

ATTACHMENT K

MIRASYS

MANUFACTURER

SPECIFICATIONS

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Video Surveillance Technical Specifications

Components

1. The networked Video Management System (VMS) shall consist of the following components:
2. Scalable video management software hosted on existing commercial grade servers with Microsoft Windows operating system.
3. The VMS shall be a true hybrid system capable of integrating existing or new IP cameras across a multi locational IP infrastructure.
4. The VMS shall support virtually all leading IP camera manufacturers for user choice and design flexibility. The VMS shall be full featured with client software applications intended for
 - a. Live video monitoring with future video wall functionality
 - b. Real-time alarm monitoring and display
 - c. Centralized System management
 - d. Instantaneous retrieval of archived video from any camera from any server
 - e. Evidence production on ASF, AVI, MKV and SEF files that can be viewed on any PC
 - f. Export of tamper evident video on recordable CD's or DVD's.
5. The VMS must have Active Directory/ LDAP integration.

Video Management System Concept of Operation

The VMS and its manufacturer shall provide the following key functions and capabilities:

6. The system shall operate in a Microsoft Windows 10 environment. It shall be an IT server based solution purpose-built for the capture, processing, storage and retrieval of unlimited amounts of digital video (limited only by the size of recording disks or disk array) and supporting audio, alarm, associated systems (access control, etc.), and other surveillance data.
7. The VMS shall support a wide range of deployments including new, all-IP camera environments as well as incorporating cameras, cabling and other security and IT

infrastructure where appropriate to maximize existing investments.

8. The VMS software shall operate consistently on stand-alone or integrated host and storage platforms from recognized IT industry suppliers. This hardware independence shall allow the host and storage platforms to be sourced from the VMS manufacturer, an integrator certified by the VMS manufacturer or supplied by the customer for optional loading and certification by the VMS manufacturer at the manufacturer's facility.
9. The VMS shall capture video, audio, alarm, associated systems and other data from a single or multiple servers.
10. The VMS shall have the ability to write to DAS, NAS iSCSI and Fiber SAN or to local storage. The VMS storage volume can be configured in RAID levels 0, 1, 5, 6, 10, 50, 60, and JBOD.
11. The VMS shall support all leading industry-standard compression formats including Motion JPEG, MPEG-4 & H.264.
12. The VMS shall simultaneously handle recording, archiving, retrieving, playback and live distribution of video and audio. The software shall operate in a continuous recording mode or according to a programmed time/date schedule. Recording functions may also be triggered by events and motion detection.
13. Live and archived video/audio data shall be available to authorized users at any time over local or wide area network connections.
14. The VMS shall incorporate a Web Client so live and recorded video may be viewed live and reviewed via the Internet by authorized users.
15. The VMS shall be capable of exporting video clips or images to CD/DVD's without third party software. All images or clips shall include an executable player that verifies no tampering has occurred and can be played on standard PC's.
16. The VMS Server software shall utilize a high performance, multi-threaded, application engine. This allows multiple tasks to be executed at the same time and is required to take full advantage of multiple core or multi-processor technology.

Licensing

The licensing program characteristics are:

1. IP camera license shall not be tied to a hardware address (MAC Address) of camera.
2. The VMS Server software licensing shall be tied only to the MAC Address of the recording server or master server.
3. Camera licenses may be moved between servers.
4. Client applications can be installed an unlimited number of times without additional licensing cost.

System Hardware Requirements

1. **VMS System Host:**
 - a. The VMS host server shall be a standalone or integrated product from a recognized industry leader including internal or external storage arrays.
 - b. Storage capacity and configuration shall be scalable based on specific application needs without modification to the base VMS software package.
 - c. The hardware may be supplied by the VMS manufacturer, a local integrator certified by the VMS manufacturer or by the client IT Team.
2. **Minimum hardware requirements**
 - a. The VMS manufacturer shall provide an online HTML based tool to calculate hardware requirements for a specific recording configuration managed by the VMS server.
3. **IP Cameras**

The VMS manufacturer shall periodically test various IP cameras to insure compatibility. Check with the VMS manufacturer for a comprehensive list of supported camera models. The following camera manufacturers have been tested and have models

compatible with the VMS:

- a. Axis Communications (Platinum Partner)
- b. Bosch (Platinum Partner)
- c. Samsung (Platinum Partner)
- d. Panasonic
- e. Arecont
- f. Sony
- g. ACTi (Platinum Partner)
- h. HikVision (Platinum Partner)
- i. Vivotek
- j. 2N Communications

4. 2N Communications Intercom Requirements:

- a. Support 2-Way Audio recording and Communication
- b. Support Video recording
- c. Support I/O Control and Status monitoring
- d. Map Devices Video, and I/O on a floor plan

System Software Characteristics

Recording Servers

5. The VMS recording server component shall have the following characteristics and features:
6. Video servers shall be capable of supporting an unlimited number of IP cameras.
7. VMS Server shall be capable of interfacing with MJPEG, Microsoft MPEG-4, ISO MPEG-4 and H.264 compressions.
8. VMS Server shall record native camera format.
9. Recorded video shall be tamper evident. Video recordings shall be marked with an electronic watermark. The electronic watermark shall be generated using an MD5 Hash algorithm.

10. Separate, programmable event and motion detection settings shall be provided per video input.
11. VMS Servers shall execute as a Windows “system service” so full VMS functionality is maintained even if a Windows user is not logged into the operating system.
12. The VMS Server shall maintain full VMS functionality regardless of the user rights of a locally logged-on Windows user.
13. A locally logged-on Windows user with less than administrative rights shall not have the ability to stop, start or otherwise control the running state of the VMS Server.
14. A windows user with administrative rights shall be able to control access to Windows applications, application settings, operating system settings and other functions without compromising VMS functionality.
15. The VMS server shall store video events as a user accessible file within the NTFS file system without requiring the user or administrator to extract the video event from an image database or other proprietary storage database for purposes of archive or review.
 - a. The VMS shall operate using “Client/Server” architecture with no central video streaming server required.
 - b. The VMS shall be compatible with IT backup software and not require a proprietary “exported video” function for management of stored video files. Compatible IT backup software shall include these features:
 - c. Locked file support
 - d. Ability to duplicate files and folders
 - e. Backup without encryption and compression
 - f. Delete original files after backup
16. The VMS shall include a built-in archiving feature for the purpose of moving recordings from their original storage volume to a different local or network-attached storage volume on an administrator-defined schedule or can initiate archive manually via client.
17. The VMS shall have the capability of utilizing edge based storage (based on camera capability). Edge storage integration shall allow the VMS to synchronize any recordings missing on the VMS server as a result of network outage or other event preventing communication between the camera and VMS. The synchronization of missing recordings shall occur when network communication is restored to the camera(s) and server(s).

18. The VMS shall provide a stable recording environment via a modular video storage and data management architecture to minimize common database corruption situations. Video and audio storage shall be stored outside of a database. This reduces the potential of video/audio data corruption and allows rapid database rebuilding with no restart required in the event of system failure.
19. The VMS shall use multiple streams from the camera(s) to minimize bandwidth sent to displays and streaming devices. While video sent from the camera is recorded in its original resolution and frame rate, the VMS resizes the resolution and frame rate sent to the display and/or streaming device based on the size of the selected parameters.
20. The VMS Client and Server applications scale to any number of cameras and servers as required.
21. There shall be no imposed limit on the scalability of the system. The VMS system shall be expandable by adding additional video servers and storage devices to support increased camera capacities.
22. The VMS manufacturer shall allow for third-party integration through the implementation of an application programming interface (API). The API shall grant internal or third-party developers the ability to add the following video functionality to their applications without the need for VMS client software to be installed or otherwise invoked:
 - a. Display live camera views.
 - b. Perform video archive search and retrieval functions.
 - c. Control pan-tilt-zoom cameras.
 - d. Add/Modify/Delete user accounts.
 - e. Initiate recording of external alarm events.
 - f. Modify a subset of the server configuration.

Configuration Server

The VMS shall support Roaming User accounts whereby users shall be able to log into any workstation running VMS client software and the Server shall provide their account information and configuration. When new client software updates are available, using system manager, administrator shall be able to deploy the recording server(s) software and driver updates to all recording servers centrally and without manually installing the update.

1. The server shall automatically “push” the update to the client following a software update.
2. The server shall accept client software update files from the VMS system’s Administration Console for pull-mode client software updates. When a user logs into the client the new software update is pulled from the server and installed automatically without further administrator or user intervention.
3. The server shall centrally store VMS client configuration. When a user of the VMS client logs in, their configuration is downloaded to the workstation they are using. This allows them to maintain their configuration when logged into any workstation running VMS client software.
4. VMS shall be run as a Windows System Service so full Server functionality is maintained even if a Windows user is not logged in to the operating system.

System Administration

The VMS shall provide the system administrator with the tools to monitor the overall system health, camera status, video archive usage and status plus other elements of every server in the Enterprise system. This tool is also used to perform individual or group updates of the VMS software on selected servers.

1. The VMS shall support “single seat administration” so that a single management application administers multi-server/multi-client environments. This allows simultaneous control of multiple servers and clients and system-wide monitoring of the health and status of all servers and cameras from one console. Support is included for:

- a. Push-based, secure, distribution of application software updates for all VMS server software components where the update process occurs in parallel for all selected servers.
 - b. Pull-based updates of video client application software via a centralized data store.
 - c. Support for remote configuration of all VMS server software components.
 - d. Support for remote monitoring of all VMS server software components.
 - e. Support for remote configuration of the centralized data store.
 - f. Copy or move cameras between servers.
 - g. Configure users and groups.
 - h. Replicate users and groups.

2. The VMS software shall be capable of monitoring one (1) or more VMS systems and reporting the following items:
 - a. Installed VMS software version.
 - b. Total amount of system memory.
 - c. Total amount of available system memory.
 - d. Total CPU utilization.
 - e. Total VMS uptime.
 - f. Video source status including current recording status and the volume where video events are currently being stored.
 - g. Storage volume status including total number of days of video available on the selected storage volume, the amount of storage that is currently being utilized and the amount of storage that remains before triggering the FIFO-mode event deletion process.
 - h. Video storage status per camera
 - i. Provide a list of events that have occurred on the selected server since the initial connection.
 - j. Listing of currently connected clients including connection number, client (source) IP address, description of the client and the username used by the selected client.

