SECTION 27 66 00
VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.01 SCOPE
A. Refer to Section 27 00 00 for additional project scope information.

1.02 PRECEDENCE
A. Obtain, read and comply with General Conditions and applicable sub-sections of the contract specifications. Where a discrepancy may exist between any applicable sub-section and directions as contained herein, this section shall govern.

1.03 RELATED WORK
A. Division 14 - General Elevator Requirements
B. Division 26 Section – Pathways for Communications and Electronic Life Safety and Security
C. Division 26 Section – Digital, Addressable Fire Alarm System
D. Section 27 00 00 – Common Work Results for Technology
E. Section 27 11 00 – Communications Equipment Rooms
F. Section 27 13 00 – Communications Backbone Cabling
G. Section 27 15 00 – Communications Horizontal Cabling
H. Section 27 16 00 – Communications Connecting Cords
I. Section 27 18 00 – Communications Labeling and Identification
J. Section 27 60 00 – Common Work Results for Security Systems
K. Section 27 62 00 – Electronic Access Control System

1.04 GENERAL SUMMARY
A. Campus has existing IP-based VMS system. Contractor shall provide cameras that connect to this system. Contractor shall work with Genetec for licensing Genetec Advantage for 1 Omnicast Enterprise Camera license for 5 years.

1. Contractors shall be Genetec Certified Elite.

1.05 SUBMITTALS
A. Product Data: For each type of product indicated, including dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
B. Shop Drawings: Detail assemblies of standard components that are custom assembled for specific application on this Project.
1. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.

2. Wiring Diagrams: Power, signal, and control wiring, and grounding.

C. Equipment List: After completion, Contractor shall provide an equipment list to Owner in an Excel spreadsheet. The list shall include every piece of equipment by name, model number, manufacturer, serial number, location, date of original installation, IP address, as well as usernames and passwords, and switch locations.

D. 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.

E. Operations and Maintenance Data: For cameras, power supplies, monitors, and control-station components to be included in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data" include the following:

1. List of spare parts and replacement components recommended being stored at the site for ready access.

F. Warranty: Special warranty specified in this section.

1.06 DRAWING SHEETS

A. All cameras are designated with a C symbol on the project drawings. PTZ (Pan Tilt Zoom) cameras are designated with PTZ text next to the C symbol. Each camera has a corresponding label of the format "**#-###".

1.07 MOUNTING AND INSTALLATION

A. Contractor shall provide the appropriate mounting hardware for all ceiling types and wall types where cameras shall be located.

B. Wall mounted 180/360 degree or multi-sensor cameras shall be mounted horizontally on a gooseneck, parapet, pendant or other similar method.

C. Exterior cameras shall be mounted on a gooseneck.

D. Cameras mounted in drop-tile shall have a tile support bridge with a steel support cable connected to structure to prevent tile sagging, theft and vandalism.

1.08 CODE AND STANDARD REQUIREMENTS

A. All work and materials shall conform in every detail to the rules and requirements of the National Fire Protection Association and any other codes as required by the AHJ.

1. Electrical components, devices, and accessories shall comply with, and be listed and labeled as defined by, NFPA 70 Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2. Electronic data exchange between video surveillance systems with an access control system shall comply with SIA TVAC.

B. All materials shall be listed by UL and shall bear the UL label. If UL has no published standards for a particular item, then other national independent testing standards shall
apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

C. Cameras shall meet the following standards:

1. MPEG-4:
   a. ISO/IEC 14496-10 AVC (H.264)
2. Networking:
   a. IEEE 802.3af (Power over Ethernet)
3. Network Video:
   a. ONVIF Profile S or better

1.09 PROJECT CONDITIONS

A. Environmental Conditions: System(s) and Equipment shall be capable of withstanding the environment in which they will be operating.

1.10 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

2.01 MANUFACTURERS

A. Manufacturers are subject to compliance with requirements herein. Provide products by one of the manufacturers specified.

