

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

SECTION 28 23 00– Video Surveillance System

PART 1: GENERAL

1.01 Summary

A. Section Includes:

1. CCTV
2. Stranded power and control cable.
3. Cable connecting hardware, patch panels, and cross-connects.
4. Cable management system.
5. Cabling identification products.
6. Grounding
7. Pathways

B. Related Specifications:

1. Communications Specification Standards – 27 00 00

C. System Requirements:

1. Install CCTV and related security hardware.
2. Provide cameras, power supplies for cameras, and other CCTV equipment.
3. Provide all required software licenses for primary and redundant recording on Panasonic i-Pro Video Insight recording system.

D. Bidding Requirements:

1. Bidder shall submit complete detailed proposals with line item cost representation for components and associated installation labor. Lump sum bids will not be accepted.
2. Include as part of the bid response the following item:
 - a. Installation schedule with proposed manpower assignments.
 - b. Resumes for project manager and lead engineer for this project.
3. Review associated electrical, low voltage infrastructure drawings to verify that necessary conduit and floor boxes will be provided by others. The Owner will provide no additional infrastructure to support the video surveillance system. Any discrepancies with the identified infrastructure to support these systems should be questioned in the form of a

request for information (RFI) during the bidding process. Be responsible for any additional infrastructure requirements after receipt of contract for this project.

4. Unspecified Equipment and Material: Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide complete and functional video surveillance systems shall be provided in a level of quality consistent with other specified items.

1.02 References

- A. The Codes and Regulations listed below from a part of this specification to the extent referenced. Work shall be performed in accordance with the applicable international, federal, state, and local codes or standards current at the commencement of installation. The following list summarizes applicable standards:
 1. UL 294, UL 1076, ULC
 2. CE
 3. FCC-Part 15, Part 68
 4. NFPA 70, NEC
 5. IEEE, RS 170 variable standard
- B. Where more than one code or regulations is applicable, the more stringent shall apply.
- C. Cable and equipment installation, identification and termination shall be performed in accordance with the applicable codes above.

1.03 System Description

- A. Complete Engineering, installation, and maintenance CCTV (Panasonic i-PRO), system.
- B. Texas State University currently uses the Panasonic i-Pro Video Insight Video Management Software (VMS) (<https://i-pro.com/us/en/surveillance/products/video-management-software/>).
- C. All video surveillance shall be recorded and stored using the current Panasonic i-Pro Video Insight VMS system that is administered by Network Operations.
- D. All video camera system's equipment and accessories shall be fully compatible, integrated, and licensed with the current Panasonic i-Pro Video Insight VMS system.
- E. All additional accessories or supporting hardware shall be fully compatible with and able to integrate with existing campus systems.
- F. Video surveillance systems shall be installed to and in compliance with Federal Law, State Law, and Texas State University policies.
- G. All video surveillance installations shall provide adequate housings and environmental controls to ensure proper operation of camera determined by environmental conditions and building

usage. Provide protection from accidental and intentional damage or tampering. Torx with center pin security fasteners shall be used for devices in public areas.

- H. All video surveillance installations shall be overt using housing and mountings which maintain or minimize disruption to architectural sensibilities or themes of the buildings and campus. No hidden or covert video surveillance systems shall be installed without prior written permission and approval of the Director of University Police Department.
- I. IP addressable digital video cameras are preferred over systems using coaxial cabling for image transmission. Installations relying on coaxial image transmission must be encoded into a digital format for transmission over network data infrastructure. Installations requiring coaxial installations require approval by Network Operations, Project Manager, and facilities owner.
- J. Cameras using optical/mechanical pan, tilt, and zoom systems are preferred to digital pan, tilt, and zoom systems. Digital pan, tilt, zoom systems require the approval of building owner, University Police Department and Network Operations.
- K. Buildings that have exterior entrances and/or interior doors, interior areas, parking lots of external areas equipped with a video surveillance system shall be equipped with signage displayed on doors or entrances announcing the use of video surveillance equipment.
- L. Signs reading, "Video Recording in Use" shall be prominently displayed on all public entrances of buildings equipped with video surveillance systems.
- M. Signs reading, "Video and Sound Recording in Use" shall be prominently displayed in areas where video and audio recordings are being made.
- N. Signs reading, "Video Recording In Use" shall be prominently displayed on the sign designating the color zone of the parking lot equipped with video surveillance systems.
- O. Signs reading "Video Surveillance System In Use" shall be prominently displayed at all vehicle and pedestrian entrances to parking garages.
- P. All equipment and components to support video surveillance system shall be installed to manufacturer's specifications. Installation of components and hardware shall be in place prior to connection to the video surveillance system.
- Q. Where practical the electric power for the video surveillance system equipment and hardware shall be connected through the building emergency power system or provided with appropriate battery backup systems.
- R. Exterior mounted cameras should be appropriately protected from lightning strikes.
- S. The final building video surveillance system shall be approved by the Director of University Police Department.

