual PTZ tour that monitors user-defined spots in live view.

E. E-Mail Notifications

1. The VMS shall support alert notifications via e-mail upon the following alarm events: Camera Motion Detection, Video Loss, Disk Full, Recording Error, User Login Fail, I/O Trigger, I/O Module Loss, SDK Events, POS Loss Prevention Settings, GV-Edge Recording Manager / GV-Control Center Login, Remote Login, Face Recognition, Intrusion, Loitering, PVD Motion, Cross Line, Leave Area, Enter Area, Third-Party Events, and Abnormal Temperature Detection.

2. The VMS shall support e-mail authentication and alternative SMTP port configuration.

3. Users shall be able to define the time interval between consecutive notifications
4. Email notifications shall include a hyperlink for direct access to the VMS interface.
5. Email notifications shall support attachment of video images corresponding to the alert condition.
6. The VMS shall support Webhooks via HTTP/HTTPS requests to trigger event actions in external applications, such as access control systems or alarm systems.

F. Audio and I/O Integration

I/O Integration

1. The VMS shall support up to **144 input** and **144 output** devices.
   a. Digital input shall be configurable as Normally Open (N/O) or Normally Closed (N/C), with or without Latch Mode.
   b. Digital output shall be configurable as N/O or N/C, with or without Toggle Mode or Pulse Mode (in seconds).
2. The VMS shall support the following actions triggered by input events:
   a. Start recording
   b. Activate alarms
   c. Send alert notifications
   d. Trigger output devices
3. Users shall be able to enable or disable I/O devices without interrupting live monitoring or recording operations.
4. The VMS shall support **I/O Control Panel** with the following functions:
   a. Real-time indication of I/O device status
   b. Manual alarm triggering from the control panel interface

5. The VMS shall support **access control integration**, including both momentary and maintained output modes. A push-button switch shall be supported to enable or disable camera or I/O monitoring functions.
6. The VMS shall support **Virtual I/O Control**, allowing users to control I/O devices connected to IP cameras over the network.
7. The VMS shall support **Visual Automation**, enabling users to trigger output devices by interacting with defined regions on the camera view.
    a. Users shall be able to define colored regions on the camera view.
    b. Clicking a colored region shall trigger the associated digital output relay.

IP Speaker Integration

8. The VMS shall support integration with **GV-IP Speakers**, transforming passive surveillance into an active deterrence system through real-time audio alerts. This integration shall enhance security operations by enabling immediate responses to various events.
    a. **Scheduling** for GV-IP Speakers shall be supported to facilitate routine announcements, warnings, or operational reminders during designated time frames.
    b. **AI Event-Triggered Audio** shall be supported to automatically play specific audio files when AI events are detected.
    c. **Motion-Triggered Audio** shall be supported to automatically play specific audio files when motion or PVD events are triggered.
9. Users shall be able to **communicate via push-to-talk**, enabling live audio broadcasting through the IP speaker during surveillance operations.

G. PTZ Control

1. The VMS shall support PTZ control, enabling pan, tilt, and zoom operations for PTZ cameras.
2. PTZ control shall be available both locally on the VMS and remotely via network access.

3. The VMS shall support control of high-speed dome cameras from third-party manufacturers via ONVIF and PSIA protocols.
4. The VMS shall support Idle Protection. When a PTZ camera remains stationary beyond a specified time period, the system shall automatically activate one of the following protection modes:
   a. Enter scan mode
   b. Move to a designated preset point
   c. Start a preset tour

   Up to 256 preset points shall be supported.
5. The VMS shall support PTZ preset activation upon input trigger, allowing cameras to move to predefined locations based on external input events.
6. The VMS shall support Advanced Single Camera Tracking, enabling a single PTZ camera to track moving objects autonomously.
7. The VMS shall support Object Tracking using one PTZ camera in coordination with one fixed camera, allowing enhanced tracking accuracy and coverage.

H. User Right Management

1. The VMS shall support up to 1,000 user accounts.
2. The VMS 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 VMS shall support the following account and password management:
   a. Password change
   b. Password retrieval via email
   c. Account activation and deactivation
   d. Account expiration control

5. The VMS shall support remote and centralized account management across multiple VMS systems using Authentication Server or GV-Enterprise plugin.