2.02 SUBSTITUTIONS

A. Unless noted otherwise, products in this section are intended as a basis of design and are open to substitutions per the product substitution procedures defined in Section 27 00 00.

2.03 CAMERAS AND DEVICES

A. General:

   1. All cameras and devices shall be time synced to the Owner’s NTP server. Coordinate with the Owner to acquire the appropriate NTP address to use.
   2. The Contractor shall select the appropriate mounting hardware for the situation.
   3. All cameras shall be equipped with remote autofocus or auto back-focus with the exception of 180/360 degree cameras and encoded analog cameras.
   4. Multi-sensor 180 and 360 cameras shall have each sensor optimally calibrated independently to the conditions.
5. All cameras shall be vandal proof and appropriate for the environment it is being installed in.

6. All cameras shall have the latest VMS recommended firmware installed and all cameras of the same model shall have matching firmware versions.

7. The contractor shall coordinate with the owner for IP addressing, network configuration and multicast network configuration.

8. All cameras regardless of manufacturer/model shall have a consistent user name and non-standard password set. This shall be documented and provided to the Owner and Architect prior to inspections.

9. The camera requirements below represent general performance criteria. Approved equals will have slight differences in specifications. The Owner and Architect have complete discretion to reject approved equals that stray too far from the minimum requirements.

B. Interior: Fixed Color Dome Camera. Assembled and tested as a manufactured unit containing dome assembly and IP color camera. Enclosure shall be vandal resistant. H.264/JPEG dual stream output for simultaneous live monitoring and high-resolution recording. Day/night sensitivity, super dynamic range, Verifocal lens, camera power via PoE. (Camera specifics require updating/review for each project pending new releases)

   1. Sony Cameras
   2. Axis Cameras
   3. Hanwha Cameras


   1. Sony Cameras
   2. Axis Cameras
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D. Exterior: 360-degree Hemispheric-view Camera. Assembled and tested as a manufactured unit containing an exterior enclosure and IP high-definition color camera. High definition, super dynamic range. Enclosure is IP66 rated with built-in fan/heater/sun shield, powered via PoE+ or 12/24 VAC. Camera is ONVIF compliant. Include all necessary mounting hardware.

   1. Multi-lens 360-degree camera
2.04 POWER OVER ETHERNET (POE) INJECTORS

A. The Contractor shall provide and install PoE injectors at locations where IP enabled devices requiring PoE are installed without PoE enabled network switches or remote devices as noted on the drawings.

B. Rack mount, multi-output
   1. 16 ports, 1ru rack mount.
   2. IEEE 802.3af (15.4 watts PoE) and IEEE 802.3at compliant (25.5 watts PoE+).
   3. Provide a minimum of 30 watts per port up to a maximum of 300 watts per chassis.
   4. RJ-45 LAN or laptop connection to enable programming of PoE shutdown and port monitoring.
   5. Auto detection and protection of legacy non-PoE devices.
   6. Manufacturer:
      a. Altronix Netway 16M
      b. Or approved equal

C. Single output, interior
   1. IEEE 802.3af (15.4 watts PoE) compliant
   2. 100-240 VAC input.
   3. Manufacturer:
      a. Transition Networks MIL-L100i
      b. Or approved equal

D. Single output, industrial interior/exterior
   1. IEEE 802.3af (PoE) and IEEE 802.3at compliant (PoE+)
   2. Operating temperature of -40 - 185 degrees F
   3. Integrated power supply accepts 12-48 VDC or 100-240 VAC depending on model.
   4. Provide with rated input voltage as required for the application.
5. DIN rail mountable
6. Manufacturer:
   a. Siemen RuggedCom RP100
   b. Or approved equal