1.04 Performance Requirements:

- A. Provide, as shown on drawings, quantity of Panasonic i-PRO cameras, encoders, mounts, and controls.

- B. Also, provide and install equipment vertical racks as required to hold encoders and other equipment.
- C. All programming of all systems' hardware is by the security contractor. A one year full parts and labor warranty is specified. Note that the full one year parts and labor warranty is unconditional and covers all portions of this system form failure, except for acts of God or misuse by the owner. During this one-year period, the security contractor must meet the following performance requirements.
 - 1. Respond Onsite Within Two to Four Hours
 - 2. Advanced Loaners
 - 3. Computerized Dispatch
 - 4. Service technicians certified on Panasonic i-PRO systems and products.
 - 5. Available 7 days a week, 24 hours a day.

1.05 Submittals

- A. Comply with requirements of Submittal Procedures by A/E specifications.
- B. Informational Submittal: Submit a detailed bill-of materials listing all part numbers and quantities for this project.
- C. Qualification data:
 - 1. List all technical personnel
 - 2. List of all technical personnel factory-certified Panasonic i-PRO.
 - 3. Resume of key project manager, and lead technician.
 - 4. Three (3) references from universities using complex video surveillance systems (more than 50 cameras) (prefer at least one reference from university or higher education entity).
- D. Pre-Qualification Certificate as part of this proposal: Submit a letter of approval from the manufactures indicating compliance with qualifications' requirements. Training certificates for design, engineering and installation of the proposed products shall be submitted with the proposal.
- E. Service Dispatch: Submit as part of this proposal an outline containing the type of service program used for dispatching and tracking service calls.
- F. Shop Drawings: Required before work can begin. Shop drawings will clearly indicate how work will be performed.
- G. Product Literature Sheets: Provide a manufacturer's product cut sheet for each component of the system including each UPS, power supply, camera, camera mount, camera enclosure, camera pole, PTZ motor or drive, lens or other devices to be utilized.

- H. Detail Drawings. Provide a detail drawing for each type of camera and device installation. This should also include device location on floor plans, wiring diagrams and point-to-point charts, and riser diagram.
- I. Project Directory. Provide a job directory of your company engineering and installation team including phone, fax, email or mail to each manager, engineer, sales rep, or installer involved in this project.
- J. Block Diagrams. Submit block diagrams for CCTV system indicating connections of equipment and indicating equipment types and model numbers.
- K. Programming Sheets – Submit programming sheets in Excel format showing hardware components location, equipment type, model number, serial number, MAC address, and default IP address.
- L. Manuals: Final copies of the manuals shall be delivered within fourteen (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 contractor 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 available from the manufacturing:
 - 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 operations. The manual shall include.
 - a. Definition of terms and functions.
 - b. System use and application software.

- c. Initialization, startup, and shut down.
 - d. Reports generations.
 - e. Details on forms customization and field parameters.
4. Operators Manual: The operators manual shall fully explain all procedures and instructions for the operation of the system including:
- a. Computers and peripherals.
 - b. Systems 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.
6. Manuals shall be delivered on CD/DVD in an organized fashion based on manufacturer and product.
- M. As-Built Drawings: During system installation, maintain a separate hard copy of drawings, elementary diagrams, and wiring diagrams of the CCTV to be used for record drawings. This set shall be accurately kept up to date by the Contractor with all changes and additions to the CCTV system. The final as-built drawings shall be provided to the end user in DXF format.

1.06 Quality Assurance

- A. Installing company must be on a pre-approved list furnished by the owner for installation services for this project.
- B. Providers of manufactured components, installation, wiring and testing shall be the responsibility of a single contractor who is an authorized dealer for the product supplied and who has been continuously in business for a period of not less than five (5) years and is licensed as required by the jurisdictions where the work will occur to perform the work specified.
- C. Service Support: Provide post-sales service support for all components in the system design that meets requirements:

1. Availability: 7 days a week, 24 hours a day.
2. Response Time: Two to four hours on-site.
3. Advance Replacement:
 - a. Contractor shall provide advance replacements for any component whenever it is required.
 - b. The contractor shall be able to provide advance loaners.