3. The VMS shall automatically and without user intervention provide a process whereby critical system events shall be visually brought to the attention of the user

4. The VMS shall provide the ability to remotely perform, in parallel, a push-mode, unattended software update to one (1) or more servers over the IP network. While updates are being performed, update events will be received and logged.
5. The VMS shall visually notify the user if a server becomes unreachable during a session.
6. The VMS shall be able to program notification to one (1) or more administrator configured e-mail addresses if any of the following events occur and the server has been configured to provide the events:
 - a. Server Connection Lost
 - b. Camera Offline
 - c. Volume Offline
 - d. Camera Connection regained
 - e. Server Connection regained
7. The e-mail server configuration shall utilize the SMTP protocol over TCP port 25 to connect to an administrator defined e-mail server. It will utilize SMTP Authentication if configured as such by an administrator.
8. The VMS shall provide the administrator the ability to control the running state of the core video server software on the selected VMS. These include starting and stopping the video system service.
9. The VMS shall provide the administrator the ability to retrieve a filterable list of events from the log files maintained on each VMS.
10. The VMS shall be capable of saving the current session with all user or administrator configured settings to a file.
11. The VMS shall be able to restore a user session from the settings located within a saved session file.

Recording Server Configuration

Configuration of VMS recording servers and VMS client users is performed in the System Manager application. The application can be run from any network connected workstation and used to perform configuration of multiple recording servers, user groups or clients (simultaneously).

1. All configuration options shall be menu driven and provide control of functions such as Add server, user group, client configuration; Edit server user group, client information; Delete server, user group, client configuration; Backup / Restore client, user group or server configuration; Users; View layouts, user rights, etc. The following functions shall be included to reduce configuration time.
 - a. The administrator shall be able to clone device profiles as well as user groups to reduce redundant configuration.
 - b. The administrator shall be able to clone IP camera configuration to reduce redundant configuration.
 - c. The administrator shall be able to clone recording schedule to reduce redundant configuration.
 - d. The administrator shall be able to move IP cameras between servers.

2. The VMS shall provide an administrative description for all configured cameras in the system.
 - a. Works like a notepad, to include Camera model, IP, Username and password, switch port, etc.
 - b. Must be user rights based and can be added to any AD/LDAP group.
 - c. Must only be seen by admin user.

3. The VMS shall allow configuration of the following server information:
 - a. Server name; TCP port numbers used for client/server communication; Embedded Web server enable and HTTP port, etc.
 - b. Store all system events to be kept in server logs.
 - c. E-mail configuration information for camera alarm notifications.
 - d. Administration of Feature Keys associated with the system.

4. The VMS shall support an unlimited number of Users/Groups. Controls shall include:
 - a. Administration of both user groups and users including viewing/modifying server configuration; logging of events such as login, logout, playback requests and live view requests.
 - b. User camera permissions including enable live view, enable playback (with or without export capability), enable Snapshot, enable PTZ control, and PTZ user priority.
 - c. Administration of user rights in client - can use only selected plugins, can open cameras, can close cameras, open new client window, can create, edit and/or view bookmarks, change camera stream settings, create and edit PTZ presets and/or tours, etc.

5. The VMS shall allow the administrator to define video recording volumes. A single or multiple recording volumes may be configured for each server.
 - a. The user shall be able to specify the location of the video recording volume. A volume can be defined as any drive letter and folder path on the server's direct attached, mapped or iSCSI storage or any UNC path. This allows for defining a volume such as C:\Video\ or \\Archive\Video.
 - b. The location of recordings across the volumes shall be tracked automatically by the VMS server so a user searching for video shall not need to specify the recording's location on disk.
 - c. The administrator may define the minimum free space on the volume which recordings cannot be written to.
 - d. Video shall be written to the volume in a First-In-First-Out (FIFO) method. When the volume has reached its maximum allowed space the oldest day of recordings is deleted in order to free space for new recordings.

6. The VMS shall allow the administrator to define archive storage volumes. The VMS shall automatically move video from a 'Regular Storage' volume to the Archive storage volume on an administrator-defined schedule.
 - a. The user shall be able to specify the location of the archive storage volume. An archive volume can be defined as any drive letter and folder path on the server's direct attached, mapped or iSCSI storage or any UNC path. This allows for defining a volume as C:\Video\ or \\Archive\Video.
 - b. Multiple archive storage volumes can be defined for each recording server.
 - c. The user shall be able to specify the number of days to keep archived recordings for before deletion from the archive storage volume. This can be separately specified for each camera on the system.

- d. The user shall be able to specify the minimum free space on the archive storage volume which recordings cannot be written to.
7. The VMS shall provide the following configurable individual camera parameters for all cameras:
- a. Enabled. If disabled no recording will take place regardless if recording is enabled elsewhere in the system (e.g., schedule).
 - b. Name.
 - c. Video Size which sets the capture resolution and FPS (e.g., 1920x1080 @# 30FPS), Client live view resolution and FPS (e.g., 1280x720 @ 15FPS), and streaming resolution and FPS (e.g., 320x240 @ 1FPS)
 - d. Compression. Selectable from MJPEG, MPEG-4 or H.264.
 - e. Video Quality sets the compression level used for the chosen compression type.
 - f. Time Stamp Overlay imposes the date and time in the Upper left corner of the exported video or still image.
 - g. Camera Name Overlay imposes the camera name in the upper left corner of the exported video or still image.
 - h. Scheduled Recording FPS sets the video recording frame rate for scheduled, continuous recording.
 - i. External Alarm FPS sets the video frame recording rate for external alarm events.
 - j. Motion Detection FPS sets the video recording frame rate for motion detection events.
 - k. The Camera adjustments button provides control of various parameters of any connected cameras. The signal adjustments include Brightness, Contrast, Hue, Saturation, Sharpness, Gamma, White Balance, Backlight Compensation and a Defaults reset setting.
8. The VMS shall provide a camera search and add tool for automatically detecting cameras and adding individual or groups of cameras. The auto detection tool shall have the following capabilities
- a. Detection of cameras via Universal Plus and Play (UPnP).
 - b. Allow for adding cameras detected to the VMS configuration for recording.
 - a. The tool shall allow for groups of camera to be added or individual cameras.
 - b. Prior to a camera being added the tool shall check to see if a video stream can be acquired preventing misconfigured camera from being added.
9. The VMS shall provide automated, e-mail notification to one or more recipients when certain alarm events occur on a per camera basis. The VMS provides control of the

following parameters upon which an e-mail may be sent:

- a. Event type which triggers e-mail notification. Configurable event types shall include Sync Loss (loss of video signal), Camera Sync Regained, External Alarm, and Motion Detection. Single or multiple events can trigger an e-mail notification.
 - b. E-mail notifications can optionally include a JPEG still image from the associated camera. The administration can configure a delay period which specifies the number of seconds before the event occurs to capture a snapshot image.
 - c. E-mail subject and recipient list. Multiple recipients' addresses may be specified.
 - d. Notification limits shall be configurable specifying the maximum number of emails which can be sent for an individual event and the minimum time between events.
10. IP Camera configurations shall be configured specifically for each IP camera. Configuration options shall include:
- a. Camera manufacturer and model. Used to specify the communication driver for the IP camera or encoder.
 - b. Camera address which can be specified as an IP address or Hostname.
 - c. Communication port numbers such as HTTP or RTSP port
 - d. Camera username and password.
 - e. Compression type (MJPEG, MPEG4 or H.264). Compression type is dependent on the camera manufacturer and model chosen.
11. The VMS shall provide a Generic (universal) driver for IP cameras and encoders not available in the supported camera list.
- a. The generic driver shall be able to pull individual JPEG snapshots at a configured interval via HTTP protocol.
 - b. The generic driver shall be able to pull a standard Motion JPEG stream via HTTP protocol.
 - c. The generic driver shall be able to pull a standard MPEG4 stream via RTSP over HTTP protocol.
 - d. The generic driver shall be able to pull a standard MPEG4 or H.264 stream via RTSP/UDP.
12. The VMS shall provide configuration support for camera based event notification.
- a. The VMS shall provide user configuration of on-camera event alerts including Motion Events, Audio Events, Camera Tampering Events and On-Camera I/O Events.
 - b. Motion Recording or Alarm Recording can be enabled for the duration of the event.

- c. An external script may be selected to be executed on event.
- 13. The VMS shall include a recording schedule planner that allows the setting of a recording schedule. Multiple schedules may be configured and each camera may have a unique recording plan within the schedule.
 - a. The VMS shall allow for the configuration of multiple schedules.
 - b. The VMS shall allow for a schedule to be run on a specific date, run on all weekdays, run on all weekends or to run every day.
 - c. The VMS shall allow the administrator to clone a multi-camera schedule to reduce configuration time.
 - d. The VMS shall allow for configuration of a unique recording plan for each camera within the schedule. The recording plan shall specify what types of recording should occur for each camera in a 24 (twenty-four) hour period. 1. Scheduled recording, motion recording, alarm recording and pre-alarm recording shall be configurable recording types within the recording plan.
 - e. Each camera's recording plan shall be displayed graphically on a time line. Unique colors will represent the different recording types to allow for easy configuration and identification of recording type(s) running at a given time.
 - f. The VMS shall allow for configuration of scheduled, alarm, motion and pre-alarm recording separately or allow combinations of those recording types to occur at the same time.
 - g. Camera recording plans shall allow the administrator to configure recording times down to 1 (one) hour increments.
 - h. The VMS shall allow the administrator to "copy and paste" individual camera recording plans to other cameras to reduce configuration time.
- 14. The VMS configuration tool shall support diagnostic and system reporting features.
 - a. VMS diagnostic and logging reports shall output the complete system configuration (excluding system and camera passwords), full system log files, license key listing and Operating System platform information.
 - b. VMS diagnostic and logging reports shall include system performance data including performance of Active Directory authentication (if applicable), Disk I/O performance, CPU performance, memory usage and performance as well as NIC interface usage and performance.
- 15. The VMS must have ability to add Failover Server.
 - a. All system data from failed server will copied to Failover server. including cameras, motion zones, recording schedules, alarms, etc.

Client Configuration

Client tiled view layout and map configuration can be defined by individual users or administrator. Client configuration can be accessible from any network connected workstation.