2.05 ETHERNET WITH POWER OVER ETHERNET (POE) UTP EXTENDER
A. The Contractor shall provide Ethernet with PoE UTP extenders for out-of-distance cameras.
B. Shall support IEEE 802.3af (PoE) and IEEE 802.3at (PoE+) on input and output.
C. Extends cable range an additional 328 feet (100 meters).
D. Can extend up to 800 meters when using multiple units.
E. No configuration required.
F. No power supply required.
G. Maintains full-rate network throughput.
H. Manufacturer:
   1. Veracity OUTREACH Max (Interior Mounted Only)
   2. Vigitron Vi2301 (Interior Mounted Only)
   3. Or approved equal

2.06 ETHERNET WITH POE OVER 75 OHM COAXIAL CABLE
A. The contractor shall provide an Ethernet over coaxial cable converter for each camera mounted within an elevator and other locations as required.
B. Provide full duplex 10/100Base-T.
C. Shall support IEEE 802.3af (PoE) and IEEE 802.3at (PoE+) on input and output.
D. Can support 802.3at at 20 watts at a minimum of 1,000 feet of 20awg RG-59.
E. Provide with optional power supply when PoE switch is not available.
F. Provide with wall mount or rack mount bracket as required.
G. Manufacturer:
   1. Vigitron Vi2401A
      a. Provide with Vigitron Vi0030 coax to 2-wire converters as required when coaxial cable is not available.
   2. Or approved equal

2.07 ETHERNET WITH POWER OVER ETHERNET (POE) UTP SURGE SUPPRESSOR
A. When protector is mounted in interior spaces:
1. Shielded RJ-45 jacks and ground stud
   a. Connect ground stud directly to ground bar (TMGB/TGB) or ground.
   b. Do not use shielded cable on the output.
2. Maximum supported data rate: 1000Mb/s (Gigabit)
3. Supports IEEE 802.3af (PoE)
4. Turn on Voltage: 150V L-L, L-G
5. RoHS compliant
6. UL 497B listed
7. Meets Telecordia GR-1089
8. Manufacturer:
   a. Transtector TSJ GbE PoE (1101-994)
   b. Or approved equal

B. When protector is mounted in the exterior:
1. Shielded RJ-45 jacks and ground stud
   a. Connected ground stud directly to ground.
   b. Do not use shielded cable on the output.
2. Outdoor-rated NEMA 3R cast aluminum enclosure
3. Pole/surface mount. Provide pole mount kit when required.
4. Supports IEEE 802.3af (PoE)
5. Meets Telecordia GR-1089-2006 surge suppression standard
6. Impedance of 85 to 115 Ohms.
7. Manufacturer:
   a. Transtector ALPU POE 60M (1101-933)
   b. Or approved equal

2.08 POWER SUPPLIES

A. Power supplies shall be provided with hard wired electrical connections.

B. The Contractor shall provide power supplies for cameras with heater/blowers, PTZ cameras that require more power than PoE can provide or remote mounted fiber optic media converters and PoE injectors. The contractor shall select an AC or DC power supply as required for the application.

C. AC wall mount indoor power supply
   1. Fuse protected outputs.
2. Contractor shall provide output quantity as required
3. 24 VAC @ 4 amps or 28 VAC @ 3.5 amps.
5. 115 VAC, 0.9 amp power input.
6. Wall-mount enclosure with ground stud.
7. Manufacturer:
   a. 4 output - Altronix ALTV244
   b. 8 output – Altronix ALTV248
   c. 16 output – Altronix ALTV2416
   d. Or approved equal

D. DC wall mount indoor power supply
1. Fuse protected outputs.
2. Contractor shall provide output quantity and power rating as required accounting for voltage drop and total current output.
3. 6VDC – 15VDC field adjustable outputs @ 1 amp each not exceeding 3.5 amps total. The contractor shall meter the far end of the connection to calibrate the power supply and ensure the output voltage meets the powered equipment requirements.
4. Filtered and electronically regulated outputs.
5. 115 VAC, 0.9 amp power input.
6. Wall-mount enclosure with ground stud.
7. Manufacturer:
   a. 4 output - Altronix ALTV615DC44ULM
   b. Or approved equal

