

(September 2021)

PERFORMANCE CRITERIA
FOR

SECTION 28 21 00

SURVEILLANCE CAMERAS
09/21

TABLE OF CONTENTS

GENERAL

1.1 REFERENCE

2.1 DESCRIPTION & MATERIALS

3.1 SUBMITTALS

3.2 QUALITY ASSURANCE

3.3 STANDARDS DEVIATIONS

3.4 DELIVERY, STORAGE AND PROTECTION

3.5 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

3.6 WARRANTY

3.7 OPERATIONS AND MAINTENANCE (O & M)

GENERAL

This Performance Criteria (PC) specifies the installation and quality of voice communication terminal equipment.

1.1 REFERENCES

1.1.1 Unified Facilities Criteria (UFC)

Contractor must comply with the following:

- A. UFC 1-200-01 General Building Requirements
- B. UFC 3-501-01 Electrical Engineering
- C. UFC 3-580-01 Telecom Building Cabling Systems Planning and Design
- D. UFC 4-010-06 Cybersecurity
- E. UFC 4-510-01 Military Medical Facilities

1.1.2 Military Standard

- A. MIL-STD 1691 Construction and Material Schedule for Medical, Dental, Veterinary and Medical Research Laboratories

1.1.3 National Fire Protection Association (NFPA)

- A. NFPA 99 Healthcare Facilities Code
- B. NFPA 101 Life Safety Code

1.1.4 Military Health System Standards

- A. Defense Health Agency Standards
 - 1. Building Control Systems Categorization Memorandum
 - 2. Cyber Security Controls for Physically Isolated Systems
 - 3. Cyber Security Controls for Medical Community of Interest (MEDCOI)
- B. Department of Defense Standards
 - 1. Department of Defense Instruction (DoDI) Number 8500.01
 - 2. Department of Defense Instruction (DoDI) Number 8510.01
 - 3. Department of Defense Instruction (DoDI) Number 8530.01

1.1.5 Federal Communications Commission (FCC)

- A. FCC Approved RF Communicating Device

1.1.6 Other Standards

- A. Reserved for future

2.1 SYSTEM REQUIREMENTS

- A. System and materials used must be UL listed and labeled; must be suitable for the environment in which they are installed.
- B. Provide cabling and other balance of system components in accordance with the manufacturer's recommendations and UFGS 27 10 00 – Building Telecommunications Cabling System.
- C. All products that have interoperability capable hardware (i.e. internal storage, data transmission via wireless, ethernet, of USB to PC or server connectivity) must meet DoDI and/or Cybersecurity requirements.
- D. System must be non-proprietary.

2.1.2 Video-signal format must comply with NTSC standard, composite interlaced video. Composite video-signal termination must be 75 ohms.

2.1.3 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.

- A. Minimum Protection for Power Connections 120 V and Greater.
- B. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements as recommended by manufacturer for type of line being protected.

2.1.4 Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components must initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display must identify tamper alarms and indicate locations.

2.2 PERFORMANCE REQUIREMENTS

- A. **Seismic Performance: Video surveillance system must withstand the effects of earthquake motions determined according to [ASCE/SEI 7].**
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified [**and the unit will be fully operational after the seismic event**]."
- B. **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.**
- C. **Comply with NECA 1.**
- D. **Comply with NFPA 70.**
- E. **Electronic data exchange between video surveillance system with an access-control system must comply with SIA TVAC.**

2.3 STANDARD CAMERAS

- A. B/W Camera:
 - 1. Comply with UL 639.
 - 2. Pickup Device: CCD interline transfer, 252,000 [512(H) by 492(V)] pixels.
 - 3. Horizontal Resolution: 380 lines.
 - 4. Signal-to-Noise Ratio: Not less than 46 dB.
 - 5. With AGC, manually selectable on or off.

