



- 1 | Remote site and sensor status
- 2 | Visual & Thermal analytics with live and recorded video
- 3 | Remote Configuration & Controls
- 4 | Real-time alarms
- 5 | Connection to SCADA & APM with DNP, ModBus & IEC 61850

## VMS2000 VIDEO MANAGEMENT SOFTWARE

### FEATURES

- Live real-time video viewing and playback
- Central monitoring and alarm management of multiple remote sites
- Video data archive management
- Automatic anomaly detection using advanced video analytics
- Manage and configure all local and remote Digital Video Servers
- Easy integration into existing systems

### KEY BENEFITS

- Unattended monitoring
- Use as part of an overall asset monitoring solution
- Architected for widely dispersed infrastructure
- Industry standard communication protocols
- Monitor critical infrastructure from a central location

The VMS2000 Video Management Software is the software component behind the Systems With Intelligence Touchless<sup>™</sup> monitoring solution. The VMS2000 allows for central and remote management of the monitoring system and provides live video viewing, remote sensor control, video data archive management, remote access services, video analytics algorithms for automated alarm and event notification.

VMS2000 can connect to multiple Digital Video Servers (DVS), at a single location or across multiple remote sites and is capable of managing and monitoring hundreds of thermal and visual sensors. The VMS2000 Client manages remote access to all Digital Video Servers which allows for the distribution and viewing of system events and alarms to any computer connected to the network. Additionally, alerts can be sent to email, SCADA or asset management applications to ensure personnel are notified of incidents in a timely manner.



## SOFTWARE OVERVIEW

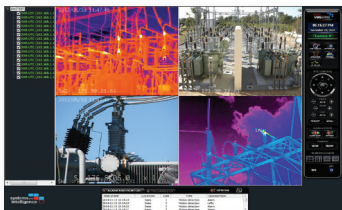
The VMS2000 Video Management Software is a collection of software components behind the Systems With Intelligence Touchless™ monitoring solution and performs the following major tasks:

1. **Video Monitoring:** shows operators real-time live video from the connected cameras.
2. **Video Playback:** operators can review recorded video.
3. **Video Analytics:** analyzes video images to determine if preset user-defined rules have been broken and decide if real-time alerts need to be generated.
4. **Recording:** 24 hours, based on scheduled events.
5. **Real-time Alerts:** sends a real-time event notification whenever an alarm is identified.
6. **Data Archive Management:** store and manage video and data on the local DVS and a centralized storage device.
7. **System Configuration:** configure all aspects of the system, including DVS hardware, sensors, analytics, and other system parameters.
8. **Auxillary Functions:** integrates additional capabilities such as access control devices, thermal sensors for asset monitoring, SCADA and asset management integration, and general digital I/O control.

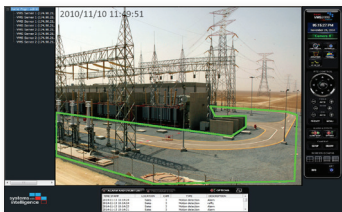


The VMS2000 software components include the following:

**VMS2000 Server:** the software that resides in the Digital Video Server (DVS), and is responsible for all the functions operating on the DVS hardware.



**VMS2000 Client:** the software that resides remotely on a user's laptop or personal computer and is the main user interface for the monitoring system. It is designed to connect to multiple DVS devices located locally or across multiple sites.



**VMS2000 Analytics:** the software algorithms that are used to automatically identify various types of site or asset anomalies.



**VMS2000 Archive Server:** the software that resides on a central dedicated computer that manages the retrieval of all stored video and data from each DVS to an external storage device for the purposes of long-term data archiving.