E. DC high current wall mount indoor power supply
1. Fuse protected outputs.
2. Contractor shall provide output quantity and power rating as required accounting for voltage drop and total current output.
3. 24VDC output @ 10 amps total.
4. Filtered and electronically regulated outputs.
5. 115 VAC, 4.4 amp power input.
6. Wall-mount enclosure with ground stud.
7. Manufacturer:
   a. 8 output - Altronix AL1024ULACM
b. Or approved equal

F. DC high current exterior power supply

1. Fuse protected outputs.
2. Contractor shall provide output quantity and power rating as required accounting for voltage drop and total current output.
3. 12/24VDC output @ 2 amps total.
4. Filtered and electronically regulated outputs.
5. 115 VAC, 1 amp power input.
6. 12.5" H x 11.5" W x 7.5" D, Non-metallic, lockable NEMA 4X enclosure with adequate space to accommodate fiber optic/copper media converter.
7. Temperature range of -40 to 120 degrees F
8. Provide with pole mount kit when required
9. Manufacturer:
   a. 1 output – Honeywell HPS5ULWP
   b. Or approved equal

G. AC high current exterior power supply

1. Fuse protected outputs.
2. Contractor shall provide output quantity and power rating as required accounting for voltage drop and total current output.
3. 24VAC output @ 4 amps total.
4. Filtered and electronically regulated outputs.
5. 115 VAC, 0.9 amp power input.
6. 12.5" H x 11.5" W x 7.5" D, Non-metallic, lockable NEMA 4X enclosure with adequate space to accommodate fiber optic/copper media converter.
7. Temperature range of -40 to 120 degrees F
8. Provide with pole mount kit when required
9. Manufacturer:
   a. 1 output – Honeywell HP24100ULWP
   b. Or approved equal

2.09 VIDEO SURVEILLANCE SERVER SPECIFICATIONS

(Server specifics require updating/review for each project pending new releases)

A. HP BCD Server

B. 2U

C. 24 TB RAW storage. 14.8 TB usable
D. E5-2620V4
E. RAID 6
F. iLO Port
G. 16 GB, plus 8 GB RAM upgrade
H. Server 2012 R2 (preferable 2016 server)
I. SAS Drives
J. 5-year, 4-hour on-site warranty
K. (4) 120 GB SSD
L. 2 Network Adapters, each with dual port 1 GB Ethernet Card
M. Dual power supply

PART 3 - EXECUTION

3.01 TESTING

A. Prior to energizing or testing the system, ensure the following:
   1. All products are installed in a proper and safe manner per the manufacturer’s instructions.
   2. Dust, debris, solder, splatter, etc., is removed.
   3. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
   4. All products are neat, clean, and unmarred, and parts are securely attached.

B. Contractor shall ensure that each device in the security system is functioning normally and in such a manner as to meet the functional and performance requirements in this specification.

3.02 TRAINING

A. Provide system operations, administration, and maintenance training by factory-trained personnel qualified to instruct.
   1. Contractor shall provide up to 12 hours of scheduled and dedicated training time in three (3) four (4) hour sessions for administration and investigation.
   2. Contractor shall provide up to 2 hours of scheduled and dedicated training time for maintenance including lens and dome cleaning, focusing and positioning.
   3. Provide printed training materials for each trainee, including product manuals, course outline, workbook or student guides, and written examinations for certification.
   4. Provide hands-on training with operational equipment.
   5. Training shall be oriented to the specific system being installed under this contract as designed and specified.
6. Contractor shall provide all necessary documentation of system operating parameters prior to scheduled training sessions.

3.03 INSTALLATION PRACTICES

A. All services provided shall be professional and conform to the highest standards for industry practices. The Owner reserves the right to halt any installation due to poor workmanship. All work shall be defect free, and the installer shall replace, at their expense, any work found to be defective.

