

GeoVision Digital Surveillance System

Part 1 – General

1. All equipment and materials shall be standard components that are regularly manufactured and utilized in the manufacturer's system.
2. All equipment and components shall have been thoroughly tested and proven in actual use.
3. All equipment and components shall be CE-marked, FCC-marked and RoHS compliant.

Part 2 - Product

General Description

The digital surveillance system shall be installed on a Microsoft Windows XP/Vista/Server 2008/Windows 7 64-bit operating system for video surveillance (CCTV) purpose. It shall serve as a digital video recorder (DVR), which shall provide a high-quality recorder capable of storage and retrieval solution for video and audio from 1 to 32 camera inputs (Analog) and up to 32 IP-device(s) at a simultaneous refreshing recording rate. Depends on purchased frame grabber model recording frame rates may vary from 15/12 fps (NTSC/PAL) to 960/800 fps (NTSC/PAL) at CIF to D1 resolution. The DVR shall own a watchdog system, and be compatible to other GeoVision peripherals for external input sensors, output alarms, additional TV displays, POS/ATM transactions, central monitoring, LPR integration, and Wiegand-based access controllers.

Functionality Description

1. The Digital Video Recorder (DVR) shall be based on a recorder and multiplexer into one unit and IP-networked.
2. Digital video management and storage capabilities in a system.
3. Ease of use, future expandability, system reliability and journaling file system.
4. The DVR can be placed on a shelf, rack or desktop for easy access and the front panel shall have lock to prevent unauthorized access.
5. 32 NTSC/PAL analog camera inputs (CVBS/BNC 1Vpp, electronic 75 ohm termination).
6. In combination of at least 32 IP-based camera(s)/video server(s) devices for future expansion.
7. It shall have at least one VGA output for multiplexed viewing on GUI and at least one analog output for spot monitoring.
8. Spot Monitoring Optional Expansion Module: Five additional analog outputs with user-selected camera(s).
 - Configurable as Main Monitor and Call Monitor.
 - Activate by VMD, Alarm Event or Digital Input.
 - User-defined display order and dwell time.
 - Trigger related Digital Output Relay.
9. It shall support automatic adjustment for DST (Daylight Saving Time)
10. It shall also have I/O expansion capability for different kinds of sensors, like smoke, vibration, magnetic contact and possibility to control relay peripherals, like acoustic alarm, fire alarm, door locks, etc.
11. RS232/485/Network Optional Expansion Set:
 - Add-On internal card with 4 Sets of Digital Input and Output Relay. Expandable up to 16 Sets.
 - Add-On external box with 16x Digital Input and 16x Open Collect Digital Output. Link to 9x Digital Output Relay Box.
 - Add-On additional RS232/485 ports through USB / COM or RJ45 for IP Network.
12. It shall redirect 16x analog video signals for further expansion.
13. Loop-Through Optional Expansion Module: Redirect and enhance video signals for additional process.
14. It shall be controllable by professional surveillance keyboard.
 - Capable to control up to 16x DVR system (RS485).
15. It shall be controllable through IR remote control.
16. PTZ camera shall be controllable by joystick, keyboard and/or IR remote controller.
17. It shall receive unaltered transaction data from banking ATM/Teller or retail Point-of-Sale (POS) through RS232/485 or TCP/IP.
18. POS/ATM Optional Expansion Set: Receive POS/ATM transaction data without altering content.

- Send and receive using RS232/485 or Printer Port
 - Send and receive using TCP/IP or RS232.
 - Forward transaction data to DVR and predetermine peripheral, like Printer.
19. It shall receive/forward unaltered information from/to Wiegand-based access control system and retrieve/display user-defined field(s) from database.
 20. Wiegand Optional Expansion Set: Receive 26-bit through 40-bit Wiegand-coded format information.
 - Send through Wiegand Port, receive using RS232
 - Forward Wiegand-coded information to DVR and predetermine system, like Access Control.
 - Retrieve/display user-defined field(s) from database.
 21. It shall support AS access control system and LPR (License Plate Recognition System).
 22. It shall support storage expansion without stopping recording.
 23. It shall support iSCSI storage system.
 24. The DVR shall be provided with external UPS for further stability and functionality even by power disruption.
 25. It shall start recording automatically upon power restoration.
 26. It shall have hardware and software watchdogs to monitor system operations.
 27. The DVR shall have manufacturer support on revision control on the hardware and software for 2 years from the date of manufacturing.