I. Playback

1. The VMS shall support the following display modes, with a maximum of **64 display channels**:
   a. Full Screen View
   b. Customizable Multi-Channel Layout, supporting configurations from 1×1 to 16×16
   c. Picture-in-Picture (PIP) View
   d. Focus Views, allowing prioritized display of up to seven selected areas within a single camera's field of view to enhance situational awareness
2. Users shall be able to **drag and drop cameras** from the camera list to playback grid for playback.
3. The VMS shall support the following **playback modes**:
   a. Frame-by-frame playback, allowing precise review of individual video frames
   b. Continuous real-time playback, enabling uninterrupted video review
4. Recorded video shall be displayed on a **timeline basis**, providing intuitive navigation and event-based access.
5. The system shall support **variable-speed playback** at the following rates relative to original speed: 1/8x, 1/4x, 1/2x, 1x, 2x, 4x, 8x, 16x, 32x.
6. The VMS shall support **forward and reverse playback**, allowing users to review recorded footage in both directions.
7. The VMS shall support **A-to-B Mode**, enabling repeated playback of recorded video between two user-defined points.
8. Users shall be able to **specify a playback time limit** for each camera channel, ranging from one minute to one month.
9. Users shall be able to **bookmark video events** during both live view and playback for quick reference and retrieval.

10. Users shall be able to apply **De-interlace** and **Scaling Render** techniques to enhance image quality during playback.
11. Users shall be able to perform **digital zooming** on recorded video, either across the entire image or within specific regions.
12. The VMS shall support **Wide Angle Lens Dewarping**, allowing correction of image distortion near the edges of recorded video.
13. The VMS shall support **object tracking** on recorded video captured by compatible fisheye cameras.
14. Users shall be able to apply **event filters** to the playback timeline, displaying only selected event types for focused review.
15. Users shall be able to **customize event colors** on the timeline, enabling visual differentiation between event types.

J. Smart Search

The VMS shall provide multiple search methods to retrieve events.

1. **Object Search.** Users shall be able to search recorded video files for motion or PVD events by specifying regions of interest in recorded videos. This function shall enable identification of activity within a specific area of the camera's field of view, regardless of when the event occurred.
2. **Advanced Log Browser.** Users shall be able to search system logs for recorded events, system activities, user actions, and people/object counting events.
3. **AI Query.** Users shall be able to perform post-event review and filtering of AI and PVD events, including face, people, and vehicle attributes.
    a. Search criteria shall include device, time range, event type, and specific people or vehicle attributes.
    b. The interface shall support event type selection and confidence level adjustment to refine detection and recognition results.
    c. The VMS shall allow zoom-in on snapshots of query results for detailed inspection.

d. The VMS shall support exporting query results in CSV or PDF format.

e. The VMS shall support a maximum of 10,000 query results per search.

f. Users shall be able to view playback and event details by selecting a snapshot from the query results.

K. Exporting Video and Scheduled Backup

Exporting Video

1. Users shall be able to export still images from videos in multiple formats including JPEG, BMP, GIF, PNG, and TIF.
2. Users shall be able to define specific time frames for video export.
3. Users shall be able to merge multiple video files into a single file.
4. The VMS shall support Compact Mode, allowing export of video files using key frames only.
5. Users shall be able to export videos in AVI, MP4, and EXE format.
6. User shall be able to apply the following settings to exported videos:
   a. Date and time stamps
   b. Camera name
   c. Privacy mask (configurable as permanent or removable via password)
   d. De-interlace
7. The exported videos shall be encoded with either AVI or MPEG4.
8. Users shall be able to export de-warped fisheye videos
9. The VMS shall support the printing of recorded images using the built-in printer.

Scheduled Backup

10. The system shall support scheduled video backup, allowing users to:
    a. Define backup time frames
    b. Select destination paths

c. Choose specific cameras

d. Specify whether to back up video, audio, or both

L. Remote Monitoring

The WebCam Server shall be built into the VMS to enable remote access with the following features:

