

SECTION 17840 - VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Digital Video Recorders.
- B. Cameras and Accessories.
- C. Cabling.
- D. CCTV Rough-In

1.2 REFERENCES

- A. NFPA 70 - National Electrical Code
- B. Electronic Industries Association (EIA) Video Surveillance Equipment Standards
- C. UL 2044 - Standard for Commercial Closed Circuit Television Equipment
- D. UL 3044 - Standard for Safety for Surveillance Closed Circuit Television Equipment

1.3 SYSTEM DESCRIPTION

- A. This specification section describes the furnishing, installation, commissioning and programming of a complete, turnkey, closed circuit television system.
- B. Performance Statement: This specification section and the accompanying CCTV-specific Contract Documents are performance based, describing the minimum material quality, required features, and operational requirements of the system. These documents do not convey every wire that must be installed and every equipment connection that must be made. Based on the equipment constraints described and the performance required of the system, as presented in these documents, the vendor and the Contractor are solely responsible for determining all wiring, programming and miscellaneous equipment required for a complete and operational system.
- C. Basic System Requirements: The CCTV system shall be an Analog system and have the following minimum features in addition to those described elsewhere in the Contract Documents:
 - 1. Viewing of any video input on any or all video outputs via automatic or manual control.
 - 2. Programmable partitioning to allow or deny access to selected monitors and cameras from the operator interface.
 - 3. Capability for user defined camera numbers and names to be displayed on-screen with date, time and alarm status for each camera.
 - 4. System architecture shall be microprocessor based with modular, scalable architecture.
 - 5. All date and time functions in the system shall be synchronized in all date/time aware equipment.
 - 6. System programming shall be by means of a PC-based interface, allowing remote storing of all programming for backup/archival purposes.
- D. Refer to the drawings for model numbers for the Basis of Design for all equipment.

1.4 ALTERNATE ACCEPTABLE MANUFACTURERS

- A. There shall be no alternate acceptable manufacturers unless noted otherwise under individual

products in Part II.

1.5 QUALITY ASSURANCE

- A. Manufacturer: The CCTV system shall be a MULTI-source manufacturer such that the single manufacturer distributes, supports, warranties and services the main components. The manufacturer shall have five (5) years documented experience.
- B. Installer: The installing dealer must be a factory-authorized service and support company specializing in the selected manufacturer's product, with demonstrated prior experience with the selected manufacturer's system installation and programming.
- C. Servicing Contractor: The manufacturer of the system must have local service representatives within 120 miles of the project site. The Servicing Contractor shall carry a complete stock of parts.

1.6 SUBMITTALS

- A. Product Data Submittal to the owner: Provide manufacturer's technical product specification sheet for each individual component type. Submitted data shall show the following:
 - 1. Compliance with each requirement of these documents.
 - 2. All component options and accessories specific to this project.
 - 3. Electrical power consumption rating and voltage.
 - 4. Wiring to be used.
- B. Submit detailed description of Owner training to be conducted at project end, including specific training time.
- C. Quality Assurance:
 - 1. Provide materials documenting experience requirements of the manufacturer and installing contractor.
 - 2. Provide system checkout test procedure to be performed at acceptance. Test procedures shall include all external alarm events.

1.7 PROJECT RECORD DOCUMENTS

- A. Provide final system block diagram showing any deviations from shop drawing submittal.
- B. Provide statement that system checkout test, as outlined in shop drawing submittal, is complete and satisfactory.
- C. Provide schedules documenting:
 - 1. Camera numbers, complete with location description.
 - 2. All terminal block wiring, including cable numbers.
 - 3. All alarm events, including RS-232 ASCII alarms.
- D. Warranty: Submit written warranty and complete all Owner registration forms.
- E. Complete all operation and maintenance manuals as described below.