Live Monitoring

1. The main GUI shall be compatible to wide screen format such as 1920x1080.
2. It shall contain multiple view configurations like single, four, six, eight, nine, ten, twelve, sixteen or 32 camera displays.
3. It shall support center placement of the camera in activity using special view configurations like 16+1 or 32+1
4. Full screen mode and/or switching mode with custom dwell time.
5. The aspect ratio shall be customizable between 3:2 / 4:3 / 5:4 or automatically fit
6. VMD/Alarm Event/Digital Input triggered camera shall be highlighted without human intervention instantly.
 - Popup Screen.
 - Centralize viewing method.
 - Triggered related digital output relay(s).
7. Camera can be hidden from public viewing.
8. Video attributes like sharpness, saturation, brightness and contrast can be modified to match the environment, providing the best optimal recording quality.
9. OSD shall be recorded and overlay over video with camera identification, date and time.
10. OSD font and position attribute shall be configurable.
11. Single-byte, double-byte or Unicode font for OSD support.
12. System date/time, remaining hard disk space and active server instances shall be shown.
13. Multi-tasking support.
 - Recording instances.
 - Playback procedures.
 - Network Server services.
 - Integrity Management.
 - Remote Operation.
14. Instant playback of the specific camera shall be available.
 - Time interval of 10, 30, 60 and 300 seconds.
 - Recording operation must not be stopped.
15. It shall have the ability to take snapshot of live scene.
16. Enhance live viewing with DirectX and De-Interlace techniques, to provide a sharper, crisp clear quality.
17. It shall support touch panel, virtual keyboard, surveillance keyboard, IR remote control and joystick without the need of conventional keyboard or mouse.
18. It shall support PAP (Picture and Picture) or PIP (Picture in Picture) to enhance area of interest.
19. It shall support (limited) shortcut keys.

20. It shall support desktop lockup. Prevent unauthorized application other than DVR launches.
21. It shall support multiple monitors with predefine divisions for live viewing, playback, alarm events or other operations without obstructing surveillance scene.
22. Alert like Video Loss or Connection Loss shall be displayed on inactive camera and an acoustic tone shall be played.
23. It shall automatically start recording and other server services and/or switch to the user-defined account when system is in idle.
24. It shall support automatic reboot in the user-defined time frame to maintain system integrity.
25. It shall support defog function to obtain better image quality.
26. It shall support anti-vibration feature to obtain better image from vibrating cameras.
27. It shall support Jigsaw function that the user can get one bigger image from 4 specified cameras.

Recording

1. The video compression shall produce high resolution with play back.
2. It shall support software and/or hardware compression.
3. MPEG2/4 Hardware compression card can be used.
4. MPEG2/4 Optional Expansion Module can be added. Real-time hardware compression relieving CPU arithmetic burden.
 - Compress to DVD compatible format.
 - Multiple MPEG4 compression levels for TCP/IP transmission.
5. The system shall have at least five user selectable image quality settings.
6. Recorded video recording resolution can be either QVGA, CIF, 2CIF, VGA or D1(4CIF) NTSC/PAL.
7. It shall support Megapixel resolution for IP device.
8. Users shall be able to select from 1 to 30 frames NTSC and 1 to 25 frames PAL by camera.
9. The maximum recording frames per second shall be 480 frames NTSC & 400 frames PAL per capture device.
10. It shall support combination of dual video capture devices which can archive in total up to 960/800 fps..
11. The system shall automatically proportion the available frame rates among cameras or users shall be able to assign different frame rates to each camera.
12. Each archive shall contain no more than five minutes to reduce maintenance efforts and prevent data corruption.
13. Recording shall use MPEG4 or derivate algorithm such as H.264 to extend recording time and be smaller enough to be transmitted through TCP/IP.
14. Storage estimator using real scenario as emulation applying different compression codecs.
15. Recording methods shall be set as continuous, time lapse, schedule, alarm event or I/O triggered and VMD recording.
 - VMD shall trigger recording procedure for associated camera(s)
16. Recording speed shall increase automatically to maximum frame rates on event of alarms, motion activity or triggered by digital inputs.
17. Each VMD grid(s) shall be defined by users with different sensitivity levels for each camera to minimize false alarm(s).
18. VMD recording shall work effectively from dusk till dawn with different luminance variation.
19. Pre-/post-recording on event or alarm set by camera shall be available.
 - Pre-recording buffer shall use DRAM or non-volatile storage to extend pre-recording time up to 45 minutes and post-recording time shall be max. 10 minutes.
 - Extend Pre-Recording time using HDD.
20. Recorded clips shall be protected from being overwritten.
21. Recorded video archives shall contain digital signature or stenographic to avoid data manipulation and be useable as evidence material in court of law. Tool for verification shall be present at no charge.
22. The DVR shall have at least built in free space of 300 GB hard disk for 1 week recording.
23. When available free disk space reaches the user-defined limit or after a certain period of time overwrite older archives must be present, preventing interruption and keeping continuous recording operation, with the exception for those which are flagged with non-overwrite protection.
24. All VMD, alarm event, I/O triggered recording shall be protocol in log database.
 - Notification shall be sent either per Email, SMS, Hotline (PSTN), or pager.
 - Related digital output relay(s), like alarm, shall be triggered.