1. **Built-in Remote Access** shall enable remote connectivity to the VMS via standard web browsers.
2. **Concurrent Connections** shall support up to 200 simultaneous users.
3. **Secure Communication** shall include SSL encryption for data protection.
4. **Automatic Port Configuration** shall support UPnP for seamless router setup.
5. **User Access Control** shall allow time-limited access for Guest and User accounts.
6. **Bandwidth Management** shall support configurable maximum image size for network transmission.
7. **Web Interface** shall support the following functions:
   a. Displaying of up to 16 channels simultaneously, with support for up to 256 channels in total.
   b. Snapshot capture and video recording
   c. Two-way audio communication
   d. Full screen, Picture-in-Picture (PIP), and Focus View
   e. Remote PTZ control
   f. Remote I/O control
   g. Image enhancement options: De-Interlace, De-Block, and DirectX
8. **Event List Query** shall include the following functions**:**

a. Allows users to search system logs for recording events, system activities, user actions, and object/people counting events
b. Supports keyword-based search criteria such as date, device, and event type
c. Enables instant playback of associated recordings
d. Displays results in text format or statistical charts
e. Supports export of results in TXT, HTML, or Excel format

M. Mobile Applications

1. Users shall be able to install a mobile app on the following smart devices to enabler live view display and remote playback.
   a. Android smartphones and tablets
   b. iPhone, iPod Touch, and iPad
2. **GV-Eye**. The mobile application shall support the following functions:
   a. Live view
   b. Remote playback
   c. Snapshot capture
   d. Picture-in-picture (PIP) display
   e. Stream switching
   f. PTZ (Pan-Tilt-Zoom) control
   g. 360° view
   h. I/O trigger activation
   i. Audio output
   j. Export/Import camera list
   k. Fisheye Dewarping (optional)
   l. Address book for storing connection information

3. **GV-Live Streaming**. The mobile application shall allow the camera of an Android / iOS mobile device to connect and stream live view directly to the VMS.

N. POS Integration

1. The VMS shall be able to capture and store the transaction data from retail POS systems via serial RS-232 port or TCP/IP connection.
   a. Up to 4 POS devices shall be connectable via a RS-232 serial cable.
   b. Up to 32 POS devices shall be connectable via TCP/IP connection.
2. Users shall have 3 integration methods to choose from:
   a. **Windows-based direct POS integration:** Applicable when the POS device is Windows-based, generates TXT, INI, or JNL files, and supports Internet or OPOS Printer Driver protocols.
   b. **POS Capture Box integration**: Applicable when the POS system meets the following conditions
      - Operates in text mode, generating TXT, INI, or JNL files.
      - Does not require software installation.
      - Runs on a Linux system, or includes a DB9/DB25 interface.
   c. **Graphic Mode POS integration**: Applicable when the POS device is Windows-based and generates RAW or EMF files.
3. All transaction data shall be logged in a database for later retrieval. Users shall be able to search transaction records using keyword queries.
4. Transaction data shall be overlaid on video with configurable position and font settings.
5. The VMS shall support Abnormal Transaction Alerts to trigger output devices and send email notifications. Alert conditions shall include:
   a. Occurrence of a predefined price amount
   b. Detection of a preset keyword during a specified transaction time

6. Codepage mapping shall be supported to display special characters and symbols from different languages.
7. The VMS shall support display of POS transaction data only (excluding live view) on any screen division.

O. Languages

The VMS shall support 23 interface languages, including:
Bulgarian, Chinese Simplified, Chinese Traditional, Czech, Danish, English, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Persian, Polish, Portuguese, Russian, Serbian, Slovakian, Slovenian, Spanish, Turkish, and Ukrainian.

P. System and Network

1. Users shall be able to save the system database in either Microsoft Office Access Database format or Microsoft SQL Server.
2. The VMS shall perform background repair of databases and video files while the monitoring is running. Users shall be able to check the repair status at any time.
3. The VMS shall support automatic discovery of IP cameras within the same Local Area Network (LAN).
4. The VMS shall support IPv4 and IPv6 addressing
5. The VMS shall support RSA Network Security to ensure secure data transmission.

Q. Utilities

The VMS shall incorporate a variety of utility features.