6. Sensitivity: Camera must provide usable images in low-light conditions, delivering an image at a scene illumination of <Insert light level> lux at f/1.4[, **with camera AGC off**].
7. Sensitivity: Camera must deliver 1-V peak-to-peak video signal at the minimum specified light level. Illumination for the test must be with lamps rated at approximately 2200-K color temperature, and with camera AGC off.
8. Manually selectable modes for backlight compensation or normal lighting.
9. Scanning Synchronization: Determined by external synch over the coaxial cable. Camera must revert to internally generated synchronization on loss of external synch signal.
10. Motion Detector: Built-in digital.

B. Color Camera:

1. Comply with UL 639.
2. Pickup Device: CCD interline transfer, 380,000 [771(H) by 492(V)] pixels.
3. Horizontal Resolution: 480 lines.
4. Signal-to-Noise Ratio: Not less than 50 dB, with camera AGC off.
5. With AGC, manually selectable on or off.
6. Sensitivity: Camera must provide usable images in low-light conditions, delivering an image at a scene illumination of <Insert light level> lux at <Insert f-stop of lens>[, **with camera AGC off**].
7. Sensitivity: Camera must deliver 1-V peak-to-peak video signal at the minimum specified light level. Illumination for the test must be with lamps rated at approximately 2200-K color temperature, and with camera AGC off.
8. Manually selectable modes for backlight compensation or normal lighting.
9. Scanning Synchronization: Determined by external synch over the coaxial cable. Camera must revert to internally generated synchronization on loss of external synch signal.
10. White Balance: Auto-tracing white balance, with manually settable fixed balance option.
11. Motion Detector: Built-in digital.

C. Automatic Color Dome Camera: Assembled and tested as a manufactured unit, containing dome assembly, color camera, motorized pan and tilt, zoom lens, and receiver/driver.

1. Comply with UL 639.
2. Pickup Device: CCD interline transfer, 380,000 [768(H) by 494(V)] pixels.
3. Horizontal Resolution: 480 lines.
4. Signal-to-Noise Ratio: Not less than 50 dB, with camera AGC off.
5. With AGC, manually selectable on or off.
6. Sensitivity: Camera must provide usable images in low-light conditions, delivering an image at a scene illumination of <Insert light level> lux at <Insert f-stop of lens>[, **with camera AGC off**].
7. Sensitivity: Camera must deliver 1-V peak-to-peak video signal at the minimum specified light level. Illumination for the test must be with lamps rated at approximately 2200-K color temperature, and with camera AGC off.
8. Manually selectable modes for backlight compensation or normal lighting.
9. Pan and Tilt: Direct-drive motor, 360-degree rotation angle, and 180-degree tilt angle. Pan-and-tilt speed must be controlled by operator. Movement from preset positions must be not less than 300 degrees per second.
10. Preset Positioning: Eight user-definable scenes, each allowing 16-character titles. Controls must include the following:
 - a. In "sequence mode," camera must continuously sequence through preset positions, with dwell time and sequencing under operator control.
 - b. Motion detection must be available at each camera position.
 - c. Up to four preset positions may be selected to be activated by an alarm. Each of the alarm positions may be programmed to output a response signal.
11. Scanning Synchronization: Determined by external synch over the coaxial cable. Camera must revert to internally generated synchronization on loss of external synch signal.
12. White Balance: Auto-tracing white balance, with manually settable fixed balance option.
13. Motion Detector: Built-in digital.
14. Dome must support multiplexed control communications using coaxial cable recommended by manufacturer.

2.4 SUBMERSIBLE CAMERAS

A. Camera: Color, designed for underwater monitoring and for inspecting pipes and storm drains. Attributes as follows:

1. Infrared LEDs to provide illumination in zero-light conditions.
2. 60-foot (18.3-m) factory-installed cable with BNC connector for video and a 2.1-mm jack for 12-V dc power supply.
3. An adjustable swivel mount and attachment base.
4. Pickup Device: CCD interline transfer, 290,000 [500(H) by 580(V)] pixels.
5. Horizontal Resolution: 380 lines.
6. Signal-to-Noise Ratio: Not less than 50 dB.
7. With AGC, from 4 to 39 dB.
8. Sensitivity: Camera must provide usable images in low-light conditions, delivering an image at a scene illumination of 0.1 lux at f/2.0.
9. Scanning Synchronization: Internal.
10. White Balance: Auto-tracing white balance, for colors ranging from 2800 to 8200 deg K.