25. It shall mask certain sensible region permanently or password-protected for later retrieve.
26. It shall send alert and flagged against overwritten when.
 - The camera is being tampered.
 - The camera view is being altered.
 - The camera is obstructed with object.
 - Notification shall be sent either per email, SMS, Hotline (PSTN), or pager.
 - Related digital output relay(s), like alarm, shall be triggered.
27. It shall support different keep dates, recycle sizes and recording locations for different cameras at the maximum of 16 groups.

Video Analysis & Object Management

1. It shall support counting from objects or persons crossing user-defined borderline to define entry and/or exit direction.
 - At least 5 sensibility levels and object sizes shall be user-defined.
 - Recorded and/or Live camera shall contain bounding boxes or other visual effects to attract security personal attention.
2. It shall support alert when a crowd of people gathers in a specified area and exceeds the defined threshold.
3. It shall support customizable motion detection by region and by defined object size.
4. It shall support continuous and static snapshots from VMD triggered cameras, which work as bookmark in a separate window for later retrieve process.
 - Extraction of human face.
 - Clicking on the snapshot shall playback the specific scenario without entering date/time/camera.
5. It shall support asset protection by defining object size.
6. It shall send alert when an unidentified object is placed.
7. Recorded clips shall be protected against overwritten, playing acoustic tone and triggering corresponding digital output relay.
8. It shall support intuitive I/O triggering.
 - Clicking on object from camera view to trigger an associated digital output relay.
 - Set as button or area. Colorize for easier differentiation
9. It shall support multiple video filters effects to enhance video quality.
10. It shall be schedule into specific time frame to perform video analytic tasks.
11. It shall support indoor and outdoor advanced operations using special USB dongle.

Event Management

1. It shall support email, SMS and Hotline (PSTN), or pager when VMD/Alarm Event/Digital Input happens, like Video Loss, Recording Error, Disk Full, I/O Error, Object Management, Sabotage on Camera.
2. It shall support email authentication, alternative SMTP and SSL secured port.
3. It shall be configurable with time interval.
4. It shall send hyperlink for users to link back to the system (with DDNS).
5. Snapshot shall be included when available or user-defined.
6. PSTN Dialup modem connection support (Redundancy).

Digital I/O Devices Connectivity

1. It shall have at least 16 inputs (max. up to 144) to trigger alarm recording with 16 outputs (max. up to 144) to drive external alarm devices.
2. It shall support IP-based Digital I/O from camera or video server.
3. 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.
4. I/O real-time status overview shall be present.
5. It shall support mixture more than one DVR I/O devices.

6. Alarms shall be activated manually or by event and associate any number of alarm devices with any cameras.
7. Cascade triggering shall be present.
8. Acoustic alert tone shall be present.
9. It shall be set as inactive or active using the user-defined schedule.
10. It shall support embed event activities into video.
11. All activities including system, sensor, VMD and user activity shall be logged in the system automatically.
12. All the alarm and events in the log database can be easily find, identified and retrieval using filter condition set by the users.

Pan, Tilt, Zoom camera Control

1. The DVR shall have inbuilt Pan/Tilt/Zoom camera operation to control PTZ cameras.
2. The PTZ control shall be available locally and remotely using remote client software.
3. It shall support IP-based PTZ cameras or video servers.
4. It shall have inbuilt protocols to control High speed domes of various manufactures like Pelco-P, Pelco-D, Ademco, Lilin, Dynacolor, Sony, Panasonic, Mintron, Kalatel, Samsung, Bosch, CBC, Chiper, Elbex, Everfocus, Hi-Sharp, JVC, Kempro, LG, Minking, Vido, Yaan, etc.
5. Tracking and zooming objects based on motion or color differentiation (using special PTZ camera). The selected object can be located as alternative windows display to highlight area of interests.
6. During operation inactivity the PTZ-camera shall be able to return to home position or conduct with user-defined tasks (Tour).
7. It shall be triggered using alarm event, VMD or I/O to a predefined preset point.
8. The PTZ camera shall be controllable by joystick.
9. It shall provide digital object tracking for single fixed camera, by enhancing and zooming object into PAP (Picture and Picture) or PIP (Picture in Picture)

