Exacq Technologies, headquartered in Indianapolis, Indiana, is a leading developer of open architecture, Video Management System (VMS) solutions for security and surveillance applications. Our exacqVision VMS client-server solutions are scalable from a small single camera solution to large scale corporate or campus systems with thousands of cameras. Real-time and recorded video can be viewed, managed and configured from any location on the network.

For additional information, contact:

Exacq Technologies, Inc.
11955 Exit Five Parkway
Fishers, IN 46037 USA
Phone: +1 317 845-5710
Web: https://www.exacq.com
E-mail: exacqinfo@tycoint.com

VIDEO MANAGEMENT SYSTEM

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 00 00 Electronic Safety and Security

28 20 00 Electronic Surveillance

28 23 00 Video Surveillance

28 23 13 Video Surveillance Control and Management Systems

Notes to Specifier:

1. Where several alternative parameters or specifications exist, or where, the specifier has the option of inserting text, such choices are presented in **<bold text>.**

2. Explanatory notes and comments are presented in **colored** text.

Important Note to Security Systems Specifiers

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security. This document is written to provide flexibility in using either format, although adoption of MasterFormat 2016 is encouraged. The following is a guide to the MasterFormat numbers relevant and related to the product referenced in this specification.

MasterFormat 2014:

27 20 00 Data Communications
28 05 00 Common Work Results for Electronic Safety and Security
28 13 00 Access Control
28 13 16 Access Control Systems and Database Management
28 16 00 Intrusion Detection
28 16 33 Intrusion Detection Control, GUI, and Logic Systems
28 23 00 Video Surveillance
28 23 13 Video Surveillance Control and Management Systems
28 23 16 Video Surveillance Monitoring and Supervisory Interfaces
28 23 19 Digital Video Recorders and Analog Recording Devices
28 23 23 Video Surveillance Systems Infrastructure
28 23 29 Video Surveillance Remote Devices and Sensors

MasterFormat 2016:

27 15 01.xx Video Surveillance Communications Conductors and Cables
27 20 00 Data Communications
28 05 00 Common Work Results for Electronic Safety and Security
28 05 xx Power Sources for Electronic Safety and Security
28 05 xx Servers, Workstations and Storage for Electronic Safety and Security
28 05 xx Storage Appliances for Electronic Safety and Security
28 05 xx.xx Network Video Recorders
28 05 xx Cyber Requirements for Electronic Safety and Security
28 05 xx Communications Equipment for Electronic Safety and Security
28 05 xx Systems Integration and Interconnection Requirements
28 05 xx.xx Electrical
28 05 xx.xx Information
28 10 00 Access Control
28 10 xx Access Control Software
28 20 00 Video Surveillance
28 2x 00 Video Management System
28 30 00 Security Detection, Alarm, and Monitoring
28 3x 00 Intrusion Detection
28 3x xx.xx Intrusion Detection Interfaces to Security Monitoring and Control