# SUBSTATION ARCHITECTURE



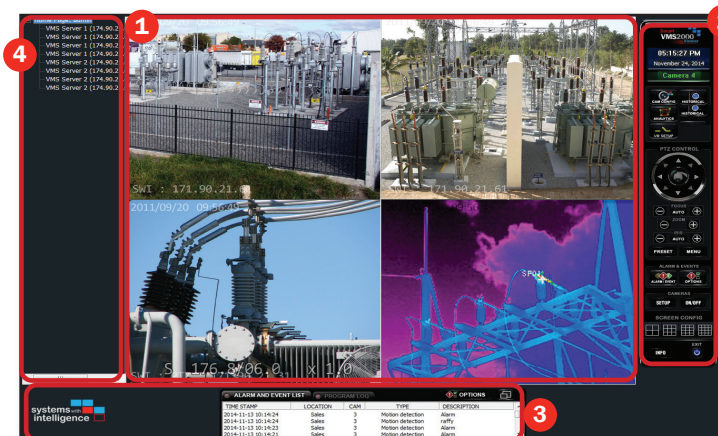
## SOFTWARE FEATURES

FUNCTIONS	
Manage Digital Video Server (DVSS)	<ul style="list-style-type: none"> <li>Manage and configure Digital Video Servers located locally or at remote sites</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>Live video viewing: Simultaneously view multiple video feeds (Full screen, Split screen (4, 9, 16))</li> <li>Event and Status display (Event Lists): event list, alarms, system status</li> <li>Event Log display: Real time displaying of event list and automatic refresh of video event list</li> </ul>
Video Analytics Rule Management	<ul style="list-style-type: none"> <li>GUI based wizard used to set up video analytics rules which perform real-time event detection on live surveillance video</li> <li>Rules tell the system which events to look for in the video</li> <li>Rules specified for each camera</li> </ul>
Alarm/Event Notification and Management	<ul style="list-style-type: none"> <li>Event list: History of all system alerts</li> <li>Event Action Plan: Able to define multiple actions in response to an event</li> <li>Email Notification: Send a notification response via email message to a contact or a distribution list</li> <li>PTZ Activation: Supports setup of Alarm related with PTZ preset location.</li> </ul>
Camera Control	<ul style="list-style-type: none"> <li>View camera configuration, rules and responses for each camera</li> <li>PTZ camera: Pan &amp; tilt, zoom control</li> </ul>
Data Storage (Archive Server)	<ul style="list-style-type: none"> <li>Manage data storage and archiving from all Digital Video Servers</li> <li>Export and store all data, including video and alerts, to a local storage device, server attached storage or network attached storage</li> <li>Ability to schedule archiving of the system database, files, alert and system events and video files locally and/or to a network attached storage device</li> <li>Backup: Automatic (schedulable) or Manual</li> </ul>
Search and Playback	<ul style="list-style-type: none"> <li>Search a video archive and playback stored and live video</li> <li>Ability to search for various events, including alerts and system events</li> <li>Playback Speed: Single frame, 1/16x, 1/8x, 1/4x, 1/2x, 1x, 2x, 4x, 8x, 16x, Fast forward and rewind</li> <li>Searching: Searching of images by date, time, camera, and event</li> <li>Image Transfer: Able to save images as BMP, JPG and AVI format.</li> </ul>



## VMS2000 CLIENT MAIN USER INTERFACE

The features of the VMS2000 Client software as shown below includes:



- 1 Video Panel:**
  - Live camera feed from one or many digital video servers (DVS)
- 2 Control Panel:**
  - Select cameras to manage & control
  - Control the PTZ camera functions
  - Access all features of the software
- 3 Alarm and Event Notification Panel:**
  - Displays a list of recent alarms & events
  - Displays the camera connection status
- 4 TreeView Panel:**
  - Displays a list of available cameras in a tree structure
  - User can define different pages and the cameras associated with each

The VMS2000 Software Main User Interface Screen.

## VMS2000 SERVER SOFTWARE

The VMS2000 Video Management System is the software component behind the Systems With Intelligence Touchless™ monitoring solution. It consists of two parts, the VMS2000 Server software that is located in the Digital Video Server (DVS), and the VMS2000 Client software that can reside locally on the DVS or remotely on a user's laptop or personal computer.

The VMS2000 Server software is responsible for all the Video Management Systems functions operating on the DVS hardware. Since it operates on the DVS itself (on the edge), it reduced ongoing operating costs because it minimizes bandwidth, communications, power and back office IT infrastructure requirements.

The VMS2000 Server software records video images, analyzes them using unique video analytics, determines if a rule has been broken, then sends a real-time alert with an image to an operator. The video is also stored in the DVS for event review and investigation. The VMS Server software is also responsible to stream the video feeds to any connected VMS2000 Client,

provide PTZ control, control all serial and digital I/O interfaces to allow integration of external security devices and other control functionality to the overall video monitoring solution.