GIS Integration

1. Integrate GPS coordinate into system.
2. Overlay GPS track path into 3rd party map system from Google®, Microsoft® and custom map system.
3. Playback video archives with GPS information

User Right Management

1. The system shall support up to 1000 accounts.
2. It shall have four predetermined user levels, like administrative, power user, normal user and guest accounts.
3. Each account level must be flexible enough for customization in order to meet different security levels or scenarios.
4. Delegation of privilege, password expiration, de-/activation account, local and remote password changes and user restriction shall be present.
5. Password shall be retrieval through Email.
6. It shall prevent unauthorized system shutdown process to specific user(s) or group(s).

POS / ATM Integration

1. The system shall be able to capture and store banking ATM/Teller or retail Point-of-Sale (POS) transaction information using RS-232/485 ports or TCP/IP available on the unit.
2. Multilanguage codepage support.
3. The text information captured from a transaction system shall be able to overlay on video and be protected with digital signature for authenticity verification.
4. It shall support user-defined font attributes, like color, font type, size, text background color and stereo effect.
5. It shall support the user-defined transaction text position.
6. Predefined condition, alert or keyword shall be highlighted using colored font and trigger digital output relay in case of event.
7. It shall support secondary display window when text overlay to camera live view is set to inactive/hidden.
8. It shall support I/O monitoring and triggering upon alarm event.
9. All transaction data shall be logged in database for later retrieve.
 - Intuitive search method.
 - Filtering using keyword(s) or phrases in user-defined parameters and criteria.
 - Cross reference search between multiple POS databases.
 - Export result for the 3rd party application or analysis.

- Export/Import search parameter(s).
10. All transaction data shall be able to monitor in live or afterward using local playback or remotely under TCP/IP environment (LAN/WAN).

Playback

1. It shall be able to use frame by frame playback method or continuously in real-time method.
2. 1/8x, 1/4x, 1/2x, 1x, 2x, 4x, 8x, 16x, 32x playback speed.
3. Forward or reverse playback.
4. It shall be able to adjust brightness, contrast, saturation, equalization, invert, grey, sharpness or softness to improve image quality.
5. It shall support video quality enhancement by optimizing color levels.
6. Display in single, quad-channel, multi-channel, and thumbnail (25 consecutive preview images), which time frame can be determined by users.
7. Recorded clips shall be easily displayed in timeline or time-tree basis.
 - In time timeline basis the interval shall be in hour or 24-hrs mode.
 - In time tree basis it shall be able to show time, total captured frames and total file size.
8. On play back it shall have the ability to do digital zooming on the whole image or by selecting specific area on the screen.
9. It shall overlay camera, recorded time, and transaction data as OSD.
10. The recorded clips shall use DirectX, De-Interlace and De-Blocking technique to enhance image quality.
11. Empty key frame shall be replaced with user-defined image.
12. It shall support point to point loop playback.
13. It shall support playback, remote management and backup of other DVR using TCP/IP connection.
14. It shall support export / merge from video clips to DVD-ROM medium.
15. It shall support export of log information.

Smart Search

1. It shall be able to search recorded images from single or multiple cameras, also the ability to search by date, time, or time frame.
2. It shall have Smart Search facility to find objects using user-defined conditions in the search grid.
3. Conditions like counting, asset protection, unidentified object and alarm events shall be supported.
4. Search result shall be played and exported to user-defined image format.
5. Quick Search for VMD, alarm event, I/O using log database.

Video Export

1. It shall support user-defined time frames.
2. It shall alert when available free backup space is not enough.
3. Custom player with all necessary codecs shall be exported.
4. Database integration tool shall be present.
5. Exported images shall contain date, time, DVR, camera, transparency and digital watermark.
6. It shall be exported in multiple formats like JPEG/BMP/GIF/PNG/TIF.
7. It shall be exported as AVI or EXE format with/out built-in player.
8. It shall combine 16 camera views into single 16x view AVI format for an easy overview.
9. Remove empty key frames when merging different time clips.
10. It shall be able to add or remove masking areas for sensible contents. The mask area can be integrated as permanently in video or recoverable using password protection.
11. It shall have an inbuilt digital signature (watermark) authentication application.
12. The storage medium shall be internal/external hard disk drives, DVD-RAM, MO, DAT, ZIP, RAID and FDD.
13. The DVR shall have internal CD/DVD-RW for one-step burning method. That means after selecting time frames it shall backup immediately without launching additional burning application.
14. Burning to DVD compatible format using hardware compression.
15. It shall support printing of recorded images for report purpose using system built-in printer.
 - It shall list with following items DVR, camera, time, date and note with custom font art and size; along with custom image position.
 - It shall be able to print thumbnails as sequential images.