2.5 REINFORCED DOME CAMERAS

A. Camera: Designed for high-abuse locations, with a weathertight [semi recessed] [surface] mounting, impact-resistance polycarbonate dome, and heavy-gage, 6061 T6 aluminum body.

1. Suitable for exterior environment, rated for continuous operation in ambient temperatures of minus 40 to plus 122 deg F (minus 40 to plus 50 deg C) dry bulb and up to 85 percent relative humidity.
2. Pickup Device: CCD interline transfer, 290,000 [510(H) by 492(V)] pixels.
3. Horizontal Resolution: 350 lines.
4. Signal-to-Noise Ratio: Not less than 46 dB.
5. With AGC and automatic backlight compensation.
6. Sensitivity: Camera must provide usable images in low-light conditions, delivering an image at a scene illumination of 6 lux at f/2.0.
7. Scanning Synchronization: Determined by external synch over the coaxial cable. Camera must revert to internally generated synchronization on loss of external synch signal.
8. White Balance: Auto-tracing white balance.

2.6 LENSES

A. Description: Optical-quality coated lens, designed specifically for video-surveillance applications and matched to specified camera. Provide color-corrected lenses with color cameras.

1. Auto-Iris Lens: Electrically controlled iris with circuit set to maintain a constant video level in varying lighting conditions.
2. Fixed Lens: With calibrated focus ring.
3. Zoom Lens: Motorized, remote-controlled unit, rated as "quiet operating." Features include the following:
 - a. Electrical Leads: Filtered to minimize video signal interference.
 - b. Motor Speed: Variable.
 - c. Lens must be available with preset positioning capability to recall the position of specific scenes.

2.7 POWER SUPPLIES

- A. **Low-voltage power supplies matched for voltage and current requirements of cameras and accessories, and of type as recommended by manufacturer of camera [, infrared illuminator,] and lens.**

1. Enclosure: NEMA 250, [Type 1] [Type 3] [Type 4X].

2.8 INFRARED ILLUMINATORS

- A. **Description: Lighting fixtures that emit light only in the infrared spectrum, suitable for use with cameras indicated, for nighttime surveillance, without emitting visible light.**

1. Field-Selectable Beam Patterns: Narrow, medium, and wide.
2. Rated Lamp Life: More than 8000 hours.
3. Power Supply: [12-V ac/dc] [120-V ac].

- B. **Area Coverage: Illumination to 150 feet (50 m) in a narrow beam pattern.**

- C. **Exterior housings must be suitable for same environmental conditions as the associated camera.**

2.9 CAMERA SUPPORTING EQUIPMENT

- A. **Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.**

- B. **Pan Units: Motorized automatic-scanning units arranged to provide remote-controlled manual and automatic camera panning action and equipped with matching mounting brackets.**

1. Scanning Operation: Silent, smooth, and positive.
2. Stops: Adjustable without disassembly, to limit the scanning arc.

- C. **Pan-and-Tilt Units: Motorized units arranged to provide remote-controlled aiming of cameras with smooth and silent operation and equipped with matching mounting brackets.**

1. Panning Rotation: 0 to 355 degrees, with adjustable stops.
2. Tilt Movement: 90 degrees, plus or minus 5 degrees, with adjustable stops.
3. Speed: 12 degrees per second in both horizontal and vertical planes.
4. Wiring: Factory prewired for camera and zoom lens functions and pan-and-tilt power and control.
5. Built-in encoders or potentiometers for position feedback [, and thermostat-controlled heater].
6. Pan-and-tilt unit must be available with preset positioning capability to recall the position of a specific scene.