1. The system shall allow for the setup of users and groups that may access the client configuration.
 - a. The system tool shall allow for the creation of a new user / group.
 - b. The system shall support automatic start the client application normally or in full screen mode, sequence mode or both. This shall be configurable by user / group.
2. The system shall allow the administrator to add multiple VMS Recording Servers to the client configuration. Tiled view layouts and maps can be populated with cameras from a single or multiple recording servers.
3. The system shall allow the configuration of unlimited tiled view layouts for the display of live video. Tiled view layouts can be configured per user or group. Up to 100 cameras can be auto setup for viewing on a target display in configurable grid arrangements.
 - a. View layouts shall have no software imposed limitation on the number of cameras which can be viewed per target monitor.
 - b. 4 x 3 or 16 x 9 (widescreen) or 9 x 16 target displays shall be supported
 - c. 4 x 3 or 16 x 9 (widescreen) or 9 x 16 (Corridor View) video feeds shall be supported within the display. A mix of 4 x 3, 16 x 9 and 9 x 16 video tiles shall be configurable in a single view layout.
 - d. Video feeds shall be added to a view layout by drag-and-drop of the selected camera to the 'drawing surface', which represents the target monitor.
 - e. The video tiles shall be easily stretched, shrunk or moved by a snap-to-grid functionality. Layouts shall optionally be drawn free form without a snap-to-grid function.
 - f. View layouts can be optionally added to a sequence with a configurable dwell time (in seconds).
 - g. The video tiles shall be capable of containing Profile Maps, Web page, Alarm Popup, Camera Carousel, Text Search and Alarm Search.
 - h. Web pages contained in a view layout can be optionally restricted by disabling links and other navigational controls to prevent web surfing.
4. The System shall allow for the setup of map based display of video. Unlimited site maps can be configured per user or group.
 - a. The System shall support the import of unlimited JPEG or BMP files as maps.
 - b. The System shall support unlimited cameras per map.

- c. Maps can be hyperlinked. Maps may be hyperlinked to unlimited levels.
 - d. The System shall support drag-and-drop based configuration of maps, so that any other map as well as cameras can be positioned easily on the target map.
 - e. Separate icons shall be used to represent fixed and PTZ cameras for easy identification by system users.
 - f. A snapshot from the target camera shall be displayed on mouse over for easy identification of camera position and field-of-view
 - g. Each camera can be configured with a cone representing the camera's field-of-view.
5. The System shall allow the administrator to set which live viewing elements will be accessible to the user. The administrator shall be able to enable or disable the display of live view layouts, maps, Sites/Zones or servers & cameras from the VMS client user.

Live View Capabilities

The primary VMS Video Client application shall provide a comprehensive set of features for the monitoring of video. These features shall include:

1. The VMS shall provide simultaneous recording, live view, playback and export of video.
2. The system shall be capable of displaying any number of live cameras concurrently per monitor. Video can be displayed on multiple monitors by opening multiple instances of the VMS Client. There shall be no software imposed limitation on the number of client applications open simultaneously.
 - a. The VMS shall provide unlimited, customized viewing layouts per user.
 - b. The VMS shall have the ability to display view layouts organized in a hierarchy of Site folders.
 - c. VMS Video Client shall support widescreen or standard displays in both 4 x 3, 16 x 9 and 9 x 16 aspect ratios.
 - d. The system shall support 16 x 9 aspect ratio cameras, 4 x 3 aspect ratio camera and 9 x 16 aspect ratio camera sources.
 - e. The VMS shall be capable of displaying tiled video views in full screen mode and filling the entire screen.
 - f. The VMS shall be capable of displaying a single camera full screen when the user double clicks the associated video tile.
 - g. VMS Video Client shall provide full screen on demand or automatically on startup of the client.
 - h. VMS Video Client shall allow the operator to toggle the title bar display on tiled view layouts.
 - i. Provide custom display size for each camera individually.

- j. Allow changing view layouts via "Tab Menu".
 - k. VMS shall limit access to view cameras user by user.
 - l. VMS shall provide adjustable frame rates individually by camera.
 - m. VMS Video Client shall provide color indicators showing the real time recording status on camera title bar display and/or on timeline.
 - n. The user shall be able to change view layouts by clicking the desired administrator-configured view layout in the Client menu. The user shall be able to enter Camera Carousel or Camera Tour mode where the VMS Video Client automatically switches between view layouts at preconfigured dwell times.
3. The VMS Video Client shall be capable of displaying maps and web pages within a video view layout.
- a. Maps displayed within a video view layout shall have full functionality including links to other maps within the system, cameras overlays, field of view cone representations and visual activity indicators.
 - b. Web pages displayed in a view layout shall provide navigation controls including forward and back buttons, the Address bar, refresh and home buttons. These functions, along with page links can be administrator disabled to prevent navigating to a different web page.
4. The VMS Video Client shall provide control of Pan-Tilt-Zoom (PTZ) cameras via on screen buttons, a virtual joystick or an attached USB joystick. Using digital PTZ as well as Axis or Panasonic mechanical PTZ cameras, PTZ camera functions can also be controlled by click on the video to center where the user clicks.
- a. VMS Video Client shall provide control of PTZ speed.
 - b. VMS Video Client shall allow enable/disable of automated PTZ tours.
 - c. VMS Video Client shall provide manual control of camera Iris, Focus, Auto Iris and Auto Focus.
 - d. VMS Video Client shall provide access to view any PTZ preset location if authorized.
 - e. VMS Video Client shall provide access to set PTZ preset location if authorized.
 - f. VMS Video Client shall allow use of Axis Point and Click Feature, as well as Axis Draw a Box feature.
5. The system shall include ability to review video from all cameras for instant replay. The review shall be accessible from tiled video displays and maps.
- a. The VMS Video Client shall provide the ability to playback any camera on the system while simultaneously viewing the same camera live.

6. The VMS Video Client shall provide access to a mapping interface.
 - a. Maps can be displayed full screen on demand.
 - b. VMS Video Client shall provide controls to toggle the display of map hyperlink and camera labels.
 - c. VMS Video Client shall provide controls to adjust the zoom level of the map.
 - d. VMS Video Client shall provide a thumbnail image pop up window when a user hovers the mouse over a camera icon.
 - e. VMS Video Client shall provide a pop up window with live video and PTZ controls when a user double clicks the camera icon.
 - f. VMS Video Client shall display preconfigured field-of-view cones representing the cameras position and field-of-view.
 - g. Camera icons shall change color indicating motion events, external alarm events, camera status, and recording status.
 - h. The user shall be able to navigate to multiple maps by double clicking a map icon located on the current map or by clicking on the desired map in a tree-view.
 - i. The VMS Video Client shall have the ability to display maps organized in a hierarchy of Site folders.
7. The system shall provide functionality for the monitor(s) of any PC on the system to be recorded. This functionality shall allow the user to drag and drop any accessible camera(s) to a designated monitor for recording. This function shall allow for easy review of tracking suspects or objects of interest across multiple cameras and allow for a single video export. This function must also run as hidden service if desired by system administrator.
8. The VMS Video Client shall provide ability to set and display live or in playback - unlimited digital zooms of any single camera on any monitor, without increasing network bandwidth.
9. The VMS Video Client must have the option to stream live video based only on motion events are detected and display video in adjustable intervals of 1-60 seconds.
10. VMS Video Client must have "ThruCast" capabilities. If the server stops recording or goes offline, cameras will continue to stream live to VMS client.
11. The VMS must have the ability to enable or disable viewing of VCA Metadata overlaid on camera views with VCA configured cameras.

Recorded Video Playback and Search

The primary VMS Video Client application shall provide a comprehensive set of search tools for the investigation of security events.

1. The VMS Video Client shall provide single and/ or multiple camera playback that includes:
 - a. Playback clips from any camera on any server.
 - b. Search by date/time.
 - c. Video clips are color coded to indicate recording.
 - d. Video clips can be filtered by recording type. Users can specify to view only motion, external alarm or scheduled recordings, or any combination of those types.
 - e. Playback controls shall include play, pause, rewind, fast-forward, frame advance, frame reverse, next clip and previous clip.
 - f. VMS must allow playback of video of entire database without switching to a different tab from live view.
 - g. VMS must provide ability to select any camera or multiple cameras in real time and playback video while the unselected cameras stay live.
 - h. VMS Video Client shall provide adjustable playback of original speed.
 - i. VMS Client must allow provide image controls such as brightness, contrast, Sharpness, and deinterlace in both the client software and the .exe player.,
 - j. VMS Video Client shall provide export to CD/DVD directly from client.
 - k. VMS Video Client shall allow for export of clips to thumb drive or any location on disk.
 - l. VMS Video Client shall allow taking of a snapshot that may be digitally zoomed, saved, printed, etc within the VMS Video Client.
2. If a 360 (fisheye) or panomorphic lensed camera has been exported in a dewarped view, that view must follow with the export so that it shows the same dewarped view when played on the .exe player or client software automatically without user intervention.
3. The VMS Video Client users with rights shall be able to create “bookmarks” and share them. Other users shall receive a visual notification of shared bookmarks.
 - a. VMS Video Client shall allow for unique text descriptions of each video clip.
 - b. VMS Video Client shall allow for export of all video clips to CD/DVD directly in the VMS Video Client interface.
 - c. VMS Video Client shall allow for export of all video clips to thumb drive or any location on disk.
4. The VMS Video Client shall provide searching which allows the user to search for video recordings with motion in a specified area of the cameras field-of-view. Using searching

the system will then identify any motion in the prerecorded video that is within the highlighted area.