1. **Dynamic Domain Name Server (DDNS)** shall enable VMS connectivity via a dynamic IP address.
   a. Users shall be able to configure a login name and password.
   b. E-mail notification shall be supported to report IP change or update failure.
2. **Watermark Viewer** shall verify the authenticity of recorded video.
   a. Upon completion of the watermark test, a check mark shall appear in the “Pass” or “Failed” column to indicate the result.
3. **3D E-Map** shall allow users to monitor surveillance areas via an electronic map.
   a. When a camera or I/O device is triggered, its corresponding icon shall blink to indicate an alert.
4. **Authentication Server**, a centralized authentication server, shall manage passwords and accounts across multiple VMS systems.
   a. Integration with Windows Active Directory shall be supported.
   b. Users shall be able to assign account privileges per VMS or VMS group.
   c. Users shall be able to import users and groups from Active Directory.
5. **Fast Backup and Restore** shall support program additions, interface skin customization, feature selection for system startup, and the backup and restoration of VMS configurations.
6. **IP Device Utility** shall automatically detect IP devices on the local network and provide quick access to device functions. Users shall be able to:
   a. Access camera’s web interface
   b. Adjust video attributes
   c. Monitor camera temperature
   d. Configure IP addresses
   e. Upgrade firmware
   f. Export/import device settings

g. Reboot devices

h. Map IP cameras to VMS channels and import channel settings

7. **Keyboard & Joystick Utility** shall enable controlling PTZ movement via a Joystick.
8. **GV-Edge Recording Manager** shall unify live monitoring and remote control of IP devices and software. Users shall be able to view live streams and playback recordings remotely.
9. **SNMP Trap Notification** shall send alert notifications to SNMP-compatible software.
10. **Report Generator** shall generate daily and/or weekly reports in MDB or HTML format, for the recording data without requiring additional installation.
11. **SIP 2-way audio communication** shall support outbound dialing and communicating with devices on the same SIP server.
12. **Licensing Management.** Licensing of VMS and third-party cameras shall be processed directly through the utility. Users shall be able to:

    a. Activate camera licenses regardless of network status

    b. Retrieve licenses to the VMS

    c. Replace third-party cameras associated with a license

13. **GV-Cloud VMS** shall provide a cloud-based video surveillance and data center solution.

    a. Motion triggers, I/O events, and AI detections shall be monitored across systems.

    b. Two-way audio communication shall be supported.

    c. Users shall be able to access live streams, playback recordings, and query events via web browser from any location.

R. CMS Integration

The VMS shall support remote access from Central Management Stations (CMS), including GV-Control Center, GV-Center V2, GV-Vital Sign Monitor, and GV-Dispatch Server.

S. AI Events

The VMS shall support the following AI analytics events.

1. **AI Analytics Event Support (GV-IP Cameras)**
   The VMS shall support the following AI analytics events from AI-capable GV-IP cameras:
   - Intrusion
   - Cross Line
   - Leave Area
   - Enter Area
   - People Count
   - Loitering
   - Face Detection
   - Crowd Detection
   - Abnormal Temperature Detection

2. **AI Analytics Event Support (Third-Party Cameras)**
   a. The VMS shall support the following AI analytics events from the Bosch DINION IP 3000i IR cameras:
      - Object in the field
      - Crossing line
      - Leaving field

- Entering field
- Loitering
- Condition change
- Following route
- Tampering
- Similarity search
- Crowd detection
- Counter
- Occupancy

b. The VMS shall support the following AI analytics events from the Hanwha XND-C6083RV and PND-A6081RF cameras:

- Leave Area
- Enter Area
- Intrusion
- Cross Line
- Object Count
- Loitering

3. **PVD Motion Detection**

PVD motion detection shall be capable of identifying human and vehicle motion while filtering out irrelevant movement from other objects. This reduces unnecessary video data and minimizes false alarms.

a. **Detection Configuration**

Users shall be able to fine-tune detection confidence levels for different object types, define detection size parameters for people and vehicles, and mask unwanted detection areas.

b. **Channel Support**

The VMS shall support up to 16 channels of PVD motion detection by default. When equipped with the GV-AI Accelerator Module, up to 64 channels of PVD motion detection shall be supported.

c. **System Requirements for Expanded Channel Support**

To expand PVD motion detection beyond 16 channels, the PC must be equipped with the GV-AI Accelerator Module and meet the following system requirements:

- **Up to 48 channels**: Minimum 16 GB RAM and 11th Generation Intel Desktop Processor or above.
- **Up to 64 channels**: Minimum 32 GB RAM and 13th Generation Intel Desktop Processor or above.

d. **GV-AI Accelerator Module Limitation.** Only one unit of the GV-AI Accelerator Module is supported per system.