- D. **Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.**

- E. **Protective Housings for Fixed and Movable Cameras: Steel [or 6061 T6 aluminum] enclosures with internal camera mounting and connecting provisions that are matched to camera/lens combination and mounting and installing arrangement of camera to be housed.**

1. Tamper switch on access cover sounds an alarm signal when unit is opened or partially disassembled. Central-control unit must identify tamper alarms and indicate location in alarm display. Tamper switches and central-control unit are specified in Section 283100 "Intrusion Detection."
2. Camera Viewing Window: [Polycarbonate] [Lexan] window, aligned with camera lens.

3. Duplex Receptacle: Internally mounted.
4. Alignment Provisions: Camera mounting must provide for field aiming of camera and permit removal and reinstallation of camera lens without disturbing camera alignment.
5. Built-in, thermostat-activated [**heater**] [**and**] [**blower**] units. Units must be automatically controlled so the environmental limits of the camera equipment are not exceeded.
6. Sun shield must not interfere with normal airflow around the housing.
7. Mounting bracket and hardware for wall or ceiling mounting of the housing. Bracket must be of same material as the housing; mounting hardware must be stainless steel.
8. Finish: Housing and mounting bracket must be factory finished using manufacturer's standard finishing process suitable for the environment.
9. Enclosure Rating: <Insert NEMA Type designation>.

2.10 MONITORS

A. Monochrome:

1. Metal cabinet units designed for continuous operation.
2. Screen Size (Diagonal Dimension): <Insert dimension>.
3. Horizontal Resolution: [**600**] <Insert resolution> lines, minimum, at center.
4. Minimum Front Panel Devices and Controls: Power switch; power-on indicator; and brightness, horizontal-hold, vertical-hold, and contrast controls.
5. Mounting: Adjustable tilting and training.
6. Mounting: [**Single, 14-inch (356-mm)**] [**Dual, 9-inch (229-mm)**], vertical, EIA 19-inch (483-mm) electronic equipment rack or cabinet complying with CEA 310-E.
7. Electrical: 120-V ac, 60 Hz.

B. Color:

1. Metal cabinet units designed for continuous operation.
2. Screen Size (Diagonal Dimension): <Insert dimension>.
3. Horizontal Resolution: [**300**] <Insert resolution> lines.
4. Minimum Front Panel Devices and Controls: Power switch; power-on indicator; and brightness, contrast, color, and tint controls.
5. Degaussing: Automatic.
6. Mounting: [**Single, 14-inch (356-mm)**] [**Dual, 9-inch (229-mm)**], vertical, EIA 19-inch (483-mm) electronic equipment rack or cabinet complying with CEA 310-E.
7. Electrical: 120-V ac, 60 Hz.

2.11 VIDEOTAPE RECORDERS

A. Description: Industrial, time-lapse type recorder, designed for continuous operation. Tape format is 1/2 inch (13 mm) using industrial-grade, T-120 cassettes.

1. Horizontal Resolution: 400 lines, minimum.
2. Recording Heads: Rotary-scan type.
3. Integral Timer: Permits programming of recording operation for adjustable daily and weekly periods.
4. Time-Lapse Operating Modes: Multiple, covering 24 to 240 hours, minimum.
5. Other Operating Modes:
 - a. Manual play and recording at two- and six-hour speeds.
 - b. Forward and reverse high-speed search.
 - c. Reverse, slow, and single-frame play.

6. Alarm Recording: Operating mode is automatically switched from time-lapse to two- or six-hour recording mode when an externally generated alarm signal is received.
7. Audio Recording: 70 to 7000 Hz. Phono and microphone input; phono output.
8. Time and Date Generator: Records time and date legend in corner of recorded scenes.
9. Tape Counter: Displays tape position.
10. Manual Recording Lock: Key or keypad operated. Prevents unauthorized tampering or control changes during preset operation.
11. Signal-to-Noise Ratio: 45 dB for video output in standard play mode.
12. Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E, or freestanding desktop.