1.8 OPERATION AND MAINTENANCE DATA

- A. Manuals: Final copies of the manuals shall be delivered within 14 days after completing the installation test. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of the company responsible for the installation and maintenance of the system and the factory representatives for each item of equipment for each system. The manuals shall have a table of contents and labeled sections. The final copies delivered after completion of the installation test shall include all modifications made during installation, checkout, and acceptance testing. The manuals shall consist of the following:
1. Functional Design Manual: The functional design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included.
 2. Hardware Manual: The manual shall describe all equipment furnished including:
 - a. General description and specifications.
 - b. Installation and check out procedures.
 - c. Equipment layout and electrical schematics to the component level.
 - d. System layout drawings and schematics.
 - e. Alignment and calibration procedures.
 - f. Manufacturers repair parts list indicating sources of supply.
 3. Software Manual: The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
 - a. Definition of terms and functions.
 - b. System use and application software.
 - c. Initializations, start up, and shut down.
 - d. Reports generation.
 - e. Details on forms customization and field parameters.
 4. Operator's Manual: The operators manual shall fully explain all procedures and instructions for the operation of the system including:
 - a. Computers and peripherals.
 - b. System startup and shut down procedures.
 - c. Use of system, command, and applications software.
 - d. Recovery and restart procedures.
 - e. Graphic alarm presentation.
 - f. Use of report generator and generation of reports.
 - g. Data entry.
 - h. Operator commands.
 - i. Alarm messages and reprinting formats.
 - j. System permissions functions and requirements.
 5. Maintenance Manual: The maintenance manual shall include descriptions of maintenance for all equipment including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.

1.9 WARRANTY

- A. Unless otherwise noted, provide warranty for one (1) year after Date of Substantial Completion for all materials and labor.

- B. Onsite Work During Warranty Period: This work shall be included in the Contractor's bid and performed during regular working hours, Monday through Friday.
- C. Operation: Upon the performance of any scheduled adjustments or repairs, Contractor shall verify operation of the CCTV system.
- D. Emergency Service: During the warranty period, the Owner will initiate service calls when the CCTV system is not functioning properly. Qualified personnel shall be available to provide service within the distance defined above. The Owner shall be furnished with telephone number(s) where service personnel can be reached 24/7/365. Service personnel shall be at site within 48 hours after receiving a request for service. The CCTV system shall be restored to proper operating condition within 72 hours after service personnel arrive on site.
- E. Records and Logs: The Contractor shall keep records and logs of each task completed under warranty. The log shall contain all initial settings upon substantial completion. Complete logs shall be kept and shall be available for review on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the CCTV system.
- F. Work Requests: The Contractor shall separately record each service call request on a service request form. The form shall include the model and serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials used, the time and date work started, and the time and date of completion. The Contractor shall deliver a record of the work performed within five (5) days after work is accomplished.
- G. System Modifications: The Contractor shall make any recommendations for system modification in writing to the Owner. No system modifications shall be made without prior approval of the Owner. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected. To the fullest extent possible, the Owner shall be provided with electronic restorable versions of all configurations prior to the modifications being made.
- H. Software: The Contractor shall provide all software updates during the period of the warranty and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with CCTV system operators, shall include training for the new changes/features enabled, and shall be incorporated into the operations and maintenance manuals, and software documentation.
- I. Refer to the individual product sections for further warranty requirements of individual system components.
- J. Provide complete terms and conditions of warranty and service.
- K. The Owner will enter into a contract directly with the vendor. This specification is not a contract between the Owner and the vendor to perform these services.

PART 2 - PRODUCTS

2.1 VIDEO MANAGEMENT SYSTEM – GENERAL REQUIREMENTS

- A. The video management system (VMS) specified is an enterprise-class analog security solution that provides seamless management of digital video, audio and data across a TCP/IP network. The system shall be capable of seem-less viewing of at least 256 cameras on a single PC/software package.

- B. The video management system shall consist of the following hardware / software components:
 - 1. Recording services
 - 2. Operator client(s)
- C. The VMS shall support the following recording services:
 - 1. Digital video recorder (DVR)
- D. The software components of the VMS shall be capable of running together on a single desktop class PC
- E. The Operator Client software shall run as an application on Microsoft Vista.
- F. The VMS shall incorporate a modular architecture and be able to support a minimum of 256 cameras on a single viewing station.

2.2 BASIS OF DESIGN MANUFACTURER

- A. Speco Technologies (DVR) – No alternates are to be accepted
- B. Cameras – American Dynamics
- C. Refer to individual parts for additional information.

2.3 CLIENT WORKSTATIONS

- A. Client Workstation:
 - 1. The VMS Client Workstation(s) are to be provided and installed by the owner at a later date if chosen to do so. No work is to be provided with-in this contract.