B. The Owner reserves the right to halt any installation due to failure of Contractor to observe installation-free periods due to instructional or administrative requirements. To the maximum extent possible, the Owner will provide advance notice of such periods.

C. Contractor is responsible for providing a complete and functional video surveillance system.

D. All manufactured items, materials, and equipment shall be applied, installed, connected, erected, used, and adjusted as recommended by the manufacturers, or as indicated in their published literature, unless specifically noted herein to the contrary.

E. Contractor shall follow these standards and approved submittals for locations of power supplies. The Owner intends to limit the number and location of power supplies to facilitate more effective long-term support and maintenance of the system.

3.04 COORDINATION

A. Contractor shall provide up to 8 hours (up to four, 2-hour sessions) of scheduled and dedicated coordination time to assist Owner with camera positioning and coordination as requested by Owner or Architect.

B. Contractor shall provide up to 12 hours of scheduled and dedicated training time in three (3) four (4) hour sessions for mapping and events to action development.

C. Contractor shall provide up to 2 hours of scheduled and dedicated training time for maintenance including lens and dome cleaning, focusing, and positioning.

3.05 AESTHETICS

A. All cables and equipment terminating at panels frames shall be vertically straight, with no cables crossing each other, from twelve inches inside the ceiling area to the termination block.

B. All cable bundles shall be combed and bundled to accommodate individual termination block rows and panels.

C. For any given telecom room, a horizontal and vertical alignment for all mounting hardware will be maintained to provide a symmetrical and uniform appearance to the distribution frame.

D. All surface-mounted devices shall be firmly secured level and plumb

E. All rack mount equipment shall be securely installed.
3.06 HARDWARE LAYOUT

A. Hardware positioning and layout shall be reviewed and approved by the Owner prior to construction. The review does not exempt Contractor from meeting any of the requirements stated in this document.

3.07 DEVICE CABELING/WIRING INSTALLATION PRACTICES

A. Wiring Method: Install cables in raceways except in accessible indoor ceiling spaces and as otherwise indicated. Conceal raceways and wiring except in unfinished spaces.

B. Wiring within enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer’s limitations on bend radii. Provide and use lacing bars and distribution spools.

C. All external wire and cables shall be supported at least every five feet from the structure or as required to maintain not more than 12” cable sag between supports and without over tensioning the cables. Provide j-hooks as needed where cable tray or raceway is not available.

D. Contractor shall coordinate installation with Division 27 05 00 cabling Contractor to ensure there is at least 2-inches of physical separation between security cabling and voice/data cabling throughout cable path. Voice/data cabling Contractor has first claim to cable tray.

E. All cables, regardless of length, shall be labeled within 18” of both ends with an identifier that is keyed to the door, room, or corridor number as identified.

F. All cables shall have 6-foot service loops neatly coiled in the equipment room. During initial cable rough-in, this Contractor shall have sufficient slack to route anywhere within the equipment room.

G. Cabling shall be adequately supported with Velcro wire wraps and horizontal support cable managers fastened to rack frame. Cables shall be dressed in a neat and orderly fashion. Any cabling or equipment installation that is deemed unacceptable by the Owner or Architect shall be replaced or corrected by the Contractor at no additional cost. Plastic zip ties are not allowed.

H. All cables are to run at right angles to the structure, placed above the ceiling in halls or corridors.

I. Cables shall not run above red iron joist.

J. Contractor shall make every effort to conceal wiring and other apparatus into walls, floors, and ceilings, assuming code and good engineering practice allows and suggests.

K. Ties and straps shall be installed snugly without deforming cable insulation. Ties shall be spaced at uneven intervals not to exceed four feet. No sharp burrs shall remain where excess length of the cable tie has been cut.