2.12 DIGITAL VIDEO RECORDERS

A. Description: Digital, time-lapse type, full-frame and motion recorder, with removable hard drive.

1. Recording Time: 400 hours minimum.
2. Resolution: 720 by 480 lines, minimum.
3. Programming must be from trackball and push buttons on face of the recorder, settings must be displayed on any video monitor connected to the recorder. Programming must include the following:
 - a. Motion analysis graph.
 - b. Password protection.
 - c. Alarm and timer controls.
 - d. Continuous recording option.
 - e. Time-lapse operating modes.
 - f. Search video by time, event, or motion.
4. Programming: Smart Media card for software updating, image archiving, and image transfer to a PC.
5. Storage: [80-GB] <Insert size>, removable hard drive. Software must permit hot-swapping drives.
6. Compression: [MPEG-2] <Insert type>.
7. Time and Date Generator: Records time (hr.: min: sec) and date legend of each frame.
8. Audio Recording: 70 to 7000 Hz. Phono and microphone input; phono output.
9. Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E, or freestanding desktop.

2.13 NETWORK VIDEO RECORDERS

A. External storage or internal 250-1, 500-GB hard disk drive.

1. Video and audio recording over TCP/IP network.
2. Video recording of MPEG-2 and MPEG-4 streams.
3. Video recording up to 48 Mbps for internal storage and up to 100 Mbps for external storage.
4. Duplex Operation: Simultaneous recording and playback.
5. Continuous and alarm-based recording.
6. Full-Featured Search Capabilities: Search based on camera, time, or date.
7. Automatic data replenishment to ensure recording even if network is down.
8. Digital certification by watermarking.
9. Internal RAID storage or non-RAID storage of up to 1500 GB.
10. Capable of adding external RAID storage up to 7000 GB for models with no internal storage.
11. Full integration with LAN, Intranet, or Internet through standard Web browser or video management software.
12. Integrated Web server FTP server functionality.
13. Supports up to 16[, 32,] or [64] <Insert number> devices.

2.14 DIGITAL SWITCHERS

- A. Quad Switch: For displaying images from four cameras on a single monitor. Provide color switcher if one or more cameras or monitors are in color.**
1. Controls: Unit-mounted front panel.
 2. Resolution: [720 by 480] lines <Insert resolution>.
 3. Modes: Auto, manual, and alarm. In manual mode, each channel can also be viewed in single display mode. In the event of an alarm, alarming channel must automatically switch to full screen. If several alarms are activated, channels in alarm must be in auto-switching mode.
 4. Channel Loss Alarm: Audible buzzer; occurrence details must be recorded.
 5. Time: Indicate date and time.
 6. Timing of Auto-Switcher: 1 to 30 seconds, selectable.
 7. Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E, or freestanding desktop.
- B. Manual Switch Bank: Low-loss, high-isolation, multiple-video switch to allow manual switching of multiple quad switches and cameras to a single output. Switches must be illuminated.**
- C. Sequential Switchers: Automatically sequence outputs of multiple cameras to single monitor and videotape recorder.**
1. Switching Time Interval: Continuously adjustable, 5 to 20 seconds minimum, with manual override.
 2. Skip-Sequential-Hold Switch: One for each camera, with LED to indicate active camera.
 3. Camera Identification Legend: Either on-screen message or label at skip-sequential switch.
 4. Alarm Switching: In the event of an alarm, alarming channel must automatically switch the monitor to full screen.
 5. Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E.
- D. PTZ Controls: Arranged for multiple-camera control, with switches to select camera to be controlled.**
1. Pan-and-Tilt Control: Joystick type.
 2. Zoom Control: Momentary-contact, "in-out" push button.
 3. Automatic-Scan Control: A push button for each camera with pan capability that places camera in automatic-scanning mode.

2.15 IP VIDEO SYSTEMS

A. Description:

1. System must provide high-quality delivery and processing of IP-based video, audio, and control data using standard Ethernet-based networks.
2. System must have seamless integration of all video surveillance and control functions.
3. Graphical user interface software must manage all IP-based video matrix switching and camera control functions, two-way audio communication, alarm monitoring and control, and recording and archive/retrieval management. IP system must also be capable of integrating into larger system environments.
4. System design must include all necessary compression software for high-performance, dual-stream, MPEG-2/MPEG-4 video. Unit must provide connections for all video cameras, camera PTZ control data, bidirectional audio, discreet sensor inputs, and control system outputs.
5. All camera signals must be compressed, encoded, and delivered onto the network for processing and control by the IP video-management software.
6. Camera system units must be ruggedly built and designed for extreme adverse environments, complying with NEMA Type environmental standards.