2.4 SYSTEM OPERATIONAL REQUIREMENTS

- A. The VMS shall provide the following functional requirements:
 - 1. The VMS shall be able to simultaneously display live video and display recorded video on single monitor viewing configurations.
 - 2. The VMS shall support both event based and continuous recording and any combination of the two on a per channel basis.
 - a. The VMS shall mark all events and they shall be available for playback and or archiving at any time
 - b. Video events shall be linked to SMS events in the SMS database. Only a single database shall be acceptable for this interface.
 - 3. At least 4 simultaneous users shall be able to access any video feed from any recorder on the network.
 - 4. The VMS shall have the ability to enhance any frame of video with embedded features. Security shall be provided to preserve the integrity of the original video image.
 - 5. Network Requirements: The VMS shall support Ethernet 100BT.
 - a. Network protocols shall be supported including TCP/IP, IPX, and UDP.

- b. The network interface shall allow remote access of the VMS from anywhere on the end-users LAN/WAN.
 - c. The system shall permit limiting of frame rate transmission to individual clients.
 - d. Both Multicast or Unicast streaming technology shall be acceptable.
 - e. The system shall be have the ability to playback stored video over the LAN/WAN for remote access of video clips. An industry standard Web Browser (e.g., Internet Explorer, Firefox) shall be the only software required to view non-authenticated video.
- 6. Camera Configuration:
 - a. Each camera shall be configurable for a alphanumeric character name.
 - b. The system shall allow for the setup and adjustment of brightness, contrast, archiving, motion detection, Pan/Tilt/Zoom, on a per camera basis.
 - c. The VMS shall support a separate frame rate for recording and a separate frame rate for viewing, for every camera input. These frame rates shall be capable of being independently set for each camera input.
 - d. MJPEG, MPEG4, and H.264 formats shall be supported in the same system and shall be configurable based on the camera.
 - e. Integral time stamping shall be supported upon receipt of video from the camera.
- B. Browser Based Video Viewer:
 - 1. The VMS shall allow monitoring of real time video from a web browser based video viewer using N-Tier architecture and Microsoft Internet Explorer @ 1280x1024 resolution. The browser based viewer shall have the ability to select multiple viewing templates. The browser based viewer shall provide the following functionality:
- C. Real Video Time Monitoring:
 - 1. The VMS shall allow monitoring of real time video from any Alarm Monitoring client workstation. Available storage devices and all video source status shall be displayed on a System Hardware Tree within the graphical user interface.
- D. Video Player:
 - 1. An advanced matrix view of available cameras shall be supported. A total of 16 cameras shall be available for viewing (live or recorded video) at 1 CIF, 30 FPS. The Video Player shall allow operator sizing of the video windows in the matrix view.
- E. Still Image Capture/Save:
 - 1. During playback or monitoring of video, the System shall have the ability to create and save a still picture. This operation shall not affect any other operation and shall not alter the recorded video. The file format shall be an industry standard format (JPEG, TIFF) allowing for file transfer via e-mail, printing or file transfer to other media

F. Export Video Clip to File:

1. The VMS shall have to ability to save and export recorded video to a file (MPEG, AVI) for the purpose of sharing and reviewing video clips. The start and end times for each video segment shall be user defined. The exported video clip shall be viewable via a standard Windows media player.

G. Video Loss Detection:

1. The VMS shall detect video loss from any or all cameras and activate an alarm.

H. Remote Monitoring Application:

1. A Remote Monitoring Application shall be supported that allows the operator to monitor video from any computer connected to the VMS network.

I. Video Authentication:

1. The VMS shall support imbedded authentication of video.
 - a. The video shall be watermarked with an authentication key/signature during recording of live video to a hard drive.

J. The VMS shall provide at least 3 different and independent programmable recording schedules.

1. The schedules may be programmed to provide different record frames rates for day, night, and weekend periods as well as holidays and exception days.
2. Advanced task schedules may also be programmed that could specify allowed log-on times for user groups, when events may trigger alarms, and when data backups should occur.

K. The VMS shall allow the establishment of user groups that have access rights to specific cameras, priority for pan/tilt/zoom control, rights for exporting video, and access rights to system event log files. Access to live, playback, audio, PTZ control, preset control, and auxiliary commands shall be programmable on an individual camera basis.

L. The VMS workstations may be connected to up to four monitors where each monitor may be configured to display live streaming video, playback video, site maps, or alarms.

M. The VMS shall export video and audio data optionally in ASF format to a CD/DVD drive, a network drive, or a USB drive. The exported data in ASF format may be played back using standard software such as Windows Media Player.

2.5 WORKSTATION SOFTWARE FUNCTIONALITY

- A. The workstation shall be a preconfigured PC ready to view and record video over the LAN, upon successful system registration. The system shall be capable of this, but this work is not in contract and to be performed at a later date.