### Key Features Include:

**Real-time camera monitoring and remote control over network** • The VMS2000 can capture live video from up to 16 cameras, which can be monitored locally or remotely over Local Area Networks (LAN) and Wide Area Networks (WAN). Users are able to locally or remotely change setting of system parameters including individual camera configuration.

**H.264 Compression Technology** • The VMS2000 supports H.264 AVC/SVC and JPEG encoding. H.264 compression provides the user with the best image quality at the lowest possible communication bandwidth and disk storage requirements. With D1/4CIF image resolution at 30 fps video with audio embedded recording, users can retain the highest possible quality of recorded events for future investigation.



VMS2000 Client Software Main Screen.

**Alarm and Event Notification** • The VMS2000 has a comprehensive set of user selectable analytic alarm rules and can be configured up to 10 analytic rule sets per camera. Additionally, an extensive set of system event and alarms are also provided to help in the overall system management and monitoring. When an alarm event occurs, the VMS2000 is able to perform one or more of the following actions:

1. Update the alarms database with a record of the time, alarm message and event image.
2. Send an alarm notification to the client viewers.
3. Send an email notification with JPEG attachment of the scene.

Additionally, a DNP, MODBUS or IEC 61850 interface is available to enable seamless integration of alarms into third party SCADA applications.

**Serial Interfaces** • VMS2000 can be configured to incorporate up to 16 serial interfaces (RS232/RS422/RS485 via DB9 or RJ45) that may be available on the DVS. This will allow integration of external devices such as access control or two-way VOIP communication.

**Digital I/O** • VMS2000 can be configured to utilize the various types of digital I/O available on the DVS.

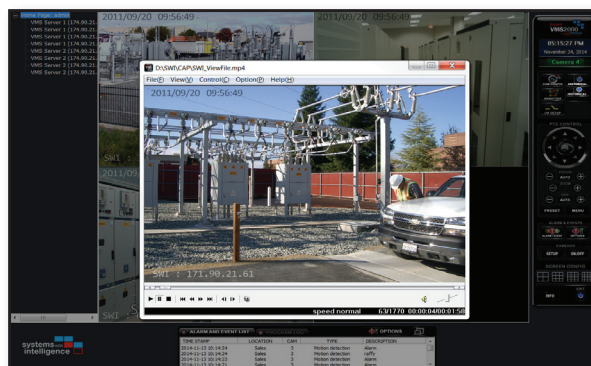
## VMS2000 CLIENT SOFTWARE

The VMS2000 Client software is the main user interface for the video surveillance system. It is designed to connect to multiple digital video servers located locally or remotely across multiple sites. VMS2000 can be run on any computer or laptop and has many features including:

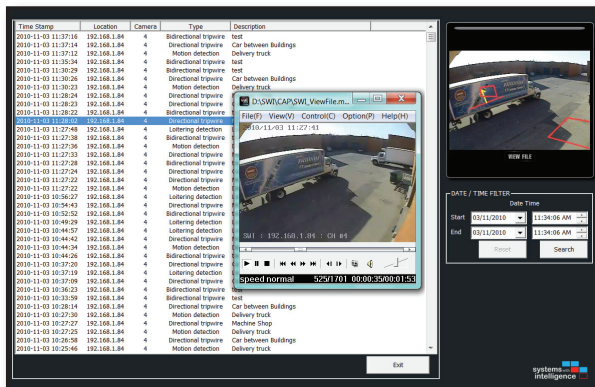
- View live video (1 to 16 images per screen)
- Review recorded and archived video
- Video data management
- Analytics configuration
- Real-time alarm and event management and email notifications
- Remote PTZ camera controls
- System configuration of all user-definable parameters



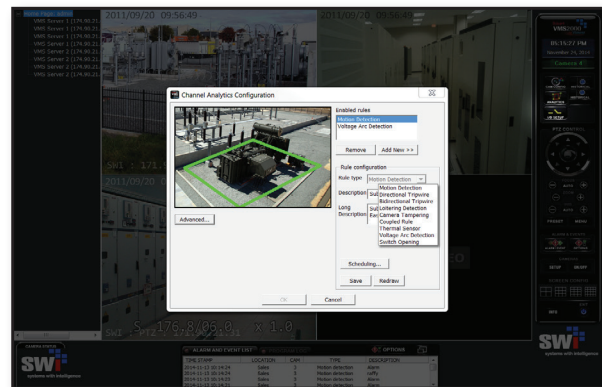
VMS2000 Client Software Main Screen.