7. Encoder/decoder combinations must place video, audio, and data network stream that can be managed from multiple workstations on the user's LAN or WAN.
8. All system interconnect cables, workstation PCs, PTZ joysticks, and network intermediate devices must be provided for full performance of specified system.

2.16 VIDEO MOTION SENSORS (INTERIOR)

- A. Device Performance: Detect changes in video signal within a user-defined protected zone. Video inputs must be composite video as defined in SMPTE 170M. Provide an alarm output for each video input.**
1. Detect movement within protected zone of intruders wearing clothing with a reflectivity that differs from that of background scene by a factor of two. Reject all other changes in video signal.
 2. Modular design that allows for expansion or modification of number of inputs.
 3. Controls:
 - a. Size of detection zones.
 - b. Sensitivity of detection of each protected zone.
 4. Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E.

2.17 CONTROL STATIONS

- A. Description: Heavy-duty, freestanding, modular, metal furniture units arranged to house electronic equipment. Coordinate component arrangement and wiring with components and wiring of other systems.**
- B. Equipment Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E.**
- C. Normal System Power Supply: 120 V, 60 Hz, through a locked disconnect device and an isolation transformer in central-station control unit. Central-station control unit must supply power to all components connected to it unless otherwise indicated.**
- D. Power Continuity for Control Station: Batteries in power supplies of central-station control units and individual system components must maintain continuous system operation during outages of both normal and backup ac system supply.**
1. Batteries: Rechargeable, valve-regulated, recombinant, sealed, lead-acid type with nominal 10-year life expectancy. Capacity adequate to operate portions of system served including audible trouble signal devices for up to four hours and audible and visual alarm devices under alarm conditions for an additional 10 minutes.
 2. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Charger must recharge fully discharged battery within 24 hours.
- E. Annunciation: Indicate change in system condition and switching of system or component to backup power.**

2.18 SIGNAL TRANSMISSION COMPONENTS

- A. Cable: Coaxial cable elements have 75-ohm nominal impedance.**
- B. Video Surveillance Coaxial Cable Connectors: BNC type, 75 ohms.**

2.19 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.

2.20 WIRING

- A. **Wiring Method: Install cables in raceways unless otherwise indicated.**
 - 1. Except raceways are not required in accessible indoor ceiling spaces and attics.
 - 2. Except raceways are not required in hollow gypsum board partitions.
 - 3. 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 bending radii. Provide and use lacing bars and distribution spools.**
- C. **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.**
- D. **Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.**

2.21 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras and infrared illuminators level and plumb.
- B. Install cameras with 84-inch- (2134-mm-) minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.
- C. 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.
- D. Install power supplies and other auxiliary components at control stations unless otherwise indicated.
- E. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system-component enclosures and mounted in self-protected, inconspicuous positions.
- F. 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.

2.22 FIELD QUALITY CONTROL

- A. **Testing Agency: [Owner will engage] [Engage] a qualified testing agency to perform tests and inspections.**

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. 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.

D. 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 feet (17 to 23 m) away. 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 criterion. Include all modes of system operation. Test equipment for proper operation in all functional modes.

E. Video surveillance system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

2.23 ADJUSTING

A. Occupancy Adjustments: When requested within [12] <Insert number> months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to [two] <Insert number> visits to Project during other-than-normal occupancy hours for this purpose. Tasks must 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.

2.24 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.