HYBRID NETWORK VIDEO RECORDER

1. GENERAL

1.1. SUMMARY

1.1.1. Section includes a large-scale video management system.

1.1.2. Related Requirements

1.1.2.1 28 23 19 – Digital Video Recorders and Analog Recording Devices

1.1.2.2 28 23 23 – Video Surveillance Systems Infrastructure

1.1.2.3 28 23 29 – Video Surveillance Remote Devices and Sensors

1.1.2.4 28 23 13 – Video Surveillance Control and Management Systems

1.2. REFERENCES

1.2.1. Abbreviations

1.2.1.1. API – Application Programming Interface

1.2.1.2. CPU – Central Processing Unit

1.2.1.3. FPS – Frames Per Second

1.2.1.4. HDD – Hard Disk Drive

1.2.1.5. HMAC – Hash Message Authentication Code

1.2.1.6. HTTP – Hypertext Transfer Protocol

1.2.1.7. IP - Internet Protocol

1.2.1.8. JPEG – Joint Photographic Experts Group

1.2.1.9. LDAP – Lightweight Directory Access Protocol

1.2.1.10. MAC – Media Access Control

1.2.1.11. MJPEG – Motion JPEG

1.2.1.12. MPEG – Moving Pictures Experts Group

1.2.1.13. PTZ – Pan, Tilt, Zoom

1.2.1.14. RAID – Redundant Array of Independent Disks

1.2.1.15. SDK – Software Development Kit

1.2.1.16. SSD – Solid State Drive

1.2.1.17. SSL – Secure Sockets Layer

1.2.1.18. TLS – Transport Layer Security

1.2.1.19. Mbps – Megabits per second

1.2.1.20. NVR – Network Video Recorder

1.2.1.21. POS – Point of Sale

1.2.1.22. PSIM – Physical Security Information Management

1.2.1.23. VMS - Video Management System

1.2.2. Definitions

1.2.2.1. LDAP – an open, vendor-neutral industry standard application protocol for accessing and maintaining distributed directory services over an Internet Protocol (IP) network.

1.2.3. Reference Standards

1.2.3.1. ISO / IEC 14496 – MPEG-4

1.2.3.2. ISO / IEC 14496 – 10 – MPEG-4, Part 10 (H.264)

1.2.3.3. ISO / IEC 10918 – JPEG

1.3. SUBMITTALS

1.3.1. Product Data

1.3.1.1. Manufacturer's printed or electronic data sheets

1.3.1.2. Manufacturer's installation and operation manuals

1.4. QUALIFICATIONS

1.4.1. Manufacturer shall have a minimum of five years' experience in manufacturing digital storage equipment and associated interfaces.

1.4.2. Manufacturer's products shall be manufactured in the United States of America.

1.5. LICENSES

1.5.1. The video management system (VMS) shall license the camera or encoder on the system.

1.5.2. There shall be no charge for concurrent clients connecting to the video management system.

1.6. WARRANTY AND SUPPORT

1.6.1. Manufacturer shall provide software updates to the video management system for ninety (90) days without charge.

1.6.1.1. An extended support option shall be available.

END OF SECTION

2. PRODUCTS

2.1. EQUIPMENT

2.1.1. Manufacturer: Exacq Technologies, Inc.
11955 Exit Five Parkway
Fishers, IN 46037 USA
Phone: +1 317 845-5710
Web: https://www.exacq.com
E-mail: exacqinfo@tycoint.com

2.1.2. Model: exacqVision Professional VMS

2.1.3. Alternates: None

2.2. DESCRIPTION

2.2.1. The Video Management System (VMS) shall be a software package for comprehensive management of live and recorded video, and associated audio and data running on a supported camera or encoder.

2.2.2. General Functionality – The VMS shall possess the following general characteristics:

2.2.2.1. Provide effective monitoring of video from IP cameras and encoding devices and data in real time over local wide area networks.

2.2.2.2. Open architecture supporting IP cameras and encoders from multiple manufacturers.

2.2.2.3. Available client software to allow remote access to live and recorded video, including access from mobile devices.

2.2.2.3.1. Support access to video from up to ten (10) cameras with an Edge license.

2.2.2.4. Camera-dependent client-side dewarp of fisheye/panoramic cameras.

2.2.2.5. Provisioned as a service without requiring any application to be running in order to operate.

2.2.3. Architecture

2.2.3.1. The VMS shall have a client/server-based architecture that can be configured as a standalone VMS with the client software running with equal functionality on the server hardware and/or the client running on any network-connected TCP/IP workstation.

2.2.3.2. User Interfaces – The VMS shall support installed client and web client interfaces.

2.2.3.2.1. The VMS shall record and retrieve video, audio, and alarm data and provide it to the VMS clients upon request.

2.2.3.2.2. Installed client characteristics:

2.2.3.2.2.1. Downloadable at no charge from the Manufacturer's website.

2.2.3.2.2.2. Full compatibility with all available features of the VMS server software at this license level.

2.2.3.2.2.3. View live video and audio, recorded video and audio and be able to configure the complete system all from a single application.