4. Built-in Face Recognition – Local Face Recognition

In conjunction with the face detection function of AI-capable GV-IP cameras, the VMS shall support face recognition using its built-in recognition engine and local face database.

a. **Snapshot Processing Rate**
The VMS shall process up to 10 face snapshots per second, whether sourced from multiple cameras or multiple frames of the same camera. Excess snapshots shall be queued and processed at this fixed rate.

b. **Face Database Capacity**
The local face database shall support up to 100,000 face images, with up to 3 face images per face profile. Each face image must exceed 150 pixels in size.

c. **Event-Based Alerts**
Recognition events for specified groups—such as “Unauthorized”—shall be able to trigger alarms, send email notifications, or initiate other alert actions.

d. **Confidence Level Adjustment**

The VMS shall allow adjustment of the face recognition confidence level. Higher confidence levels result in stricter differentiation between similar faces, improving recognition accuracy and reducing false positives.

e. **Live Face Tracking on E-Map**
The VMS shall support live face tracking on the E-Map, displaying the real-time movement paths of recognized individuals across multiple cameras.

5. Face Recognition Integration

The VMS shall integrate the facial recognition capabilities of GV face recognition cameras (GV-VD8700 and GV-FD8700-FR) and GV-AI FR software to distinguish detected human faces, and support the following features:

a. **Access Control Integration**
The VMS shall support pairing Face IDs with access cards for integration with the access control system.

b. **Face ID Access Scheduling**
Face ID access schedules shall be used to authorize or deny access. Schedule-based alerts shall include email notifications, output device activation, computer alarms, or application launches.

c. **Live Face Tracking on E-Map**
The VMS shall support live face tracking on the E-Map, displaying the real-time movement paths of recognized individuals across multiple cameras.

6. Face Recognition Capabilities

The VMS shall support the following face recognition features, whether utilizing Local Face Recognition or integrated recognition via GV face recognition cameras and GV-AI FR software.

a. **Real-Time Event Monitoring**
Users shall be able to monitor real-time face recognition events and view associated profile details, including:

- Snapshots of the recognized face
- Enrolled face photo
- Name (if available)

- Assigned face group
- Gender
- Age group
- Camera channel
- Recognition timestamp

Double-clicking an event entry shall instantly play the associated recording.

b. **Face Search Functionality**
The VMS shall provide face search capabilities based on the following criteria:

- **Face Matching**: Using a face image captured during a recognition or detection event, or an uploaded photo for comparison
- **Face ID:** Searching by name (if enrolled in the face database) or face group
- **Demographics:** Filtering by age group or gender

7. Video Metadata Support

a. The VMS shall support receiving video metadata from AI-capable GV-IP cameras, enabling event searches based on people and vehicle attributes.

b. The video metadata shall facilitate rapid and accurate identification of specific individuals or suspicious vehicles using AI Query, available on both local VMS and GV-Cloud VMS platforms. For details on AI Query, refer to Item 3, Section J: Smart Search.

c. The video metadata shall include the following attributes:

- People Attributes: Age group, gender, upper and lower clothing, accessories
- Vehicle Attributes: Vehicle type, color, brand

8. **Face Detection**

   The VMS shall support face detection via AI-capable GV-IP cameras.

   a. Users shall be able to apply face blurring to censor detected faces in live view and recordings.

   b. Users shall be able to monitor real-time face detection events, including: snapshots of detected faces, camera channels, and event time.

   c. Double-clicking an event entry shall instantly play the associated recording.

9. **Abnormal Temperature Detection**

   The VMS shall support abnormal temperature detection using the GV-TMEB5800 thermal camera. It shall:

   a. Display temperature readings in both live and recording footage

   b. Trigger alarms based on user-defined temperature thresholds

10. **AI-based Object and People Counting**

    The VMS shall support AI-based counting features, including:

    a. Object counts received from AI-capable GV-IP cameras

    b. People counts received from GV-3D People Counter V2 and V3 units

11. **Direct Configuration of AI Event Parameters**

    The VMS shall allow direct configuration of alarm zones and PVD parameters on AI-capable GV-IP cameras without accessing the camera's web interface. Supported AI event types include:

    a. Cross Line Detection

    b. Enter/Leave Area

    c. Intrusion Detection

    d. Face Detection

    e. People Flow Counting

T. System Requirements

Licensing and Trial Versions

1. **Licensing Requirements**. It shall be determined based on the number of display channels. The VMS supports connection of **up to 256 IP channels**. Additional licenses are required when connecting more than 64 channels of GeoVision IP devices or when connecting to any third-party IP devices.