2.25 DEMONSTRATION

- A. [Engage a factory-authorized service representative to train] [Train] **Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.**

3.1 SUBMITTALS

3.1.1 Submittals required for government review

- A. **Submittal requirements are outlined in [Division 01] [PWS SOW] []**
- B. [Product Information must include manufacturer's installation instructions, sizing (including required clearance for access and maintenance), utility requirements, isometric drawings, tagged floorplans showing placement for count accountability and accessories/options/consumables list.]
- C. **All submittals require Government approval prior to procurement. Submit all listed items herein, with information sufficient to show full compliance with the criteria. Submit all product selections for review and approval, including but not limited to materials, finishes, colors, options, accessories, and complimentary products. Provide for review all warranties and service contracts and any available extended warranty or service options.**
- D. Samples: Furnish material samples and full range of color selection options for all items that offer material and color selections.
- E. Submit and highlight all applicable options for Government review for all items which optional accessories are provided.
- F. [Joint Interoperability Test Command (JTIC) Approval Documentation.]

3.2 QUALITY ASSURANCE

3.2.1 Materials and Equipment

- A. Materials and equipment must be standard products of a manufacturer regularly engaged in the manufacture of products which are of a similar material, design, and workmanship and are offered for sale on the commercial market through advertisements, manufacturer's catalogs, or sales brochures. The products must have been in commercial or industrial use under similar circumstances and of similar size for 2 years prior to selection for approval/procurement. Products must be supportable for at least three years after government acceptance.

3.2.2 Alternative Service Record

- A. Products having less than a 2-year field service record will be acceptable if a certified record of the manufacturer's factory or laboratory tests demonstrating performance compliance is provided to the Contracting Officer.

3.2.3 Service Support

- A. Equipment items must be supported by service organizations located near the equipment installation, able to service the equipment on a regular basis and respond to emergency calls throughout the warranty period.

3.2.4 Manufacturer's Nameplate

- A. Each item of equipment must have an attached nameplate that is securely affixed in a conspicuous space. A nameplate listing only the name of the distributing agent is not acceptable. The nameplate must contain the following fields in English:

1. Manufacturer's name and address
2. Model and Serial Number
3. Item's utility ranges and/or capacities
4. Voltage, amperage, and applicable Underwriters Laboratory (UL) or Conformité Européenne (CE) rating if electrically powered
5. Date of manufacture

3.2.5 Factory Inspection

A. Arrange and perform all quality control and quality assurance inspections required by the technical sections of the criteria, unless otherwise specified. Report these inspections in the daily report to the Government inspector.

3.2.6 Product Qualifications

A. The products specified in the technical sections of this criteria establish standards for each item.

3.2.7 Design Parameters

A. It is not the intention of this Criteria to limit consideration to products of specific manufacturers. The product standards establish the characteristics for which submitted items of equipment will be reviewed and approved by the Government. Equipment furnished must meet each of the following parameters specified in the technical sections:

1. Size of equipment
2. Function of equipment
3. Standard and listed accessories and options
4. Equipment controls and performance of equipment
5. Construction of equipment
6. Finish

3.3 STANDARDS DEVIATIONS

3.3.1 Reporting and Submission for Approval

A. Submit for approval a record of deviations from the standards listed in section (3.2.7.A.) established for each specified product, before ordering equipment.

3.4 DELIVERY, STORAGE AND PROTECTION

3.4.1 Packaging and Transporting

A. Each unit of equipment must be placed in a substantial shipping container or crate for safe transportation to final destination. The shipping container or crate for heavy equipment must be on skid construction to facilitate handling by lift equipment.

3.4.2 Packing List

A. Clearly and legibly indicate on exterior of each container or crate the shipping address and a brief description of contents. Fasten to outside of container a packing list and complete instructions for uncrating equipment and setting it in place. Protect such information in a weatherproof envelope.

3.4.3 Protection

A. Properly protect all materials and equipment from injury and damage during storage, installation, and acceptance.

3.5 INSTALLATION, VERIFICATION AND ACCEPTANCE TESTING

3.5.1 Qualifications of Installers and Inspectors

- A. If required by product warranty, use installers that are approved and licensed by the manufacturer. When required to complete installation, all electricians and plumbers used must be bonded and licensed in the project's jurisdiction.
- B. [Company specializing in installing the products specified in this section must have a minimum 5 years of documented experience.]
- C. [Company specializing in installing the products specified in this section must be within 200 miles or 4 hours travel time.]