2.2.3.2.2.4. Add and remove features based on the permissions of the user and the licensed functionality.

2.2.3.2.3. PC Web Client – The web client interface shall operate without requiring installation of any software.

2.2.3.2.3.1. Functions:

2.2.3.2.3.1.1. View live video.

2.2.3.2.3.1.2. View recorded video.

2.2.3.2.3.1.3. Control pan-tilt zoom (PTZ) cameras

2.2.3.2.3.1.4. Activate triggers and associations.

2.2.3.2.3.2. The VMS server shall be able to transcode video into a JPEG file sized for compatibility with the browser screen before sending it to the client browser.

2.2.3.2.3.3. The web client shall be capable of decoding JPEG and H.264 and H.265 video streams.

2.2.3.2.4. Mobile web client – A free mobile application shall be available from the Manufacturer.

2.2.3.2.4.1. The mobile application shall support Apple iOS and Google Android operating systems.

2.2.3.2.4.2. Functions:

2.2.3.2.4.2.1. Remote view of live and recorded video through the Video Server.

2.2.3.2.4.2.2. PTZ control and the monitoring and activation of alarms and events from the mobile device.

2.2.3.2.4.2.3. Interaction with single NVR or server device from the Manufacturer.

2.2.3.2.4.2.4. Monitoring of events configured by a Client.

2.2.3.2.4.3. The web service supporting the mobile application shall size the video stream to accommodate both low bandwidth and high bandwidth networks.

2.2.3.3. The VMS shall allow the user to have any combination of VMS client applications running on any of the supported operating systems and be able to connect to any of the VMS servers running on any of the supported operating systems.

2.2.3.3.1. Multiple client workstations shall be capable of simultaneously viewing live and/or recorded video from one server.

2.2.3.4. The VMS shall have the capability to run multiple client applications simultaneously on one workstation with multiple monitors.

2.2.3.4.1. Up to 12 monitors shall be configurable on a single workstation with one (1) client application running on each monitor.

2.2.3.5. A single server shall be able to simultaneously provide live and/or recorded video to one or more workstations.

2.2.4. Specific Functionality – The VMS shall have the following elements:

2.2.4.1. Video Streaming

2.2.4.1.1. Video formats supported: MJPEG, MPEG-4, H.264, H.265

2.2.4.1.2. Each video stream shall have the ability to be recorded, viewed live, saved to views, exported, and available in search and playback.

2.2.4.1.3. Streams shall be individually configurable for recording schedules.

2.2.4.2. Recording

2.2.4.2.1. Functions:

2.2.4.2.1.1. Continuous, uninterrupted, and unattended recording of all video and audio transmitted to the VMS, including during times of administration and configuration of any feature.

2.2.4.2.1.2. Recording triggered by video motion detection within a defined region of interest of the camera's view.

2.2.4.2.1.2.1. Configurable recording of video prior to the detection of the motion.

2.2.4.2.1.3. Record video based on metadata generated by an edge network device and included in the video stream sent to the VMS server.

2.2.4.2.1.4. Configure each video input's recording time on an hourly basis, to further allow the user to schedule when to record on motion, when to record on event and when to not record.

2.2.4.2.2. File system and operations:

2.2.4.2.2.1. The VMS shall use the operating system's native file system for recording the video.

2.2.4.2.2.2. The video file shall contain the data of the video, audio, and associated metadata.

2.2.4.2.2.3. The index file shall contain the index of the metadata from the network device.

2.2.4.2.2.4. When the VMS searches for video, it shall receive and display the information in the index files.

2.2.4.2.2.5. When a client requests to display the video, the VMS shall transmit the video file data from the server to the client.

2.2.4.2.3. Recording Storage

2.2.4.2.3.1. Content

2.2.4.2.3.1.1. The VMS shall provide for recording of video as well as associated audio and data files, as determined by rules, events, or manual selection.