16. It shall have the capability to burn a single large file on more than one CD/DVD in sequence.

Remote Monitoring

1. The DVR shall be IP-networked.
2. It shall support Multicast streaming using alternative NIC.
3. No software required to be installed previously. All necessary applications shall be downloaded automatically using ActiveX techniques from the Internet.
4. Access using either MS Internet Explorer or Remote Client Software.
5. It shall support secure socket layer (SSL), IP filter and RSA encryption.
6. It shall support custom digital certificate and private key with encryption strength up to SSL v2/v3 1024 bit
7. TCP/IP connection port(s) shall be user-defined.
8. It shall support Dynamic Domain Name Server (DDNS) which allows DVR to use Dynamic IP address for Internet connection.

- Dynamic Domain name shall be provided freely.
- Login name and password determined by users.

9. Each DVR system shall support up to 200 concurrent connections.
10. It shall support Guest account with time limitation.
11. It shall support File Transfer Protocol with alternative Port and Interval.
12. It shall support bandwidth control.
13. It shall support UPnP capable router.
14. It shall support electronic map for an intuitive camera and digital I/O status overview.

- Multi-Layer support.
- Concurrent up to 500 DVRs connections.

15. Client using MS Internet Explorer® shall be able to

- Connect and switch to multiple DVR(s)
 - a. Real-time bandwidth adjustment.
 - b. User-defined control levels, camera, video attributes.
 - c. Start/Stop normal, schedule, I/O recording
 - d. Pop-up when VMD, alarm event, I/O triggered.
 - e. Save snapshot from instance.
 - f. Remote PTZ control.
 - g. Two-way audio communication.
 - h. Object Counting data.
- Display live MPEG4 video or JPEG image(s)
 - a. Switch viewing across 16 cameras.
 - b. OSD with camera/date/time.
 - c. Full screen display.
 - d. Instant switch of image resolution.
 - e. Save as AVI or JPEG.
 - f. Print live image.
 - g. De-Interlace, De-Block and DirectX enhancement.
- Playback recorded video(s).
 - a. Time tree listing.
 - b. Sort by date/time/camera.
 - c. Smart Search.
 - d. Download remotely.
 - e. Full screen display.
- Monitor camera(s) and Digital I/O live using electronic map.
- Monitor POS/ATM live transaction data(s).
- Monitor mobile operation through GPS coordinate on 3rd party map system.

16. Client using remote client software shall be able to

- Connect and switch to multiple DVR(s).
 - a. Viewing 16 cameras simultaneously.
 - b. Single or mixed hosts.
 - c. Save snapshot from instance.
 - d. Remote PTZ control.
 - e. Two-way audio communication.
 - Display live MPEG4 video or JPEG image(s)
 - a. OSD with camera/date/time/bandwidth/IP.
 - b. Full screen display.
 - c. Instant switch of image resolution.
 - d. Save as AVI.
 - e. Print live image.
 - f. De-Interlace, De-Block and DirectX enhancement.
17. It shall support live monitoring and playback from handheld devices such as Windows PDA/Smartphone, Blackberry®, Iphone®, and Android devices.
- Snapshot.
 - PTZ and I/O control.
 - Rotate/Zoom/Image adjustment.
 - 3GPP support.

Customization

1. It shall support the user-defined alert screen, like Video Loss.
2. It shall support the user-defined GUI skin.
3. It shall support the ability to add/remove feature(s) from DVR main system.
4. It shall support the ability to backup/restore DVR settings.

System Requirements

The target platform shall meet or exceed the following design and specifications:

PC shall be based on a Pentium® Core 2 Duo, 2.4 GHz or greater
 At least 2GB RAM.
 Network adapter 1000 Mbit Ethernet is optional and recommended.
 Standard sound card is optional and recommended.
 Minimum 120 GB storage capacity for installation and video archives.
 Microsoft® Windows XP/Vista/Windows 7/Server 2008 with the latest Service Pack.
 Graphic card: ATI Radeon X1300 PCI-E / NVIDIA GeForce 7300 PCI-E or better.
 DirectX 9.0 or better.