1.07 Contractor Performance Requirements

- A. Working Hours Response: During normal working hours, all telephone calls placed to the contractor shall be answered by a live person, not an auto-attendant.
- B. The contractor shall use a computerized service dispatch system that is a commercial off-the-shelf product used for dispatching service companies. At the end of every week, the contractor will be required to email Texas State University a list of all service calls and their status on an automatic basis. Excel spreadsheets are not acceptable for a service dispatch program.
- C. The contractor shall have a dedicated position specifically for managing and dispatching service call for their clients. This position shall perform no other functions except service-related dispatch functions and service.
- D. Engineering: The contractor must have field-trained engineers on staff that are 100% conversant in AutoCAD and are able to provide the necessary electronic drawings and submittals required for a project of this size.
- E. The Contractor must be a certified dealer of all products utilized in the CCTV system.

1.08 Substitutions and Quality:

- A. Where products are specified by name, provide and install that product. Substitutions will not be accepted for the CCTV system or their sub-system.

1.09 Delivery, Storage, and Handling

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and materials.

1.10 Project Conditions

- A. Environmental Limitations: Do not deliver or install cables, equipment, and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.11 Coordination

- A. Coordinate layout and installation of video surveillance system's equipment with Network Operations.

1. Meet jointly with Network Operations to exchange information and agree on details of equipment arrangements and installation interfaces.
 2. Record agreements reached in meetings and distribute them to other participants.
- B. Coordinate layout and installation of the video surveillance systems cable pathways with telecommunications contractor.

1.12 Warranty

- A. During the first year, provide a full service warranty program that guarantees a two to four hour on-site response, include all parts and labor, and provides advance replacements for any defective components. The installation contractor must qualify as the service organization and provide the on-site warranty service. The contractor recognizes that in emergent situations, Texas State University Network Operations personnel may have to respond before the contractor. In the event that Texas State University Network Operations initially responds, the contractor accepts the work performed and agrees that the Warranty is still in full force and effect. The contractor will reimburse Texas State University for all expenses.
- B. The system components shall be guaranteed against all defective materials, design and workmanship for a period of one-year from the date of acceptance by the client after final testing. New replacement parts shall be furnished promptly and defects in design and workmanship shall be corrected, without cost to the Owner, promptly upon receipt of notice from the Owner of failure of any part of the system during the guarantee period. This is a one year full parts and labor warranty and no alternative will be acceptable.
- C. Any item failing before the one year guarantee period expires shall be replaced and the guarantee extended for that item for twelve months from the replacement date of the item.
- D. The warranty period for any part which has a warranty by the manufacturer of longer than 12 months shall be for the longer period. Provide a copy of the manufacturer's warranty period statement for all major CCTV components.

PART 2: PRODUCTS

2.01 Wiring and Cabling

- A. Data transmission cable.
1. All video surveillance system data wiring, cables, jumpers, and connectors will comply with requirements of Division 27 Construction Standards.
- B. Low Voltage Electrical Wiring.
1. All video surveillance low voltage electrical wiring, cables, and connectors will comply with the requirements of Division 27 Construction Standards.
 - a. CAT 6E.
 - b. 18awg/2 conductor

2. All video surveillance system low voltage electrical wire shall be rated and adequate to supply the intended cameras full functionality including but not limited to camera operations, audio equipment, mechanical movement, and environmental housing without exceeding seventy-five percent (75%) of the wire's rated capacity.

2.02 Electrical Power Needs

- A. Video surveillance power supplies should be located in Telecommunication/IDF closets.
- B. Preferably, video surveillance system power cables shall not be installed to be within the public view. However, if power cables cannot be properly concealed and must be in the public view, they shall be placed in conduit to prevent damage or tampering.
- C. Video surveillance power supplies shall be connected to the building's emergency power system to insure service in the event of a power failure.
- D. Power Over Ethernet (POE) or centralized power supply distribution to video cameras shall be utilized for all applicable camera locations.

2.03 Mounting Equipment

- A. All video surveillance camera housings and mounts must provide protection against accidental and intentional damage or tapering. Torx center pin security fasteners shall be used on devices in public areas.
- B. All video surveillance camera housings and mounts shall have adequate housings and environmental controls to ensure proper operation of camera as determined by environmental conditions and building usage.
- C. All video surveillance installations shall be overt using housing and mountings which maintain or minimize disruption to architectural sensibilities and themes of the building and campus.