2.2.4.2.3.1.2. The VMS shall support recording video based on the following classifications:

2.2.4.2.3.1.2.1. Free run video (all video).

2.2.4.2.3.1.3. The VMS shall support the configuration of unique weekly recording schedules per camera.

2.2.4.2.3.2. Storage Types

2.2.4.2.3.2.1. The VMS shall support local SSD disk storage.

2.2.4.3. Events – The VMS software shall use events to initiate desired actions, including the following:

2.2.4.3.1. Events:

2.2.4.3.1.1. Input trigger.

2.2.4.3.1.2. Software initiated trigger through VMS display.

2.2.4.3.2. Actions:

2.2.4.3.2.1. Record video.

2.2.4.3.2.2. Record audio.

2.2.4.3.2.3. Output trigger.

2.2.4.3.2.4. Log Event.

2.2.4.3.2.5. Call a camera PTZ preset.

2.2.4.3.2.6. Utilize a webhook to send data to an HTTP-generated endpoint.

2.2.4.3.2.7. Send video to supported analytics device for analyzation.

2.2.4.4. Search and Playback from client interface – This function shall allow a user to:

2.2.4.4.1. Search and play back recorded video, audio and events from VMS server.

2.2.4.4.2. Search and play back video from multiple cameras simultaneously in a synchronized multi-camera layout.

2.2.4.4.3. Search recorded video based on time, date and video source with results displayed as a clickable timeline, thumbnail, or list.

2.2.4.4.4. Search and play back audio in synchronization with video.

2.2.4.4.5. Perform a visual thumbnail search, selecting one image per camera per set time period.

2.2.4.4.5.1. Play video from a selected image.

2.2.4.4.5.2. Zoom into a time range around a selected image.

2.2.4.4.6. Select a preference of the source of recorded video, audio and events.

2.2.4.4.6.1. Select to prefer system video.

2.2.4.4.6.2. Disable any preferences and search all simultaneously. .

2.2.4.5. Video and Information Display

2.2.4.5.1. The VMS shall have a live display mode, wherein a user shall be able to view live video, live audio, POS data and alarm information.

2.2.4.5.2. The VMS shall allow users to view multiple video streams per device, depending on the device's streaming capability.

2.2.4.5.3. The VMS client shall be able to use OpenGL and Direct 3D to decompress and render video.

2.2.4.5.4. The VMS client shall support using GPU resources of the client workstation, if available, to accelerate decoding of video streams.

2.2.4.5.5. The VMS shall allow cameras in logical groups and preset views.

2.2.4.5.5.1. Views shall save the location of video streams, audio streams and POS data.

2.2.4.5.5.2. Views shall be accessible in both live and recorded modes.

2.2.4.5.5.3. The VMS shall be able to automatically cycle through two or more saved views to create a video tour, with a configurable dwell time for each view.

2.2.4.5.6. The VMS shall allow the viewing of live video from guard tour sequences.

2.2.4.5.7. The VMS shall support the use of a panoramic lens on an analog or IP camera.

2.2.4.5.7.1. The VMS client shall de-warp the image on both live and recorded video.

2.2.4.5.8. The VMS shall be able to organize the camera video view panel in the following layout patterns:

2.2.4.5.8.1. 1- camera (full screen)

2.2.4.5.8.2. 4-camera (2x2)

2.2.4.5.8.3. 7-camera (3 large panels and 4 small panels)

2.2.4.5.8.4. 10-camera (2 large panels and 8 small panels)

2.2.4.5.8.5. 13-camera (1 large panel and 12 small panels)

2.2.4.5.8.6. 16-camera (4x4)

2.2.4.5.8.7. 8-camera (1 very large panel and 7 small panels)

2.2.4.5.8.8. 9-camera (3x3)

2.2.4.5.8.9. 6-camera (2x3) widescreen

2.2.4.5.8.10. 12-camera (4x3) widescreen

2.2.4.5.8.11. 20-camera (5x4) widescreen

2.2.4.5.8.12. 30-camera (6x5) widescreen

2.2.4.5.8.13. 48-camera (8x6) widescreen

2.2.4.5.8.14. 16:9 display panels

2.2.4.5.8.15. Custom

2.2.4.5.9. The VMS shall allow the customization of the user interface to display software (soft) triggers and initiate actions.