2.6 DIGITAL VIDEO RECORDERS

- A. Sixteen-channel DVR, 720 x 240 resolution. Hard drive shall be sized to provide a minimum of 25 days simultaneous and continuous storage assuming all inputs at a minimum of 7.5 fps with a recording resolution of CIF at the minimum compression (best picture quality) setting capable on the DVR.

- B. Capacity: Minimum of six (6) recording intervals shall be available from 1 to 30 fps.
- C. Hard Drive Capacity: 2TB of installed hard drive space.
- D. Video Parameters:
 - 1. Resolution: NTSC standard 525 lines, 240 fps, 280 TVL color.
 - 2. Luminance Signal: Frequency modulation recording.
 - 3. Color Signal: Low frequency conversion, subcarrier phase shift recording.
 - 4. Video Input: Sixteen (16), BNC connector type. VGA video output.
 - 5. Video Signal: Composite video signal 1V peak-to-peak, 1V luminance and 286 mV sync.
 - 6. Operating Temperature: 14°F to 120°F.
- E. Operational Features:
 - 1. Alarm Recording: Adjustable timed modes of 15 seconds, 30 seconds, 45 seconds, 1 minute. Provide two (2) mode manual capability for continuous recording until alarm is reset or until alarm is switched off.
 - 2. Timer: Daily start and stop times available for one week interval. Up to eight (8) programs shall be available per day.
 - 3. Lock: Provide lock feature to disable all operating controls.
 - 4. Memory Backup: Programmable functions shall be retained for 31 days with no loss when 120 volt power input is lost or disconnected.
 - 5. Indexing: Index signals shall be added automatically at the beginning of each alarm recording event.
 - 6. Failsafe: A signal shall be activated to indicate HDD full. A programmable option shall allow recording to automatically continue from the beginning of the HDD. An additional programmable option shall not allow re-recording on the HDD when it would result in overwriting an alarm event.
 - 7. RS-232C terminal shall be provided for connection to external media for backup and copying of digital recording.
 - 8. Basis of Design – Speco DVR16TL2TB
 - a. No Alternate Approved Manufactures/Models are to be accepted.

2.7 CAMERAS AND ACCESSORIES

- A. Indoor Recessed mount
 - 1. CCD Cameras (High Resolution):
 - a. Description: The camera shall be provided with an enhanced CCD sensor utilizing a layer of micro-condensing lenses positioned above the CCD's photosensitive layer, which shall gather, condense and focus image information directly onto the CCD's individual cells.
 - b. Camera shall have the following minimum specifications:
 - 1) High Resolution Color Camera.

- 2) 540TVL resolution.
 - 3) 0.65 lux @ F1.2
 - c. Cameras shall be recessed ceiling mount. Provide with tile bridge as required to prevent acoustical tile ceiling warping.
 - d. Electrical Requirements:
 - 1) Input Power: 24 VAC provided by a Class 2 power supply (12-28 VAC).
 - 2) Video Out: 1.0 V peak-to-peak, 75 ohms BNC with UTP Balun or 100 ohm UTP output.
 - e. Warranty: Provide a two-year manufacturer's warranty.
 - f. Basis of Design – American Dynamics
 - 1) Camera - American Dynamics ADCDH2506TN
 - 2) Alternate Acceptable Manufactures
 - a) All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
 - b) Pelco
 - c) Vicon
- B. Outdoor Pendant Mount
- 1. CCD Cameras (True Day/Night):
 - a. Description: The camera shall be provided with an enhanced CCD sensor utilizing a layer of micro-condensing lenses positioned above the CCD's photosensitive layer, which shall gather, condense and focus image information directly onto the CCD's individual cells.
 - b. Camera shall have the following minimum specifications:
 - 1) True day/night mode Color/B&W camera.
 - 2) 540TVL resolution.
 - 3) 0.07 lux @ F1.2
 - c. All outdoor cameras shall have integral heater installed with-in housing.
 - d. Provide with Pendant mount and adapter as required.
 - e. Electrical Requirements:
 - 1) Input Power: 24 VAC provided by a Class 2 power supply (12-28 VAC).

