

## SECTION 28 20 00 - VIDEO SURVEILLANCE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes expansion of an existing video management system consisting of color IP surveillance cameras and data transmission wiring to network switches. Connect cameras to existing digital network video recorder and other associated head-end equipment. Configure and program all cameras for monitoring, administration, and playback on Owner's existing equipment.

#### 1.3 DEFINITIONS

- A. BNC: Bayonet Neill-Concelman - type of connector.
- B. FTP: File transfer protocol.
- C. IP: Internet protocol.
- D. LAN: Local area network.
- E. MPEG: Moving picture experts group.
- F. NTSC: National Television System Committee.
- G. NVR: Network Video Recorder
- H. PC: Personal computer.
- I. PTZ: Pan-tilt-zoom.
- J. TCP: Transmission control protocol - connects hosts on the Internet.
- K. UPS: Uninterruptible power supply.
- L. VMS: Video Management System
- M. WAN: Wide area network.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
  - 3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
  - 4. UPS: Sizing calculations.
  - 5. Wiring Diagrams: For power, signal, and control wiring.
- C. Design Data: Include an equipment list consisting of every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Product Warranty: Sample of special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, monitors, videotape recorders, digital video recorders, video switches, and control-station components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
  - 1. Lists of spare parts and replacement components recommended to be stored at the site for ready access.
- B. User Licenses: For cameras, recorders, and other equipment as appropriate.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
  - 1. Control Station: Rated for continuous operation in ambient temperatures of 60 to 85 deg F and a relative humidity of 20 to 80 percent, noncondensing.

2. Interior, Controlled Environment: System components, except central-station control unit, installed in air-conditioned interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg Fdry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
3. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg Fdry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph and snow cover up to 24 inchesthick. Use NEMA 250, Type 4 enclosures.
4. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SYSTEM REQUIREMENTS

- A. Video-signal format shall comply with NTSC standard, composite interlaced video. Composite video-signal termination shall be 75 ohms.
- B. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.
  1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Section 26 43 13 "Surge Protection for Low-Voltage Electrical Power Circuits."
  2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Section 26 43 13 "Surge Protection for Low-Voltage Electrical Power Circuits" as recommended by manufacturer for type of line being protected.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NECA 1.
- C. Comply with NFPA 70.

## 2.3 COLOR CAMERA, INTERIOR, FIXED

### A. Features:

1. 1/2.8" Progressive Scan
2. 3.4 - 8.9 mm lens
3. Motion JPEG and MPEG-4 video compression
4. Up to 30 frames per second
5. Multi-casting and multi-video streaming
6. Auto-iris lens
7. Indoor vandal resistant housing
8. Flush mounted dome and housing cover
9. Pole mounted dome and housing cover
10. Two-way half-duplex audio support
11. Power Over Ethernet 802.3af Class 3

### B. Manufacturer/Model: Axis P3245-LV (no exceptions)

## 2.4 COLOR CAMERA, EXTERIOR, FIXED

### A. Features:

1. 1/2.8" Progressive Scan
2. 3.4 - 8.9 mm lens
3. Motion JPEG and MPEG-4 video compression
4. Up to 30 frames per second
5. Multi-casting and multi-video streaming
6. Auto-iris lens
7. Outdoor vandal resistant housing
8. Flush mounted dome and housing cover
9. Two-way half-duplex audio support
10. Power Over Ethernet 802.3af Class 3

### B. Manufacturer/Model: Axis P3245-LVE (no exceptions)

## 2.5 360-degree Multisensor Camera

### A. Features:

1. 4 x 1/2.8" • • progressive scan RGB CMOS
2. Varifocal lens, 3-6mm, F2.0
3. 0.17lux, F2.0
4. Motion JPEG and MPEG-4 video compression
5. Up to 30 frames per second
6. Multi-casting and multi-video streaming
7. Auto-iris lens
8. Indoor/outdoor vandal resistant housing
9. Power over Ethernet 802.3af Type 1 Class 2, max 5.5 W