2.04 Data Transmission Resources Needs

- A. Contractors shall work closely with the Texas State University-San Marcos Office of Technology Resources via the Office of Facilities Planning Design and Construction to ensure adequate computer network resources are available for intended additions to the Texas State University video surveillance systems.
- B. Data cable runs shall be limited to no more than 290 ft. from the camera device and switch. During design and installation close attention should be paid to the distance of cabling runs for video surveillance.
- C. Camera installations requiring cable runs longer than 290 ft may use the following methods to transmit data to the telecommunications/IDF closet with prior approval by Network Operations.
 1. Single or Multi-mode fiber with required conversion devices. (See Division 27 Construction Standards).
- D. All data transmissions between cameras and recording servers or devices shall be encrypted or made on secure network pathways to ensure data cannot be intercepted or manipulated.

2.05 Camera Requirements & Products

- A. All cameras shall provide a minimum 2MP resolution, dynamic range, and field of view to provide clear and crisp images to the Owners satisfaction.
- B. Networkable IP passed cameras are preferred. Analog cameras must interface with and be fully compatible and functional with Panasonic i-PRO system currently in use. Analog camera video signals will be encoded using a Panasonic i-PRO digital encoder. (Requires approval by Network Operations)
- C. Corner mount Exterior Multi-Lens camera shall be Panasonic i-PRO 4K resolution per camera with corner mount and camera arm.
- D. Interior fixed ceiling tile mount with bracket shall be Panasonic i-PRO 2 MP or higher resolution with matching recessed mounting kit.
- E. Interior elevator camera shall be Panasonic i-PRO 2 MP or higher resolution with a NVT Phybridge Ethernet over twisted pair converter.

2.06 Attic / Repair Stock

- A. Provide equal to 5% of each type of camera installed (1 minimum each camera type not to exceed 3 per project).

PART 3: EXECUTION

3.01 Examination

- A. The contractor shall examine areas and conditions under which the equipment is to be installed and shall notify the general contractor in writing of conditions detrimental to proper and timely completion of work.

3.02 Video Surveillance Administration

- A. Administration of the video surveillance infrastructure includes documentation of devices, cables, termination hardware, patching and cross-connection facilities, conduits, or other cable pathways, and telecommunications closet.
- B. In order to create a consistent environment, Texas State University maintains a campus wide numbering scheme for video surveillance devices. (Building name abbreviations published in the Texas State University Master List of Buildings <https://www.fss.txstate.edu/planning/spmgt/addresses.html> Parking Lot numbers published in Parking Services Parking Regulations and Map <https://www.parking.txstate.edu/map.html>.)
- C. All video surveillance cameras, devices, and cables shall be clearly marked using permanent means. Video cameras shall use the following system of numbering:
 - 1. Exterior Cameras Mounted Viewing Building Entrance: Abbreviated building name + EXT + number of door+ abbreviated compass direction of door relative to the center of the

- building. Example: JCK EXT 27 NW (if more than one camera at entrance for the same purpose includes decimal designator to number of door).
2. Exterior Camera Mounted to Building Viewing Parking Lot: Abbreviated building name + LOT + number of parking lot + abbreviated compass direction of door relative to the center of the parking lot. Example: JCK LOT R10 S.
 3. Exterior Camera Mounted to Parking Garage Viewing Garage: Abbreviated building name + EXT + GAR + floor + abbreviated compass direction of door relative to the center of the garage. Example: SPCK EXT GAR 1st N.
 4. Exterior Camera Mounted to Building Viewing Area Around Building: Abbreviated building name + EXT + abbreviated name of area covered + abbreviated compass direction of area viewed relative to the center of area viewed. Example JCK EXT 27 NW (if more than one camera at entrance for the same purpose includes decimal designator to name of area covered).
 5. Exterior Camera Mounted to Light Pole Viewing Parking Lot: Abbreviated name of area viewed + EXT + abbreviated building name of nearest building + abbreviated compass direction of area viewed relative to the center of area viewed. Example: Ponds EXT JCK E.
 6. Exterior Camera Mounted to Light Pole Viewing Parking Lot: LOT + number of parking lot + abbreviated compass direction of area viewed relative to the center of the parking lot. Example: Lot R5 SW.
 7. Interior Camera Mounted Viewing Building Entrance: Abbreviated building name + INT + floor + number of door + abbreviated compass direction of door relative to the center of the building. Example: JCK INT 1st 27 NW (if more than one camera at entrance for the same purpose included decimal designator).
 8. Interior Camera Mounted Viewing Interior Room: Abbreviated building name + INT + number of room. Example JCK INT 202 (if more than one camera at entrance for the same purpose includes a decimal designation at end of sequence. Example: JCK INT 202.1).
 9. Interior Camera Mounted Viewing Interior Area: Abbreviated building name + INT + Floor + abbreviated name of area viewed. Example JCK INT 1st Lobby (if more than one camera used for the same area include a decimal designator. Example: JC INT 10th Hallway.1.)
 10. Interior Camera Mounted Viewing Building Elevator Cab: Abbreviated building name + INT + Elev + Elevator number. Example: JCK INT Elev 1 (if more than one camera used for the same area includes a decimal designator).
 11. Interior Camera Mounted Viewing Garage Elevator Cab: Abbreviated building name + INT + GAR + Elev + Elevator number. Example: JCK INT Elev 1 (if more than one camera used for the same area includes a decimal designator).
 12. Special Use Cameras: Abbreviated building name + Number of room + abbreviation of department name + decimal designation. Example: JCK 202 Chem-1).