3.5.2 Installation, Operation, Testing and Certification

- A. Products must be delivered in manufacturer's original packaging with manufacturer's installation instructions. Include clearly marked project reference.
- B. Prior to installation, thoroughly examine the equipment, materials, and components for both visual defects and conformance with criteria.
- C. Install all equipment in compliance with manufacturer's written instructions and installation procedures.
- D. After installation, the equipment must be inspected and tested under operating conditions. If the equipment fails an inspection or test, such defects/failures must be corrected. Upon correction of defects/failures, inspect and retest all affected functions related directly and indirectly to the defect or failure. Corrections, replacement, and retesting must be made at no additional expense to the Government.
- E. Provide all items necessary to make equipment fully functional.
- F. Provide appropriately trained personnel to energize, commission, inspect, electrical safety check, calibrate, certify, and provide all required technical testing for equipment and systems. Contractor must provide documentation, test reports and certification documentation attesting that the equipment is properly installed, functional, safe, calibrated, and ready for its intended use.
- G. An equipment item will be considered defective if it cannot be made to meet all established criteria consistent with the activities listed in section (F).
- H. Provide two sets of special tools, software, and any other item/s for each equipment [item] [item type] if required for maintenance and/or future reconfiguration of the item.
- I. Contractor to supply all start-up supplies for medical equipment for a fully operational installation. Contractor must supply to the Government a listing of all needed supplies for ongoing equipment operation for each item of equipment requiring additional supplies for operation.
- J. Engage a factory-authorized service representative to train Government's staff and maintenance personnel to adjust, operate, and maintain medical equipment.
- K. [Confirm functionality of required interfaces to other systems and networks.]

3.6 WARRANTY

3.6.1 Minimum Requirements

- A. Warranty requirements are outlined in [Division 01] [PWS SOW] [____].
- B. [Provide manufacturer's written warranty for all items listed. Provide warranty for a minimum of (1) year against defects in materials and workmanship. Warranty must provide for material, labor and all associated replacement and/or repair costs required to provide for a fully operational equipment replacement or repair. Submit manufacturers and installers standard service contract beyond the warranty period for Government review. Warranty must be transferrable to the final owner without risk of being voided. All warranty certification and documentation must be provided to the final owner after date of acceptance.]
- C. Provide routine warranty service in accordance with manufacturer's warranty requirements, for a period of [12 months (minimum)] [____] after the open for business date. Perform work during regular working hours. Perform service only by factory trained personnel. Maintain a maintenance log of all service orders performed during the warranty period.

3.7 OPERATIONS AND MAINTENANCE (O & M)

3.7.1 Provide the following to the final owner

- A. Provide O & M data for all FFE-LVS as outlined in [Division 01] [PWS SOW] [____].
- B. Upon completion of equipment installation, furnish [two (2)] copies of operators/service/maintenance manuals for each type of equipment which will require service or maintenance
- C. Each manual must contain operating instructions and information required for performing periodic maintenance on the equipment. Each service manual must include an illustrated parts breakdown which identifies each part of the

unit with manufacturer's part number, wiring diagrams, and a list of necessary service parts, tools, and equipment needed to support maintenance requirements.

- D. Accessory Catalogs: Upon completion of the Project, furnish two copies of the manufacturer's catalogs containing optional accessory items available for all equipment relative to the procured equipment/system delivered herein.
- E. Provide instruction video for cleaning and maintenance, when available.
- F. Provide cleaning requirements for all items to prevent void of warranty.
- G. [Provide contact information for Repair Technician or Emergency Repair Company]
- H. Provide contact information to [Logistics, Pharmacy, Laboratory, and Biomedical Equipment Services.]
- I. Train designated staff in the operation and maintenance of the provided equipment/system. Provide two training sessions for equipment/system users and two training sessions for maintenance personnel scheduled to accommodate shift work. [Provide training certificates that can be executed up to eleven months after the system is installed, in order to provide a refresher course for each group of trainees.] Provide DVD copy of the training with the O & M data.

--End of Section--