2.2.4.5.9.1. The VMS shall also display the status of any soft triggers on the connected VMS server.

2.2.4.5.10. Overlay controls shall appear when hovering over a camera in live view.

2.2.4.5.10.1. Appearance: text color, font, style, transparency, location

2.2.4.5.10.2. Control types: audio inputs and outputs, alarm outputs, input events, soft triggers, serial data, manual record.

2.2.4.5.11. System information shall be capable of display on a single page to include the following:

2.2.4.5.11.1. Status of all servers and cameras currently connected.

2.2.4.5.11.2. Alarms, events, MAC addresses, camera configuration, format, and frame rate from each individual camera.

2.2.4.5.12. The VMS shall be able to display the following additional system information:

2.2.4.5.12.1. User currently logged in to the system.

2.2.4.5.12.2. Plug-in file version information number and status.

2.2.4.5.12.3. System log containing a detailed history of system processes.

2.2.4.5.13. The VMS shall support creation of user views, based on permission level of the user.

2.2.4.5.14. The VMS shall support display of notification to the user for common setup tasks that should be performed, including:

2.2.4.5.14.1. Configuring motion on all cameras.

2.2.4.5.14.2. Changing the default password, including forcing strong passwords.

2.2.4.5.14.3. Time delta between server and camera.

2.2.4.6. Pan Tilt Zoom (PTZ)

2.2.4.6.1. The VMS shall allow control of PTZ cameras to authorized users and be used to maneuver and zoom a PTZ camera at adjustable speed.

2.2.4.6.2. When used on a non-PTZ camera, the VMS shall allow a user to digitally pan, tilt and zoom on any video, whether live or recorded.

2.2.4.6.3. The VMS shall allow the following methods of controlling a PTZ camera to be available:

2.2.4.6.3.1. PTZ graphics control windows.

2.2.4.6.3.2. Live graphic overlay PTZ control icons.

2.2.4.6.3.3. Keyboard control (up, down, left, right arrows; page up, page down for zoom).

2.2.4.6.3.4. PTZ presets.

2.2.4.6.3.5. Digital PTZ.

2.2.4.6.3.6. USB joystick.

2.2.4.6.3.7. Proportional PTZ control using a mouse.

2.2.4.7. Export

2.2.4.7.1. The VMS software shall have the capability to export video, POS data and audio files from a single source without overwriting previous exports.

2.2.4.7.1.1. Export file formats supported: .exe, .avi, .ps, .mov, .psx, .mp4

2.2.4.7.2. The VMS software shall have a feature to export a video segment from specific single cameras or audio inputs to a CD or DVD upon an event.

2.2.4.7.3. VMS standalone player

2.2.4.7.3.1. The VMS standalone player shall package all the exported video into a single executable file.

2.2.4.7.3.2. The VMS standalone player shall be able to authenticate that the video has not been tampered with using keyed Hash Message Authentication Code (HMAC).

2.2.4.8. Administration and Configuration

2.2.4.8.1. User administration functions:

2.2.4.8.1.1. Permissions

2.2.4.8.1.1.1. Authenticate the user's permission level by:

2.2.4.8.1.1.1.1. Combination of username and password.

2.2.4.8.1.1.2. Allow for pre-set permission groups:

2.2.4.8.1.1.2.1. Restricted.

2.2.4.8.1.1.2.2. Power User.

2.2.4.8.1.1.2.3. Full Admin.

2.2.4.8.1.1.2.4. User Admin.

2.2.5. Updates – The Manufacturer shall have available timely updates of the VMS software.

2.2.5.1. Updates shall be discoverable by the software when Internet connectivity to https://exacq.com is available.

2.2.5.2. The VMS software shall support the ability to update without losing any configuration.

2.2.5.3. The VMS software shall provide the ability to update the software from within the software.

2.2.5.4. The VMS software shall provide the ability to run an executable update program in the operating system to update the software.