### B. Manufacturer/Model: Axis P3727-PLE (no exceptions)

2.6 180-degree Multisensor Camera

A. Features:

1. 4 x 1/1.9" progressive scan CMOS
2. 3 x lenses, fixed focus, 3.2 mm, F2.0
3. Color image: 0.17 lux, F2. - B&W image: 0.05 lux, F2.0
4. Motion JPEG and MPEG-4 video compression
5. Up to 30 frames per second
6. Multi-casting and multi-video streaming
7. Auto-iris lens
8. Indoor/outdoor vandal resistant housing
9. Power over Ethernet 802.3af Type 1 Class 3, max 12.9 W

B. Manufacturer/Model: Axis P3807-PVE (no exceptions)

2.7 IP ENCODER

A. Features:

1. Multiple H.264 streams per channel
2. Full frame rate in all resolutions
3. Intelligent video capabilities
4. Two-way audio support

B. Manufacturer/Model: Axis Q7424-R (no exceptions)

2.8 POWER SUPPLIES

A. Cameras: Power-Over-Ethernet (POE) compatible.

B. Low-voltage power supplies matched for voltage and current requirements of system accessories, and of type as recommended by manufacturer.

1. Enclosure: NEMA 250, Type 1.

2.9 COPPER PATCH PANEL

A. Features:

1. Universal T568A and T568B wiring cards for 110-style IDC terminations
2. Color-coded front labeling for easy port identification; ANSI/TIA-606-B compliant
3. Terminates 26-22 AWG solid conductors
4. Color: Orange

2.10 SIGNAL TRANSMISSION COMPONENTS

A. Infrastructure Cabling: Category 6.

1. ISO listed, National Electric Code type CMP, plenum rated
2. 4-pair unshielded twisted pair (UTP)
3. Nominal outside diameter: 5.3mm
4. 14 pf/m nominal capacitance
5. Color: Pink
6. Snagless plug hoods

B. Patch Cords: Category 6.

1. ISO listed, National Electric Code type CM
2. 4-pair unshielded twisted pair (UTP)
3. Nominal outside diameter: 5.3mm
4. 14 pf/m nominal capacitance
5. Color: Orange
6. Snagless plug hoods
7. Furnish cables of appropriate length with no excess to be looped in a wire management system.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.
- B. Examine roughing-in for LAN, WAN, and IP network before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 WIRING

- A. Comply with requirements in Section 27 05 28 "Pathways for Communications Systems."
- B. Wiring Method: Install cables in raceways unless otherwise indicated.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- E. For communication wiring, comply with the following:
  1. Section 27 15 13 "Communications Copper Horizontal Cabling."
- F. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

### 3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras level and plumb.
- B. Mount interior cameras on a ceiling surface or on a pendant secured to the structure. Mount exterior cameras on a wall or ceiling surface or on a teardrop mount. Coordinate exact mounting location of each camera with Owner.
- C. Provide cameras with varifocal lenses so that each camera target can be easily adjusted. Label each camera according to location and/or targeting; coordinate labeling with Owner.
- D. Confirm intended target for each camera with Owner. Verify field conditions with Owner to confirm exact location, mounting height, pan, tilt, and zoom for each camera prior to installation.
- E. Install cameras with 84-inch- minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.
- F. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.
- G. Install power supplies and other auxiliary components at control stations unless otherwise indicated.
- H. Avoid ground loops by making ground connections only at the control station.
  - 1. For 12- and 24-V dc cameras, connect the coaxial cable shields only at the monitor end.
- I. Identify system components, wiring, cabling, and terminals according to Section 27 05 53 "Identification for Communications Systems." Provide label for each camera indicating location and/or targeting. Review labeling with Owner prior to installation.
- J. Program cameras using naming conventions provided by Owner.

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
  - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
  - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
    - a. Prepare equipment list described in "Informational Submittals" Article.
    - b. Verify operation of auto-iris lenses.

- c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
    - d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feetaway. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
    - e. Set and name all preset positions; consult Owner's personnel.
    - f. Set sensitivity of motion detection.
    - g. Connect and verify responses to alarms.
    - h. Verify operation of control-station equipment.
  - 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
  - 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- C. Video surveillance system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within twelve months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to four visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:
- 1. Check cable connections.
  - 2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
  - 3. Adjust all preset positions; consult Owner's personnel.
  - 4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
  - 5. Provide a written report of adjustments and recommendations.

### 3.6 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.
- B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

END OF SECTION