- 2) Video Out: 1.0 V peak-to-peak, 75 ohms BNC with UTP Balun or 100 ohm UTP output.
- f. Warranty: Provide a two-year manufacturer's warranty.
- g. Basis of Design – American Dynamics
 - 1) Camera - American Dynamics ADCDT2910CN
 - 2) Pendant Mount - American Dynamics ADCDMWALL
 - 3) Integral Heater - American Dynamics ADCDHTR
 - 4) Alternate Acceptable Manufactures
 - a) All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
 - b) Pelco
 - c) Vicon

2.8 RACK MOUNT CCTV POWER SUPPLY AND UTP CABLE BALUN

- A. Provides Class 2 SELV camera power while receiving video transmission and delivering P/T/Z telemetry all over a single 4-pair Cat5e cable.
- B. (16) individual Power/Video and Data channels in a single rack unit design
- C. Basis of Design – NVT NV-16PS13-PVD
 - 1. Alternate Acceptable Manufactures
 - a. All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
 - b. Nitek

2.9 EQUIPMENT CABINET

- A. A double swing wall mount lockable cabinet with 16RU (Rack units) of space and a depth of 22".
- B. Installed cabinet as indicated on the drawings.
- C. Data and Power shall be installed with-in the cabinet to support the CCTV equipment.
- D. (1) 2" conduit shall be extended from the cabinet to above accessible ceiling to provide pathway for all CCTV cabling. No exposed cabling is allowed to be installed.
- E. Basis of Design – Middle Atlantic
 - 1. Cabinet - Middle Atlantic DWR-16-22
 - 2. Fan - Middle Atlantic DWR-FK22

3. Alternate Acceptable Manufactures

- a. All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
- b. Great Lakes

2.10 RACKMOUNT KEYBOARD/VIDEO/MOUSE DRAWER

- A. 15" LCD with touchpad and keyboard in a 1RU sliding rack mounted drawer.
- B. Do not provide with optional KVM switcher.
- C. Provide with video and mouse and keyboard cabling.
- D. Provide with all required mounting hardware to mount in cabinet.
- E. Basis of Design – i-TECH Company DigiView 15"

1. Alternate Acceptable Manufactures

- a. All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
- b. NTI

2.11 REMOTE MONITOR LOCATION

- A. Provide and Install a keyboard, video and mouse extender that utilizes category 5e or category 6 cabling to extend video and control signals over the required distance.
- B. Coordinate final balun location with owner prior to installation.
- C. Remote keyboard monitor is to be owner provided and contractor installed. The owner may choose to add a keyboard and mouse at a later date and the system shall have the functionality of doing so at that time. The contractor shall not install the USB connection between the KVM transmitter and the DVR until such time the owner decides to do so.
- D. Basis of Design – Gefen EXT-CAT5-1000

1. Alternate Acceptable Manufactures

- a. All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
- b. NTI

2.12 UNINTERRUPTABLE POWER SUPPLY (UPS)

- A. Rack mounted 1400VA 1050Watts 120VAC power supply with built in surge and under-voltage protection.
- B. Required 3RU (rack units) of space for installation.
- C. Power only CCTV equipment from this UPS.

- D. 2 Year product warranty.
- E. Basis of Design – APC SU1400RMXLB3U
 - 1. Alternate Acceptable Manufactures
 - a. All alternate manufacturer products are to meet the minimum specifications called out above before being considered as acceptable.
 - b. Tripp Lite

2.13 ANALOG CABLING

- A. Provide all patch cords required for a complete installation.
- B. New camera cabling shall be category 6 plenum rated cabling. The cabling manufacturer shall match that which is being installed elsewhere in the building. Refer to contract document for additional information. This shall be provided and installed by others. Final termination of these cables including a patch panel of the same manufacturer shall be provided and installed by the security contractor.
- C. All cabling with-in exposed areas shall be routed with-in conduit.
- D. All cabling at the rack location shall be installed on a 24-port category 6 patch panel. Provide wire management as shown on sketch S1. These shall be provided and installed by the security contractor and shall be of the same manufacturer as the cabling (provided by owner).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with the manufacturer's instructions and recommendations for installation of all products.
- B. Provide and install all required conduits, backboxes, cabling, terminations, programming, etc. to provide a complete turn-key system installation. Contractor must meet all individual manufacturers' installation specifications.
- C. Seal all exterior penetrations.
- D. Provide all system wiring (unless noted otherwise) between all components as directed by the manufacturer.
- E. Mount all cameras in the approximate locations shown on the drawings. Coordinate installation with other trades and utilities in the vicinity. All Cameras shall have a lens calculation performed by the vendor and shall include vari-focal lenses. Provide Owner with results of lens calculation before proceeding with installation.
- F. Video Surveillance System will depend on Owner's network unless specifically indicated on plans or specifications.
- G. Security Contractor is responsible to coordinate with Owner's technology department on acquiring network connections as well as any network configuration information such as IP numbers that will be required to connect DVR servers to Owner network.