L. Contractor shall notify Owner immediately if obstruction or hazard is discovered in a pathway provided by others.

M. Cable shall be stored and handled to assure that it is not stretched, kinked, crushed, or abraded in any way. Bend radiuses shall meet manufacturer specifications and/or recommendations. Cable shall not be installed in ambient temperatures or moisture conditions above or below the manufacturer’s rating.
N. No splices shall be installed in any cable.

3.08 CABLE TERMINATION

A. Termination hardware (blocks and patch panels) positioning and layout shall be reviewed and approved by the Owner prior to construction. The review does not exempt Contractor from meeting any of the requirements stated in this document.

B. 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 specifications. If manufacturer’s torque specifications are not indicated, use those specified in UL 486A and UL 486B.

3.09 INTEGRATION WITH PHYSICAL SECURITY SYSTEMS AND INTERCOM/PA SYSTEM

A. The video surveillance system shall be integrated with the Access Control System.

B. The Contractor shall set up a meeting between the Owner, Architect and manufacturer to determine the exact functionality of the integration before the integration starts.

3.10 FIRE STOPPING

A. Fire stopping of openings between floors, fire-rated walls, and smoke-rated walls, created by others for This Contractor to pass cable through, shall be the responsibility of the This Contractor. Sealing material and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work.

B. Any openings created by or for This Contractor and left unused shall be sealed up by This Contractor.

C. This Contractor shall be responsible for creating a waterproof seal in and around any openings that This Contractor creates from the structure to the outside environment.

3.11 SYSTEM INSPECTION

A. Contractor shall coordinate with project representative for inspection after Contractor has completed testing of entire system.

B. Contractor shall have trained Contractor representative and testing equipment onsite during inspection to assist with spot verification of tests.

C. Contractor shall verify with Project Representative the precise positioning of camera aim and shall make fine adjustments as requested.

3.12 LABELING

A. Contractor shall neatly label all security devices and cabling at both ends. All labels shall be on Project as-built drawings.

3.13 CAMERA INSTALLATION

A. Contractor shall field verify all camera locations and positioning with Owner prior to installation.
3.14 DOCUMENTATION

A. Upon completion of the installation, Contractor shall provide full documentation sets to the Architect for approval as described in section 27 60 00. All documentation shall become the property of the Owner.

B. Documentation shall include the additional specific items detailed in the subsections below:

1. Contractor shall provide hard copy and electronic forms of the final test results.
2. Contractor shall provide a document including the following:
   a. Camera label/identifier
   b. Location of each drop by orientation/permanent landmark in the room
   c. Contractor shall provide accurate as-built Construction Drawings. The drawings are to include cable routes and device locations.

3.15 PRE-CHECKOUT

A. The Contractor shall demonstrate the following to Owner during system demonstration.

1. The cameras are fully installed and functional.
2. Camera adjustments are complete to the Owner’s satisfaction including:
   a. Aim/Zoom
   b. Focus/Back Focus
   c. Masking Zones
   d. Motion Detection Zones
   e. Pre-Set/Tours

3.16 FINAL ACCEPTANCE

A. In addition to closeout requirements in section 27 60 00, This Contractor shall demonstrate the following before final approval.

1. Owner training is complete.
2. Punch list items are complete.
3. As-built documentation is complete and submitted to Owner/Architect.

3.17 ANNUAL SUPPORT AGREEMENT

A. An annual support agreement (after the 1st year full of support/warranty) shall not be part of the bid. The Contractor shall work directly with the Owner at the end of the project to determine the ongoing hardware/software support. The Contractor shall send the Architect a copy of the support agreement for review prior to finalization.
3.18 DEMONSTRATION

A. Engage a factory authorized service representative to train personnel to adjust, operate, and maintain video surveillance systems. Refer to Division 01 Section "Demonstration and Training."

B. In addition to the above hour requirements, the security integrator shall include four (4) additional hours of training to be used during the (1) year warranty period. These additional hours can be used at the Owner’s discretion for any or all of the systems included.

END OF SECTION 27 66 00