2.3. PERFORMANCE

2.3.1. Compatibility

2.3.1.1. Video – The Video Server shall be compatible with the following video manufacturers: Illustra, Axis, Vivotek, IQEye and ISD.

2.3.2. Maximum cameras per server

2.3.2.1. IP: 1

2.3.3. Maximum number of simultaneous clients per server:

2.3.3.1. Installed client: 10

2.3.3.2. Web client: 1

2.3.4. Display

2.3.4.1. Local client display rate:

2.3.4.1.1. Windows OS: up to 1800 frames per second

2.3.4.1.2. Linux OS: up to 1200 frames per second

Client display rates (fps) are based upon the CPU installed in the workstation, as follows:

Processor (Intel Core):	**i3**	**i5**	**i7**
Windows:	**480**	**1100**	**1800**
Linux:	**600**	**1100**	**1200**

2.4. Computing Requirements

2.4.1. Server requirements:

2.4.1.1. Acceptable operating systems:

2.4.1.1.1. Microsoft Windows Server: 2016/2012 R2

2.4.1.1.2. Microsoft Windows: 10

2.4.1.1.3. Linux Ubuntu: 18.04 64-bit

2.4.1.2. Processor: Intel Celeron G5900 minimum

2.4.1.3. RAM: 2 GB minimum

2.4.1.4. Operating system drive: 32 GB minimum

2.4.1.5. Network interface: 1000BASE-T Ethernet

2.4.2. Client workstation minimum requirements:

2.4.2.1. Acceptable operating systems:

2.4.2.1.2. Microsoft Windows Server: 2016/2012 R2

2.4.2.1.3. Microsoft Windows: 10

2.4.2.1.4. Linux Ubuntu: 18.04 64-bit

2.4.2.1.5. Apple Mac OSX: 10.15, operating on an Intel CPU

2.4.2.2. Processor: Intel Celeron G5900 minimum

Because decompressing video is CPU-intensive, the PC workstation requires multiple core processors with a recommendation of one core for each VMS client application.

2.4.2.3. RAM: 2 GB minimum

2.4.2.4. Network interface: 1000BASE-T Ethernet

2.4.2.5. HDD Storage: 10 GB minimum

2.4.2.6. Graphics: Intel UHD Graphics 610

2.4.3. Multi-monitor client workstation

2.4.3.1. Acceptable operating systems:

2.4.3.1.1. Microsoft Windows Server: 2016/2012 R2

2.4.3.1.2. Windows: 10

2.4.3.1.3. Linux Ubuntu: 18.04 64-bit

2.4.3.1.4. Apple Mac OSX: 10.15, operating on an Intel CPU

2.4.3.2. Processor: Intel Core i7-8700

2.4.3.3. RAM: 16 GB minimum

2.4.3.4. Graphics: Intel UHD630 or NVIDIA NVS Series

2.4.3.5. Network interface: 1000BASE-T Ethernet

2.4.3.6. HDD Storage: 128 GB SSD minimum

2.4.4. Acceptable web browsers:

2.4.4.1. PC: Microsoft Edge, Firefox, Safari, Chrome, all non-JavaScript browsers

2.4.4.2. HTML compliance: HTML 4.0

2.4.4.3. Mobile device: Apple iOS, Google Android

END OF SECTION

3. EXECUTION

3.1. INSTALLATION

3.1.1. Contractor shall comply with all Manufacturer installation guidelines.

3.1.2. Contractor personnel shall comply with all applicable state and local licensing requirements.

3.2. STORAGE

3.2.1. Hardware shall be stored in an environment where temperature and humidity are in the range specified by the hardware manufacturer.

END OF SECTION