- a. A single or multiple motion zones may be defined for searching.
 - b. Clips shall become instantly available for playback while the search is on-going.
 - c. User may specify a date/time range.
 - d. User shall be able to set low, medium or high levels of motion
 - e. Once search is completed and all thumbnails have populated, the thumbnails will playback automatically back to back for quick review of the specified time.
 - f. The preview screen in the same tab will provide the view as each thumbnail is played back.
5. The VMS Client shall provide a "Storyboard" Export Feature to allow the user to create
- a. "Storyboard" feature must be able to add up to 120 clips in one export
 - b. Must be able to allow the user to add notes to each clip
 - c. Must provide the ability to export a Draft which contains all the cameras and times for each clip that can be emailed to other users.
 - d. Must export as a single export to be reopened from the player or client
 - e. Must playback video as a stitched video sequentially for each clip (Like a movie)
 - f. Notes shall show as subtitles at the bottom of each camera view.
6. The VMS Video Client shall support multi-camera playback that includes:
- a. Playback video from up to sixteen (16) cameras simultaneously.
 - b. VMS Video Client shall support playback of cameras from a single or multiple recording servers.
 - c. VMS Video Client shall provide standard playback controls including play, pause, rewind, fast-forward, frame advance, frame reverse, next clip and previous clip.
 - d. VMS Video Client shall provide adjustable playback of original speed.
 - e. VMS Video Client shall provide export to CD/DVD directly from client.
 - f. VMS Video Client shall allow taking of a snapshot that may be digitally zoomed, saved, printed, etc.
 - g. Recordings may be exported with an optional executable player that allows for verification that no tampering has occurred during the copy and export process.
 - a. The VMS Video Player shall have the ability to playback between one (1) and sixteen (16) exported video clips simultaneously.
7. The VMS shall provide a "Thumbnail" Search feature.
- a. Thumbnail search to include ability to break down any specified time period by thumbnail images from 4-60 Images.
 - b. Allow user to select large or small images to display a more detailed view of the thumbnail.

- c. View next to thumbnails should provide quick review of desired thumbnails and provide ability to quickly export the video.
8. The VMS Client shall serve as a media player with any exported and/or archived video and/or audio.
 - a. VMS client will have ability to play any exported video and/or audio from any camera or device exported from any client or recorder on the system.
9. The VMS Client must export an executable media player.
 - a. The Player shall function exactly as the client and allow for digital zoom, 360 (fisheye) dewarping, view multiple exported cameras simultaneously, view storyboard exports as well, as well be able to create an export from a previous export (trim down a large archive or export).
 - b. Player must be able to run without any installation on the PC
 - c. The player shall be capable of creating an export from a previous export or archive and be able to export in ASF, AVI, MKV or SEF, regardless of original export format.
10. The VMS Client must be able to initiate a manual archive.
 - a. Can select any or all cameras on server(s) to export.
 - b. Archive minimum of 1 hour and up to 1 week.

Pan-Tilt-Zoom Controls (PTZ)

1. The VMS shall provide the ability to control one (1) or more PTZ cameras using IP protocols.
2. The VMS shall integrate the Axis Box Draw feature to zoom PTZ immediately into a region of interest by simply drawing a box around it.
3. The VMS shall also integrate the one click center feature from Axis that auto centers the PTZ simply by clicking anywhere in the camera's field of view.
4. The VMS shall provide the ability to digitally Pan Tilt and Zoom on any fixed or PTZ camera.
5. The VMS shall be capable of automatically returning a PTZ camera to its specified Home position after a configurable period of inactivity.
6. The VMS shall be capable of controlling user access to a single PTZ camera by a configurable user or group priority level. In the event a user attempts to control a PTZ camera when a higher priority user is currently controlling the camera an "Arbitration

Timeout” setting shall allow the administrator to specify the number of seconds VMS waits before relinquishing control to the second user.

7. The VMS software shall be capable of configuring preset tours for Pan Tilt and Zoom capable cameras. The PTZ Preset Tour shall automate camera movement between two or more preset locations. The VMS software shall be capable of configuring an individual PTZ tour for each PTZ capable camera. The PTZ Tour configuration options shall include:
 - a. Up to 100 preset locations.
 - b. Configuration of a dwell time between preset locations. The dwell time is the time the camera spends on a preset location before moving to the next location specified in the tour. Each preset location can have an individually configured dwell time.
8. The VMS shall be capable of automatically stopping a preset tour when a user attempts to control the camera.
9. The VMS shall be capable of automatically restarting the tour after a configurable period of inactivity.
10. The VMS shall provide an “Automated Attendant” feature. This allows programming of fixed cameras that detect motion to direct a PTZ camera to move and focus on a preset location. This flexibility provides security coverage in multiple locations with multiple views. Parameters include:
 - b. Provide 4 (Four) motion zones per camera field of view.
 - a. Adjustable Dwell Time before cycling to another motion alarm.

Motion Detection/Video Content Analytics/External Alarms Capabilities

The VMS Recording Server and System Configuration tools shall provide a comprehensive set of tools for handling security alarms. The following features shall be available:

1. Motion detection shall provide multiple, configurable detection windows in the field-of-view.
2. The VMS shall allow the user to set the zones (areas) that the video motion detection engine should analyze for movement. The VMS shall provide control of the following parameters:
 - a. Select Zone identifies a zone to add actions to.
 - b. Pick the Zone to be analyzed via the mouse.

- c. Selected Zone then provided actions that can be deployed for the particular zone such as PTZ preset, PTZ tour, record video with pre and post times, send email, etc.
 - d. OK closes the window and saves the changes.
 - e. Cancel closes the window while discarding any changes.
3. Motion detection shall be programmable with variable sensitivity levels with three motion detection options one specific to an indoor environment, one specific to an outdoor environment, and one for more difficult scenes where there is more noise.
4. External alarms shall trigger alarm recording. External alarm sources available include but are not limited to:
 - a. Alarms from supported Video Analytic Systems.
 - b. Alarms from supported Access Control Systems.
 - c. Alarms from I/O devices.
 - d. Alarms from supported IP Cameras and Encoders.
5. The VMS shall allow the administrator the ability to program settings which control the software motion detection and external alarm recording behavior of the VMS. The VMS shall provide control of the following parameters:
 - a. Pre-alarm/Pre-motion(s) shall set the number of seconds to capture video prior to the start of a video motion or external alarm event. Pre-alarm recording is selected in 5 second increments and is programmable from 0 seconds to 60 minutes prior to the alarm event.
 - b. The VMS shall provide separate configurable post alarm or post motion event recording times. The post motion and post alarm settings are selected in 1 second increments and is programmable from 0 to 60 minutes after the motion or alarm event. The VMS shall provide a configurable Motion Sensitivity setting which selects the sensitivity level of the motion detection engine for the selected camera. The sensitivity scale is from 0 to 100 with a default of 65. It also includes a size parameter which allows for further threshold adjustments the default is set at 5% of the field of view. Lowering the first value shall decrease the sensitivity of the motion detection while increasing the value makes the motion detection more sensitive to change due to movement.
6. The VMS shall provide tools for the automatic control of a PTZ camera on motion or alarm event.
 - a. On motion detection 1 or more PTZ preset positions may be initiated across 1 or more cameras.
 - a. Each motion window shall have the ability to move multiple PTZ cameras automatically initiated by one event.
 - b. Each motion window may control multiple separate PTZ cameras.

- c. There shall be no software imposed limit on the number of preset positions that can be controlled on a motion event.
 - d. The administrator shall be able to select whether Motion Zone actions take place only on the motion detection recording schedule or all the time.
 - e. On PTZ capable cameras the camera may be directed to a preset position on alarm event prior to alarm recording.
7. The VMS shall provide the ability to add Video Content Analytics as needed to Analog or IP cameras added to the system. The analytics shall provide the ability to create up to 39 rules per cameras FOV. The Analytics shall include the following capabilities.
- a. Classification: Person, Group of People, Object, Vehicle, or Clutter.
 - b. Loitering/Dwell time using classification filters
 - c. Tailgating rules with classification filters
 - d. People or vehicle counting
 - e. Lines/Zones direction filters Numerous per cameras FOV

Input/output Devices

The VMS shall provide tools for the configuration of various IP and / or USB connected IO devices which can trigger alarm recording. The following features shall be available:

1. The VMS shall provide individual connection options for IP alarm I/O devices. There shall be no software imposed limit to the number of IP connected IO devices. The following parameters may be controlled:
 - a. Device Model allows selection of the specific device model.
 - b. Address (Hostname/IP) provides the IP address or hostname for the selected device.
 - c. Username provides the username that the server will use to contact the device.
 - d. Timeout controls how long, in seconds, the VMS should wait for a response to an initial HTTP request.
 - e. Retries controls how many times the VMS should attempt to connect to the IP camera before declaring it unreachable.
2. The VMS shall provide control of recording actions when the state of the associated input changes. Each input on the associated device may have its own configurable recording actions. The following features shall be available:
 - a. Each input can trigger recording on a single or multiple cameras.
 - b. Multiple inputs can trigger recording on the same or different cameras.

- c. Alarm event triggers can occur when an input is closed or open, based on administrator configuration.
3. The VMS shall provide automatic control of the outputs associated with the I/O device. The following features shall be available:
 - a. The output may be setup to close or open on event.
 - b. Events that can trigger output control shall be camera Sync Loss (signal loss), Motion Detection or External Alarm. Any combination of those shall be programmable.
 - c. It shall be possible for the administrator to associate events from multiple cameras for automatic triggering of the output.
 - d. When multiple events and/or multiple cameras are selected to trigger a single output any selected event on any selected camera shall trigger the output.

Audio Recording

The VMS shall be capable of recording audio with video through the use of VMS manufacturer supported audio capture adaptors (check with manufacturer for currently supported devices). Additionally, the VMS shall be capable of capturing audio directly from supported IP cameras. The following features shall be available:

1. The VMS shall allow an audio stream to be assigned to an analog or IP video channel. The following parameters may be controlled:
 - a. Link Devices attaches an audio stream to a selected video source.
 - b. Can specify in VMS Client which audio device to use and link to any camera(s) timeline.
2. The VMS shall allow independent control of each audio capture adaptor device properties. The following parameters may be controlled
 - a. Continuous record or audio detection capabilities, per audio channel.
 - b. Scheduling of continuous record, audio detection or off, which is color coded for individual audio channels.
3. The VMS shall capture audio from supported IP cameras and encoders.
 - a. The VMS shall capture audio synchronized with the video when recorded with MPEG4 or H.264 video streams.
 - b. The supported audio format shall be G.711 μ -Law.

- c. The supported capture protocol shall be RTSP over HTTP or RTSP over UDP.

Alarm Video Monitoring

The VMS shall be capable of displaying video only when an alarm condition is present during user defined time periods through the VMS Client. In addition, a history will be maintained of all alarms until the alarm component data is overwritten or user defined for up to 365 days. The video for any of these stored alarms may be recalled quickly and then displayed in a side-by-side display with live video from the associated camera.