<table>
<tr><th>Supported Devices</th><th>Channels</th><th>License Requirements</th></tr>
<tr><td rowspan="2">GV-IP Devices Only</td><td>≤ 64 ch</td><td>No license required.
Optional:
⊙ AI License</td></tr>
<tr><td>65 – 256 ch</td><td>License required:
● GV-VMS Pro License required, in increments of 32 ch
GV-VMS Pro License
<table>
<tr><th>Levels</th><th>Total Channels</th><th>Additional Channels (Beyond free 64 ch)</th></tr>
<tr><td>#1</td><td>96 ch</td><td>32 ch</td></tr>
<tr><td>#2</td><td>128 ch</td><td>64 ch</td></tr>
<tr><td>#3</td><td>160 ch</td><td>96 ch</td></tr>
<tr><td>#4</td><td>192 ch</td><td>128 ch</td></tr>
<tr><td>#5</td><td>224 ch</td><td>160 ch</td></tr>
<tr><td>#6</td><td>256 ch</td><td>192 ch</td></tr>
</table>
Optional:
⊙ AI License</td></tr>
<tr><td rowspan="2">GV-IP Devices +
3rd-Party IP Devices</td><td>≤ 64 ch</td><td>Licenses required:
● 3rd-Party License for 3rd-party and UA-IP cameras, in increments of 1 ch
● HD DVR License for UA-XVR and UA-XVL series, in increments of 1 ch
Optional:
⊙ AI License</td></tr>
<tr><td>65 – 256 ch</td><td>Licenses required:
● GV-VMS Pro License required, in increments of 32 ch
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</table>
● 3rd-Party License for 3rd-party and UA-IP cameras, in increments of 1 ch
● HD DVR License for UA-XVR and UA-XVL series, in increments of 1 ch
Optional:
⊙ AI License</td></tr>
</table>

2. **AI License Requirement**. An AI License is required to enable full AI functionality, including PVD events and built-in face recognition (Local Face Recognition). AI camera events do not require an AI License.

3. **License Types**. There shall be two distinct license types: GV-USB Dongle and Software License. These license types are not compatible with one another.

- **GV-USB Dongle**: A hardware-based license, available in external or internal form factors.
- **Software License**: A digital license activated via software key.

4. **Trial Versions**. The VMS shall provide two types of trial versions:
   - **Third-party IP Device Trial**: A 60-day trial period is provided for connecting up to 16 channels of third-party IP devices. No license key is required.
   - **AI Function Trial**: A 30-day trial period is provided for enabling AI functions on up to 4 channels. A license key is required.

Minimum PC Requirements

5. **Minimum PC Specifications**. It shall be determined based on the number of display channels. The following requirements apply when connecting to VMS using dual-stream GeoVision and third-party IP cameras:

	GV-VMS (Up to 64 Channels)	GV-VMS Pro (Up to 256 Channels)
OS	64-bit Windows 10 / 11 / Server 2016 / Server 2019 / Server 2022	
CPU	11th Generation i7-11700, 2.5 GHz	14th Generation i7-14700K, 3.4 GHz
Memory	16 GB RAM	32 GB RAM
OS HDD	SSD, ≥150 GB free space	
Processor Graphics	Please see *GPU Decoding* specifications below.	

6. **GPU Decoding and Frame Rate Optimization.** A higher total frame rate can be achieved when the CPU includes onboard GPU capabilities or is connected to an external GPU for GPU decoding. For detailed specifications, refer to the GPU Decoding section in the Datasheet.
7. **SSD Requirement for Database Storage**. When the number of connected channels exceeds 64, all databases—including the AI event database—must be stored on an SSD to ensure optimal access performance and system responsiveness.
8. **Fisheye Dewarping Support.** To enable fisheye dewarping, the graphics card must support DirectX 10.1 or above.
9. **H.265 Decoding and Face Recognition Search.** Searching face recognition events by face images and decoding H.265 streams requires a 6th Generation Intel Desktop Processor or above with onboard GPU.

10. **PVD Motion Detection.** The functionality requires an 11th Generation Intel Desktop Processor or above with onboard GPU.
11. **Local Face Recognition.** The functionality requires a 9th Generation Intel Desktop Processor or above with onboard GPU.