- H. All +120 VAC power to all devices as required for proper system operation shall be provided and installed by Vissering Construction. All work shall be performed by a licensed electrician from the state of Illinois.
- I. Provide all low voltage power to all devices as required for proper system operation.
- J. All low voltage security shall be routed with other low voltage cabling and shall use existing cable tray, j-hooks and bridal rings to the fullest extent possible. In the event no cable management is existing, contractor shall install new bridal rings at least every 5' along the route of the cable.
- K. Cabling shall be plenum rated when installed outside of conduit in plenum ceilings.

3.2 FIELD QUALITY CONTROL

- A. Where these specifications require a product or assembly without the use of a brand or trade name, provide a product that meets the requirements of the specifications, as supplied and warranted by the system vendor. If the product or assembly is not available from the system vendor, provide product or assembly as recommended by the system vendor.
- B. Periodic observations by the owner will be performed during construction to verify compliance with the requirements of the specifications. These services do not relieve the Contractor of responsibility for compliance with the Contract Documents.
- C. Provide ground loop isolation transformers or other means in circuits where picture disturbances, interference or other erratic behavior is evident.
- D. It shall be the Contractor's responsibility to correct all inadequate picture quality issues prior to acceptance of the system.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Installation shall be performed by a factory-trained and certified Contractor/Installer.
 - 1. The Installer shall provide a comprehensive, site-specific customer planning guide for the system. The Installer shall conduct a conference with the Owner prior to any installation to discuss the programming options of the system and the planning guide. The result of this planning guide shall be the determination of the system options for each device.
- B. The Installer shall include labor for all planning and all programming activities required to implement the Owner's operational preferences for each device. Any software programmable option, within the bounds of the hardware specified, shall be included.
- C. It shall be the responsibility of the Contractor/Installer to provide a complete, functional system as described by the Contract Documents. These responsibilities include:
 - 1. Complete hardware setup, installation, wiring and software configuration of the system, including all remote operator locations and all peripheral hardware.
 - 2. Complete programming of all hardware and software options in accordance with the Owner's preferences as determined by the planning guide conference.
 - 3. Complete system diagnostic verification.
- D. Contractor shall provide an authorized manufacturer representative to commission the system and ensure that facility-wide standards and project setup procedures are adhered to.

3.4 SYSTEM ACCEPTANCE

- A. The vendor shall submit for review a formal acceptance and system checkout program. The system checkout procedures shall include all system components and software. The Contractor shall perform the tests and document all results under the supervision of the manufacturer's system engineer.
- B. All operational scenarios, as defined by the customer planning guide, shall be tested to simulate the actual use of the system in the normal operating environment. The successful completion of these operational scenarios shall be documented.

3.5 SYSTEM DOCUMENTATION

- A. Complete documentation shall be provided for the system. The documentation shall describe:
 - 1. All operational parameters of the system.
 - 2. Complete documentation of all programming and options.
 - 3. Complete operating instructions for all hardware and software.
- B. The following sections shall be provided in the system documentation:
 - 1. System Administrator Manual: Provides an overview and a step-by-step guide and instructions detailing all system administrator responsibilities and functions.
 - 2. User Manual: A step-by-step guide and instructions detailing all system user functions.
 - 3. Alarm Monitoring Manual: A step-by-step guide and instructions detailing all alarm monitoring system functions and responsibilities.
 - 4. Technical Maintenance Manual: A comprehensive document providing all maintenance actions, system testing schedules, troubleshooting flowcharts, functional system layout, wiring diagrams, block diagrams and schematic diagrams.

3.6 SYSTEM TRAINING

- A. All labor and materials required for on-site system training by a certified representative of the system manufacturer shall be provided. Training shall be conducted at the project site using the project equipment.
- B. Provide two weeks advanced notice of training to the Owner.
- C. Provide a training outline agenda describing the subject matter and the recommended audience for each topic.
- D. At a minimum, the following training shall be conducted:
 - 1. System Administrators: A course detailing the system functions and operations. Provide configuration training on all aspects of the system.

SECTION 17840 - VIDEO SURVEILLANCE – IVCC Ottawa Campus

- E. Minimum on-site training times shall be:
 - 1. System Administrators: One (1) Four-hour day.

END OF SECTION