1. The VMS Client shall display video from associated cameras on an external alarm event and/or motion detection event.
2. The VMS Client shall offer an Alarm Search Plugin to quickly search by name, time and date of single, multiple or all alarm events and be able to double click on those events to quickly display all components of that alarm.
3. Multiple cameras may be associated with the VMS Client for monitoring. There shall be no software imposed limit to the number of cameras which can be monitored.
4. The VMS shall maintain a history list of all alarm or motion events up to 365 days or user selected time until removed from system. Quick recall of recent alarms shall be possible via a double clicking on any item in the Alarm list. A new alarm review window will display the recorded alarm video from the prerecording time.
5. Each camera or group of cameras from a single or multiple servers may be monitored on a schedule. The schedule can define when to perform monitoring of alarm events and/or motion events on the associated cameras. Schedules can be configured graphically with different colors representing alarm and motion events on a timeline. Multiple schedules may operate simultaneously.
6. The VMS shall maintain a log of all alarm events for up to 365 days or have the option to remove alarm events when component data is overwritten.

Pop Up Event Notification

The VMS shall be capable of displaying video alarm popup windows on external alarm or motion detection event using the Alarm Popup Plugin.

1. The VMS application shall display video from associated cameras on an external alarm event and/motion or VCA detection event.
2. VCA Alarms will have the ability to show the zones and lines that have been tripped.
3. The Alarm Popup Plugin shall run either as its own full screen tab or run in a selected camera scene within camera grid.
4. Multiple cameras may be associated with the VMS application for monitoring. There shall be no software imposed limit to the number of cameras which can be monitored.
5. Cameras from a single or multiple recording servers may be monitored simultaneously in the Alarm Popup Plugin.
6. Multiple monitors shall be supported and the VMS Client shall be configurable so the user can select which monitor and scene to display video popup windows in.
7. Individual sound clips (WAV files) can be configured for single or multiple cameras to play when an external alarm and/or motion detection event occurs. Each camera configured for monitoring can have a different sound clip associated to it, or no sound at all.
8. The VMS must be able to dynamically track alarms on Profile Map plugin and display in different color which camera(s) are in alarm on the same grid as Alarm Popup Plugin.
9. The VMS application shall be configurable so each camera can popup in a user configurable scene on the grid or full screen and on any combination of monitors connected to the computer, up to 8 simultaneously.
10. The VMS application shall have a text based alerts mode optionally available to the user. In text alert mode window, the user will see text alerts describing the camera, associated recording server and event type on an event in place of video. The user will be able to click the text alert to display video of the event. These events can be prioritized by high, medium and low, and must have the option to require acknowledgement before alarm is dismissed.

Remote Web Video Monitoring

1. The VMS shall allow authorized users to remotely view live video, playback recorded video and export Images via Microsoft Internet Explorer, Mozilla Firefox and Safari.

2. The VMS shall provide its own web server software fully integrated and not require a 3rd party web server such as Microsoft IIS or Apache be used for the web client functionality. This shall provide a higher level of security and easier configuration as compared to integrating with a 3rd party web server application.
3. There shall be no software imposed limitation on the number of simultaneous connections to the Web Client.
4. Log-in and authentication is required when connecting to the system.
5. The VMS Web Client shall provide up to 4 cameras synchronized playback that includes:
 - a. Search by date/time.
 - b. Standard playback controls shall include play, pause, rewind, fast-forward, frame advance, frame reverse and a speed control bar to control the playback position.
 - c. The playback window size can be scaled by user controllable buttons to a larger or smaller size.
 - d. Shall provide adjustable playback speed.
 - e. Shall allow taking of a snapshot that may be to thumb drive or any location on disk.
6. The VMS Web Client shall provide extensive live viewing functionality to include:
 - a. Switch viewing among four (4) live camera layouts (single camera, quad view, 9 camera 3x3, 16 camera 4x4).
 - b. The user shall be able to customize the live view layouts independently of any other users. The layouts shall be customized by dragging-and-dropping of cameras the user has permission to access to the desired viewing tile.
 - c. The live view layout size can be scaled by user controllable buttons to a larger or smaller size. PTZ capable cameras shall be indicated as such by a dome camera icon in the video tiles title bar.
7. The VMS Web Client shall provide Pan Tilt and Zoom camera controls that include:
 - a. On click of a PTZ capable camera the PTZ controls shall be displayed.
 - b. PTZ camera movement can be controlled by control buttons (Up, Down, Left, Right, Up Right, Up Left, Down Right, Down Left, Zoom in & out).
 - c. PTZ preset positions can be set or shown by the user (provided they have been granted permission to access the preset positions).
 - d. PTZ camera speed can be controlled by the PTZ cursor.

Mobile Device Video Monitoring

1. The VMS shall be compatible with client viewing applications available for Android, iPhone and iPad platforms.
2. The VMS mobile client shall support viewing of live video.
 - a. The VMS mobile client shall support displaying video in either single or quad display modes.
 - b. The VMS mobile client shall support status view of inputs and be able to trigger outputs.
3. The VMS mobile client shall support playback of recorded video.
 - a. VMS recording server, camera, date & time of the recording.
 - b. The VMS mobile client shall provide a playback speed bar control to provide a means of quickly moving through the recorded clips.
 - c. The VMS mobile client shall support up to 4x fast forward, rewind, skip to beginning/end of clip, pause and play controls for playback of recordings
4. The VMS mobile client shall support Transcoding, which requires the VMS recording server to transmit only the resolution necessary to display on the mobile device, reducing the bandwidth consumed for live display of video.
5. The VMS mobile client shall support Pan Tilt and Zoom camera control. a. The VMS mobile client shall provide PTZ control buttons including move up, down, left, right, up left, up right, down left, down right, zoom in & out.
6. The VMS mobile client shall support showing preset positions preconfigured on the VMS recording server.

Professional Services Technical Specifications

Acceptable Installers

1. The system shall only be provided by Contractors who are factory authorized to install, service and maintain the system by the manufacturer.

2. The Contractor's installers and technicians must also be factory trained and certified to perform such tasks.

Preparation

1. The Contractor shall order all required licensing and parts as needed upon notification of award of the Work.

Installation

1. The Contractor shall coordinate with the [CLIENT]'s IT Department if connecting to their network.
2. The Contractor shall carefully follow the instructions in the manufacturer's' Installation Manual to insure all steps have been taken to provide a reliable, easy to operate system.

Initial Programming and Configuration

1. Contractor shall provide initial programming and configuration of the video management system. Programming shall include defining hardware, operating sequences, cameras, and the like.

INTRODUCTION

Mirasys Video Content Analytics (VCA) offers intelligent analytics options for the Mirasys Video Management System (VMS). The usage of VCA offers added value to the video management system by increasing the understanding of motion paths and viewing what type of actions are caused.

Some of the benefits of Mirasys VCA are:

- The setup is versatile and supports, for example, different type of vehicle classification, zone definitions, entering directions and vehicle speed.
- The rich functionality enables to use the live or recorded view in Mirasys VMS.
- You have over 40 different analytic alternatives available per one camera picture.
- Objects you want to analyse at the same time may also overlap each other.
- The object that is analysed can have several different analysis going on at one time.

Mirasys VCA can be applied on supported cameras, either analog or IP cameras, and the frame rate requirement is 12 fps (frames per second). Mirasys VCA works also with thermal cameras.

Mirasys Reporting can be used to retrieve the classified by Mirasys VCA vehicles or persons and their movement into trend reports for selected time frames. Mirasys Reporting uses calculation formulas which help you to get more out from the VCA results and utilize the information better in the business. Mirasys VCA offers extreme flexibility because reports can be built and time frame freely selected by the user.

User rights can vary between VMS, reporting and different VCA options.

This document presents:

- Mirasys VCA functionality
- Mirasys Reporting
- Important aspects of the VCA implementation
- Some basic rules of calibrating cameras

For more information see *Mirasys VMS 7.3 - VCA Installation and Configuration Guide*.

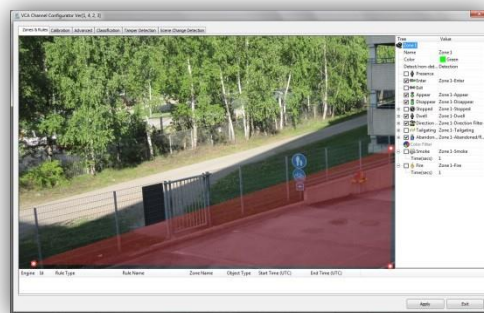
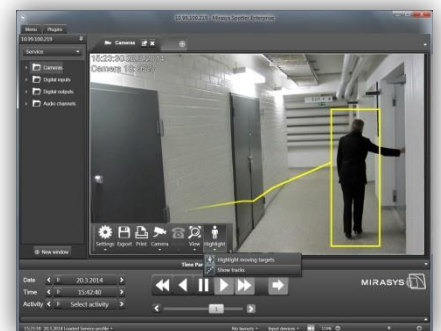
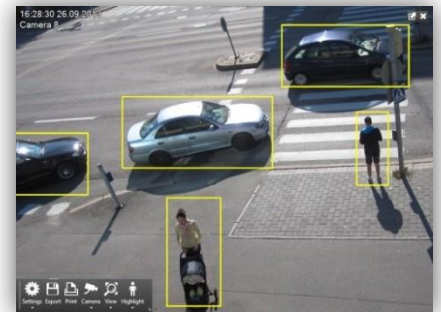
ABOUT MIRASYS

Mirasys Ltd. is one of the leading suppliers of open platform Video Management Systems (VMS). Mirasys surveillance systems are used for loss prevention, perimeter protection, building management, and enhancement of operational efficiency by customers from many industries in over 40 countries. More than 50.000 customers use Mirasys systems with nearly one million cameras. Mirasys supports over 2.100 validated IP camera models from leading manufacturers, thousands of compatible camera models and all analog cameras. Additional information at www.mirasys.com.