13. Video Encoders: END + abbreviated building name + number of room installed + decimal designator. Example: End JCK 202.1
14. Power Supply: PWR + Abbreviated installed location/building + number of room installed – number. Example: PWR JCK INT 202-1.

3.03 Records

- A. A record is a collection of information about or related to a specific element of the video surveillance system. Records must be maintained in a computer spreadsheet, or in a computer database. Submit proposed record format to Network Operations for approval. Paper records are encouraged but are optional. A device and cable record is prepared for each camera/device/door installation. The record will show the camera/device/door name and must describe the components from origin point and destination point. The device and cable record will record what services and/or connections are assigned to each installed location based on Camera number. An equipment record is prepared for services distributed from a certain piece of equipment, such as an encoder, controller, or a system.

3.04 Drawings

- B. Drawings are used to illustrate different stages of video surveillance system installation planning, installation, and administration.
- C. Installation or Construction Drawings
 1. Installation or construction drawings are the plans that show the installer how the infrastructure and devices are to be installed. The quality of the installation can be directly impacted by the level of detail in the installation drawings and written specifications. Installation drawings for Texas State projects shall, at a minimum, device installation, show pathway locations and routing, configuration of telecommunications spaces including backboard and equipment rack configurations, and wiring details including identifier assignments.
- D. As-built Drawings
 1. The as-built drawings graphically document the installed video surveillance devices and infrastructure through floor plan, elevation, and details drawings. In many cases, these drawings will differ from the installation drawings because of changes made during construction and specific site conditions. In the as-built drawings, the identifiers for major infrastructure components must be recorded. The pathways, spaces, and wiring portions of the infrastructure each may have separate drawings if warranted by the complexity of the installation, or the scale of the drawings. As-built drawings are a vital component of the administration system, and must be kept current as adds, moves, and changes take place. Texas State University requires the installer to provide a complete and accurate set of as-built drawings.

3.05 Labeling and Color Coding

- A. It is important that both labeling and color coding be applied to all video infrastructure components. Labeling with the unique identifier will identify a particular component. Proper color coding will quickly identify how that component is used in the overall systems infrastructure of the facility.
- B. Labeling
1. Labels are generally of either the adhesive or insert type. All labels must be legible, resistant to defacement, and maintain adhesion to the application surface.
 2. Outside plant labels shall be totally waterproof, even when submerged.
 3. All labels shall be machine printed.
 4. Labels applied directly to a cable shall have a clear vinyl wrapping applied over the label and around the cable to permanently affix the label.
 5. Other types of labels, such as tie-on labels, may be used. However, the label must be appropriate for the environment in which it is used and must be used in the manner intended by the manufacture.
- C. Color Coding – Cable Termination Fields
1. Color coding shall be applied to all cable termination fields in Telecommunications Closets, Equipment Rooms, and Entrance Facilities. Color coding may also be used to identify specific cables in a pathway, or the function of specific equipment racks or equipment. The same color is always applied to both ends of any given cable. Cross-connections are generally made between termination fields of different colors. The color may be applied to the plywood backboard behind the termination block, may be the color of a plastic cover on a termination block, or may be the actual color of the insert label on a termination block or patch panel. See Communications 27 00 00 Construction Standards of the Texas State University.
- D. The following color code shall be used in all Texas State facilities relative to the video surveillance system:
1. Neon-Green – Video Surveillance

END OF SECTION 28 23 00