Historical Video Screen Viewer.



Historic Alarm & Event View window.



Examples of Channel Analytics Configuration screen.

## VIDEO ANALYTICS

The Systems With Intelligence system incorporates sophisticated, easy to use, video analytics algorithms that allow automated and unattended monitoring of critical infrastructure. These algorithms can identify various types of incidents such as motion detection, perimeter violation, and loitering. Thermal cameras can monitor the substation for intruders as well as monitoring the operating temperatures of assets. Temperature analytics monitor defined regions in the field of view for absolute or comparative values and send alerts on out-of-range events.

For electric utility applications, where much of the critical infrastructure is dispersed over a wide geographic range, the use of video analytics makes it possible to monitor many remote sites at the same time without undue burden on operators or other staff.

## OTHER BENEFITS WITH VIDEO ANALYTICS

**Reduce Network Bandwidth** • Streaming video over a network gives rise to many bandwidth and network resource issues. In many cases, and in particular for remote locations, continuously streaming video over a wide area network is not practical. In this case, video analytics can be used to decide when to transmit video. For example, when a person enters a field of view where no one

The analytics developed by Systems With Intelligence work on fixed cameras, PTZ cameras as well as the thermal cameras and include the following:

- Thermal Monitoring
- Temperature is out of specified range
- Temperature differential between two regions is out of range
- Temperature rate of change is out of range
- 3 phase temperature differential

should be present, a small video clip can be transmitted to an operator for remote viewing. Bandwidth and network resources are preserved and only used when an event of interest occurs. Video analytics can provide effective monitoring of remote locations that may only have limited bandwidth connections.



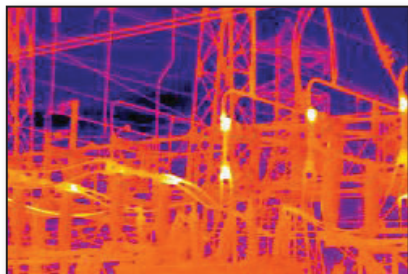
## Reduce Video Storage Requirements •

Storage optimization is a common use for video analytics. In its simplest form, video analytics examines video feeds to identify changes in motion. Based on the presence or absence of motion, the video management system can decide not to store video or to store video at a lower frame rate or

resolution. Since surveillance video captures long periods of inactivity, like at unmanned substations, using video analytics can reduce storage consumption by 60% - 80% relative to continuous recording. Recording only when an event has occurred also results in the ability to quickly search and retrieve specific security events in post-event analysis.

## AUXILLARY FUNCTIONS

VMS2000 provides a flexible platform to seamlessly integrate many auxillary functions into the overall solution. The following provides some examples of possible integration. Contact Systems With Intelligence to discuss integration of other functions or systems.



Hot Spot Monitoring Using Thermal Cameras.

### Thermal Camera Integration

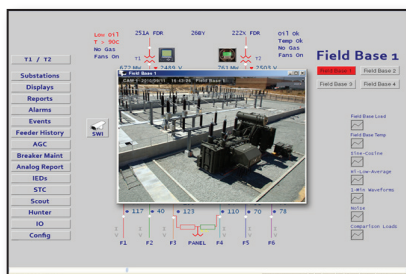
- Asset monitoring
- Preventive maintenance
- Automated alarms and notification based on “thermal” rules



Integrate Various Types of Access Control Devices

### Access Control Integration

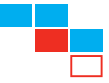
- Tie in card readers and other physical security devices
- Video verification
- Event logging
- User policy management



Live Video Feed Directly in a SCADA

### SCADA Integration

- Integrate into existing HMI's (via API or system calls)
- Obtain alarm and event information through standard utility protocols such as DNP, MODBUS and IEC 61850



## CONFIGURATION

VMS2000 Server software must be ordered in conjunction with the Systems With Intelligence Digital Video Server. The number of IP cameras must be specified, in addition to how many channels of analytics are required.

The VMS2000 Client software can run on any Windows computer subject to sufficient available computing power. One software license is required for each computer running the Client software. Software licenses can be ordered in packages and can be added at a later date.

Contact Systems With Intelligence for VMS2000 Software ordering details to ensure the correct configuration and options are selected.



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