VCA FUNCTIONALITY

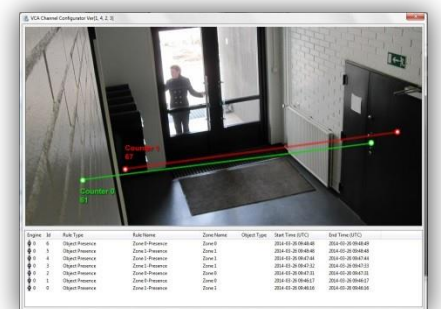
INTELLIGENT MOTION DETECTION

- **Identify motion in the video view.** You see selected moving objects in the whole image/view highlighted with boxes around them. If you want to follow a specific object, you click it and the box around has different colour making it more visible from the others.
- **Line of movement** visible in the video view. With an object track you are able to see the direction from where the object has come from.
- **Setup of interest lines.** An interest line you can use to define what is the point after which the movements of objects are interesting. For example, only objects moving inside a fenced area are worth to follow.
- **Autozoom / virtual camera:** you can zoom within the video view to see more specifically, for example, the face of a moving person you follow on the screen.



KNOWING YOUR PEOPLE FLOW

- **Filter counting by movement flow in a certain direction.** Typically used at entrances of shops and similar or if people flow needs to be counted in narrow indoor spaces. If used outdoors larger perspective might create a problem because the camera needs to be on top of people flow to create correct statistics.



- **Accurate shadow reading.** Creates more precise results also in challenging lighting conditions.
- Can be **used on any camera** added to the system. No separate camera investments are needed (camera characteristics may affect the accuracy).
- The **hermeneutic movement detection method** in use is a highly accurate analytics engine.

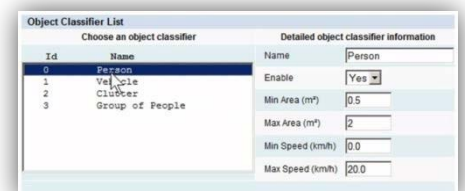
COMBINING MOTION DETECTION AND ANALYSED CLASSIFICATION

This versatile tool fits many needs. With the same tool you can count people coming in, get statistics how well a campaign area is attracting people, how well the traffic is running, what kind of traffic and so on.

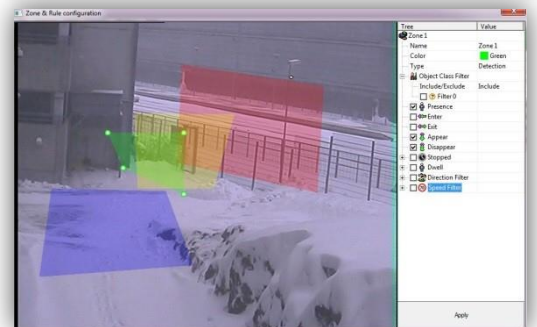
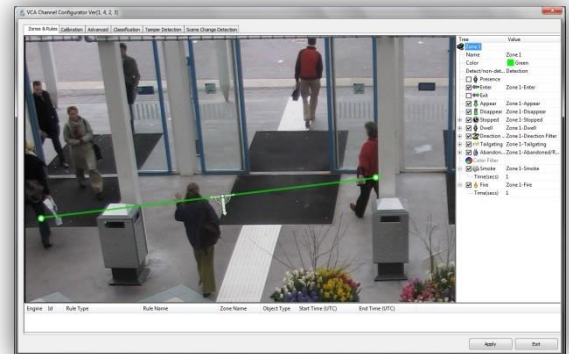
It is an excellent tool for areas where only one or few cameras can manage the surveillance of the whole space but several different analyses are needed like in kiosks, shops, small museums etc.

VCA offers also numerous possibilities on how you want to trigger the alarms: a person running to/from a specific zone, too many people in a certain area, people going through the personnel door at a certain time, loitering people etc.

- **Identify motion in selected areas:** analyzing the amount of people entering/exiting, following speed on vehicles, and finding out stopping persons or vehicles or dwell time.
 - Different rules apply to presence, enter, exit, appear, disappear, stopped, dwell and direction. For example:
 - Stopped rule: Max value is 60 seconds. After 60 sec. the tracking engine assumes, that the object is permanent. The Stopped rule is suitable for vehicles.
 - Dwelling rule: The Dwelling rule is suitable for persons/pedestrians. Dwelling time value determines for how long persons can stay in the zone.
- **Object classification - distinguishing a car from a bike or a person.** Works as a gateway counter to make sure that, for example, only one person with one ticket goes through the gate and no tailgating happens.
 - Object classifications:
 - Person: min area 0.5 m², max area 2 m²
 - Clutter: min area 0 m², max area 0.4 m²
 - Vehicle: min area 5 m², max area 100 m²



- Classify vehicles by size.
- Classify and select that only people are counted.
- Zone detection with direction: easy to define a counting area before doors in a corner by using the direction and acceptance angle. Especially, if doors open outside, you need to have a big enough area so that door movements do not affect counting, but small enough area so that passing people are not counted either.
 - Object direction rule: When the object trail travels over the green line or crosses the zone within the configured direction and acceptance angle, it will trigger the alarm shown by the red point.
- Create multiple analyzing zones and lines on one video stream. These can overlap each other.
- Abandoned object (left luggage) or removed object. The time frame can be freely determined. Useful for example, for stations, airports, stadiums and other places that are busy with people.



WHEN CAMERA-BASED VCA NEEDS TO BE CONNECTED TO VMS

- Camera VCA intelligence can be used to enhance network efficiency with select cameras.
- It can help save server space and bandwidth by configuring cameras to send a video stream based on camera VCA.
- Areas of surveillance or non-surveillance can be setup.
- Best for cases where only limited number of cameras and always the same cameras are used for analytics purpose because every camera VCA has to be calibrated separately for producing the information.
- Restricts the freedom of the camera choices when cameras need to be changed - all camera brands and models are not doing the same job.
- A camera has limited possibilities to provide analytic tools compared to software running on a server.

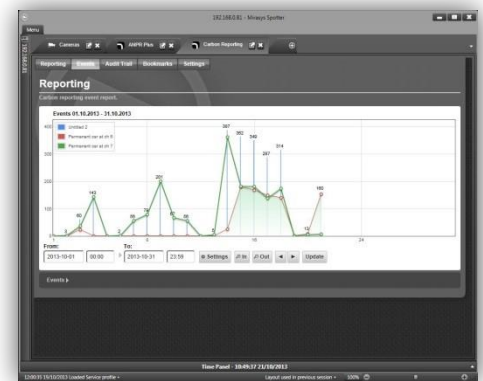
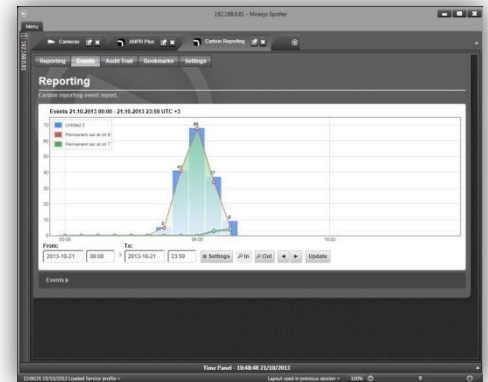
MIRASYS REPORTING ENHANCES YOUR MIRASYS VCA INFORMATION

Mirasys Reporting brings the numerical information to an easily readable form, from where you can, for example, track trends over time or look for abnormalities from large amounts of data. You can define the events that are reported, freely select time-frame and compare different time-frame activities in graphs.

Mirasys Reporting has built-in calculations which have an important role in utilizing the VCA results.

Examples of usage areas:

- To find out the amount of customers and how it is divided between weekdays or during the day, or how it is divided between aisles or campaign areas.
- To see what is the throughput of different counters at the shop.
- To calculate the amount of cars in the parking place during days.
- To realize the areas where people are loitering and how long they do it.
- To find out the number of alarms triggered.

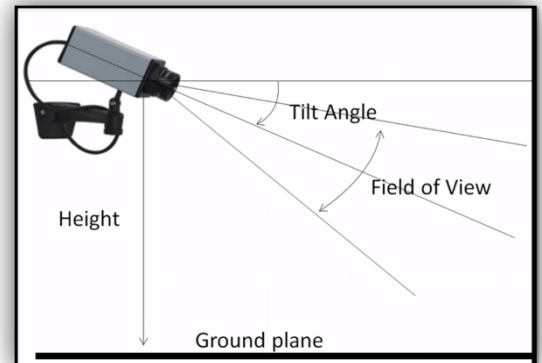


IMPORTANT ASPECTS OF THE VCA IMPLEMENTATION

- Targets defined for the information which is followed or tracked. There are so many possibilities available that without clear understanding of what needs to be measured and why, you might end up having wrong parameters in use resulting useless data.
- User rights setup. In many cases all analysis cannot be available for everyone.
- Analysis and reporting definitions. You can be overwhelmed by the possibilities Mirasys Reporting offers. You get most out form the reporting tool with well-defined needs.
- Test period for initial setup and finalizing it after test period. This helps to fine tune the system to fit for real life nuances before the actual use.

WHY CAMERA CALIBRATION IS IMPORTANT

- Calibration is required so that real world area of tracked objects are measured.
- When calibration is done correctly, then the tracking engine of VCA can classify an object, so it can be identified as a person, vehicle, clutter or group of people.
- After camera calibration it is possible to measure the objects physical data such as object speed and height.
- Vertical Field of View (FoV)
 - 40 degree angle = Extended lens
 - 90 degree angle = Wide angle lens
 - 10 degree angle = Telefoto lens
- Golden rules:
 1. Measure the Height
 2. Adjust the Tilt Angle and Vertical Field Of View
 3. Use at least two 3D mimics to match the height of people/vehicles both a near and far point of the video



Repeat steps 1-3 until 2D and 3D features match fairly well (+ or - 10%).

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VIDEO MANAGEMENT SIMPLIFIED



MIRASYS



SOFTWARE



FEATURES



PLUGINS



HARDWARE



VERTICALS



SUPPORT

EASY. OPEN. SECURE.



Software

Enhancing the way you interact with a surveillance system

With nearly 20yrs in business, and over 1,000,000 cameras managed, Mirasys has been a consistent force in the video surveillance industry. The core competency has always been Video Management Software. Due to the maturity of the company, and an undeviated focus on software development, our products have become more reliable, innovative, powerful, scalable, and easier to use than ever before.

Our foundation and the heart of the company can be summed up with 3 words:

Easy, Open, & Secure

Easy

From sales and setup, to training; the software is designed to simplify the processes of those selling, installing, supporting, and using the system.

Open

Over 2400 documented IP cameras supported; Mirasys takes a "Native" approach to IP camera integrations. We support client side Dewarping for 360 degree cameras from all major manufacturers. Our Access Control integrations include: Lenel, ICT, Salto, Paxton, Axis, ISONAS, ZK Access, Amano McGann, and more.

Secure

In a world where we are all connected; security is paramount. Being a Microsoft certified partner Mirasys realizes that cyber security must be at the heart of all development. With every release we work to make every connection to the system more secure.

Pro License vs Enterprise License

Feature	Pro	Enterprise
Max Channel per server	50	256
Multi site	No	Unlimited
Audio Recording	No	Yes
Lan Based & virtual I/O	Yes	Yes
Active Directory/LDAP	No	Yes
Mapping	No	Yes
Max number of Users	5	Unlimited
Storyboarding	View	Create/View
Failover	No	Yes
Agile Virtual Matrix	No	Yes
Mobile Access Android / IOS	Yes	Yes
Free Tech Support	Yes	Yes

Features

“Video Management Simplified”



360 Dewarping



VCA



Digital I/O Management



Two-way Audio



Agile Virtual Matrix



Failover



Storyboarding



Motion Search



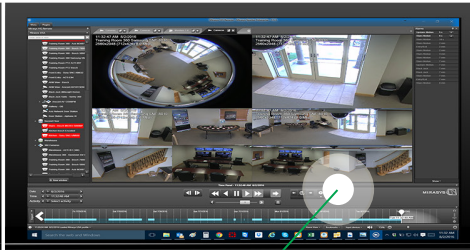
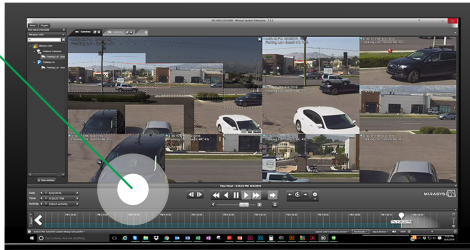
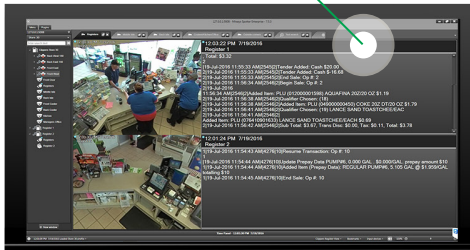
iHDSO

POS INTEGRATION

Ability to record and search any transaction or POS entry

MAP & ALARM VIEW

Active alarms tracking with in Map and Video



iHDSO

Intelligent High Definition Scene

Optimization

360 DEWARP

Single View, Panoramic View

Quad View and Fisheye

LAYOUTS

Custom layouts to fit each users

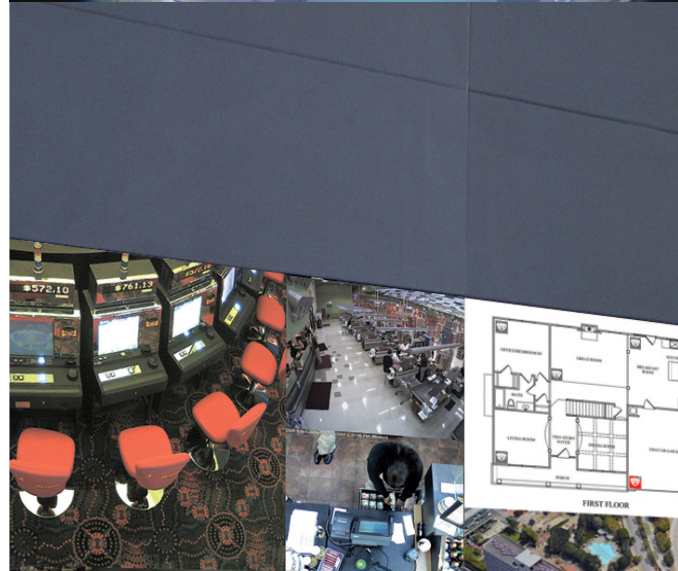
individual needs

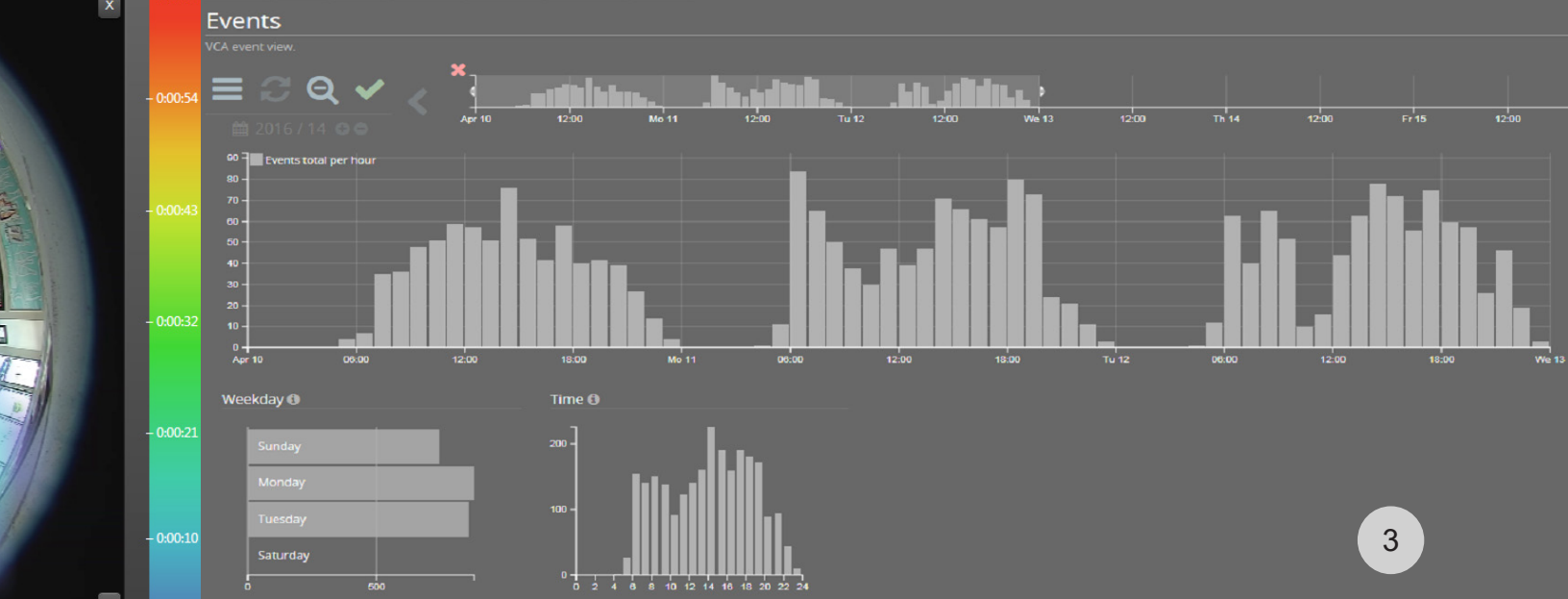
PLUGINS

Add even more functionality to an already feature rich Video Management System

WHAT ARE PLUGINS?

Meet the requirements of the most demanding projects using "Plugins". In addition to the built-in features and functions, "Plugins" provide a wealth of beneficial options making it easy and fast to manage a monitor wall with AVM, monitor areas of traffic in a retail environment using Heat Map, generate reports on any system function including audit trail, POS data and people counting using Reporting, capture and search license plates with ANPR, or integrate with many other 3rd Party systems.





3

1

1. AGILE VIRTUAL MATRIX

The perfect solution for projects that require real-time monitoring of an enterprise system. This feature allows a single or multiple operators (with rights) to take control of literally hundreds of monitors and thousands of cameras from a single operator workstation.

2. ACTIVITY MAP

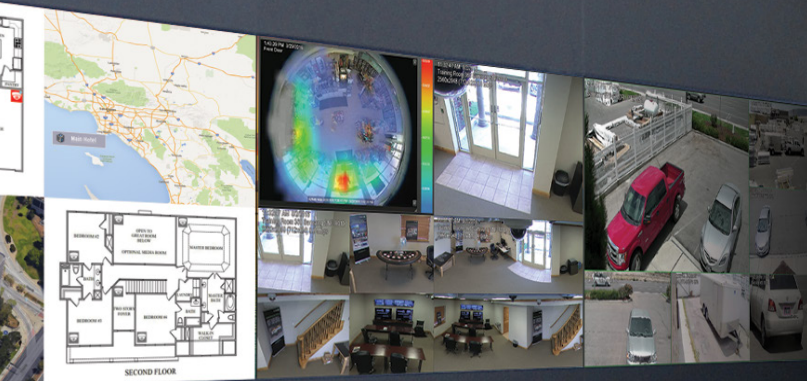
A perfect visual record to quickly identify hot spots, dead areas and bottlenecks. Each color represents areas of traffic and how often motion is detected.

3. REPORTING

Create reports, charts and diagrams to fit the needs of your environment. These reports are easy to read while delivering the necessary information.

4. ANPR

Automatic Number Plate Recognition is a powerful tool to assist in identifying vehicle plates. This empowers the user to grant or deny access to restricted areas or simply just generate a backlog of searchable license plates.



AGILE VIRTUAL MATRIX



ANALYTICS



Takes video to a whole new level by bringing intelligence into the system. Video is analyzed and compared to provide realtime threat detection and statistical data. Mirasys enables Video Content Analytics (VCA) on virtually any camera added to the system, or you can leverage analytics at the edge from one of our supported camera partners.

VCA Capabilities :

1 Line Crossing

Create a virtual perimeter, or virtual line anywhere on the cameras field of view.

2 People Counting

Setup a line for an entry or exit point and add a counter to generate statistical data.

3 Object Removed/Left Behind

Monitor an area to prevent theft of important items, or monitor public areas to ensure safety by quantifying risks when objects are left behind.

4 Loitering

Typically, when a crime occurs the assailant will stakeout the perimeter to determine vulnerabilities. Loitering rules can be created to alarm when someone has stopped in a zone for longer than the set period of time.

Mirasys VCA allows over 39 Rules to be created for each cameras field of view. Filters can be applied for every zone or line allowing the user to set rules for People, Groups of People, Vehicles, or Objects.

Edge Analytics:

Mirasys open architecture enables the use of analytics that reside at the edge on the camera. These analytics can be leveraged to create situational awareness in critical projects within the Mirasys video management system.

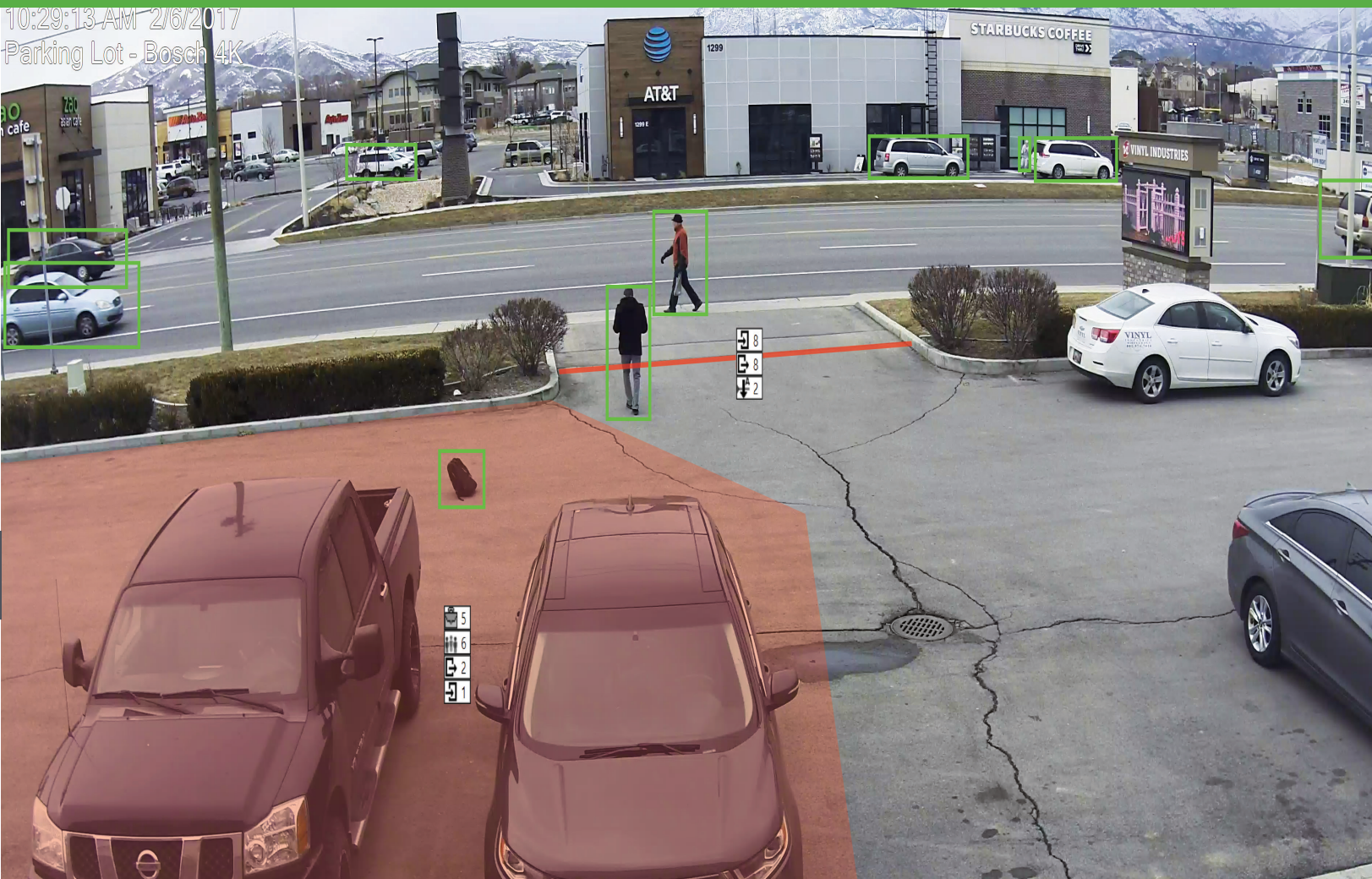


Supported Edge Analytics





VIDEO CONTENT ANALYTICS



HARDWARE

The professional solution to any size project.

1 Retail and Extreme Class Recorders

- **Retail Class Server**

Powerful budget friendly recorders offered in both desktop and rack mount options. Great for retail or small commercial applications

- **Extreme Servers**

Rugged fanless recorders designed for mobile or difficult environments.

2 1 - 4 Class Professional Viewing & Recording Servers

- **Recording & Viewing Servers 1-4 Class**

Extensive options to fit the most demanding project. With flexible storage, processor, RAM, Graphics and RAID options our hardware can be adapted to your project needs.

- **Management Servers**

Our high availability management servers provide the ability to manage user rights and functionality efficiently and effectively from any location.



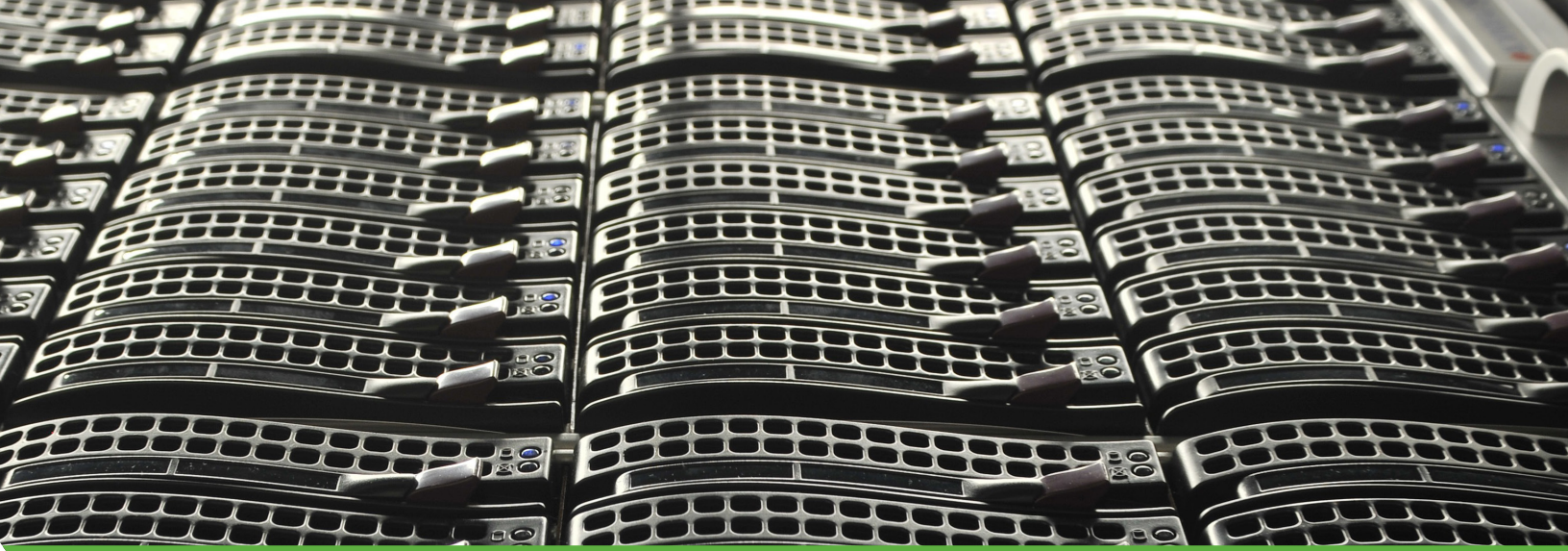
3 Warranty

What would a hardware solution be without a warranty to back it up. With 3 years next day onsite, Mirasys will be there to support you should a problem arise. With a fast and easy to use RMA process, no one will be left in the dark without support.

***3yr next day onsite hardware warranty & 3yr free software updates with combined purchase.**

4 Support

All Mirasys customers are supported no matter which version of software. Our support goes beyond just a phone number to call. We proactively look into ways to better the user experience at each opportunity. Mirasys technical support team has been and will always be a trusted source of support.



HARDWARE WITH A PURPOSE

All hardware is not created equal. From the ground up every component included in every recording server, workstation, and management server, was picked to optimize the user experience. When you purchase Mirasys software with Mirasys Hardware you are getting much more than just a windows PC. All settings have been optimized to provide the best possible performance with our software.

Reliability and customization is at the heart of our hardware design. From options on operating system, to RAID configuration, to redundant power supplies we make sure that your precious data is on demand and ready when needed.

All hardware comes with a Next Day Onsite 3 Yr warranty, if this doesn't turn your head than 3yrs of free Mirasys software updates should as they are included with every hardware/software purchase.



4 Class Professional Recording Servers

VERTICALS

Companies and organizations are increasingly interested in utilizing surveillance cameras actively and effectively to support their daily operations.



City Surveillance

On the streets, the cameras serve three purposes: they protect the citizens, the infrastructure and the society. They are an important tool in preventing crime. Surveillance enables solving crimes more effectively, as well as gathering evidence.

Among other cities, the Mirasys system protects the streets and people of the Metropolitan City of Bangkok every day.



Hotels

The video surveillance solutions of hotels require the system to be flexible. Their needs are constantly changing and expansion is required. Integration with other systems simplify and secure their daily tasks. Efficient and effective tools allow for security personnel to find that key piece of evidence.



Retail

Thanks to video content analytics and its reporting results, any store can benefit from the data the system collects. Point of sale data can also be recorded to identify potential theft. Marketing becomes more efficient when we can understand the consumer in a new way.

Over 70,000 customers from different industries from different parts of the world use our system. In fact, the basis of our product development is to produce more versatile and efficient solutions to meet the needs and challenges of our different customers.



Education

Good video surveillance provides security for students and protects valuable property. The Mirasys system aids in preventing vandalism as well as detecting other security threats. Active Directory/LDAP integration allows IT personell to manage users securely and efficiently.



Casino

Casinos have the most stringent laws and require high availability of all video and data recorded. This places high demands on the system. Recorder failover, RAID, and redundant power supplies assist in maximum up time. Agile Virtual Matrix empowers the operators to call up any camera to any monitor. Video analytics and reporting can be used to collect marketing data.



Banking

Mirasys has decades of experience in securing banks and solving the challenges it poses. The video management solution has been developed according to the feedback and experiences received from different banks, so that it can meet the specific monitoring requirements of banks. That is why banks rely on the commitment and professionalism of Mirasys.

MIRASYS



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