SECTION 28 23 00 VIDEO SURVEILLANCE

1. **GENERAL**
	1. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.
	2. All manufactured products shall be thoroughly tested and proven in actual use.
	3. All manufactured products shall include, at no additional cost, online support services and availability of a toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) for emergencies.
	4. The manufacturer shall repair or replace without charge, manufactured products proven defective in material or workmanship for the stated warranty period from the date of shipment.
2. **PRODUCTS**
	1. **IP VIDEO MANAGEMENT SYSTEM**
		1. The IP video management system shall consist of Digital Sentry® NVs version 7 software operating on an optimized Pelco-supplied hardware platform. The NVs software shall consist of base software with individual, non-expiring licenses in the required quantity.
		2. The IP video management system software updates shall be downloadable from a publicly available website.
		3. The IP video management system shall support up to 128 combined IP and analog video streams, with up to 64 direct-attached analog cameras. Analog streams shall be supported using Pelco and/or third-party encoders.
		4. The IP video management system shall provide 350 Mbps for RAID5, 300 Mbps for JBOD systems throughput for recording of analog and IP video streams, playback and export.
		5. The IP video management system shall have a SSD system drive to increase responsiveness.
		6. The IP video management system shall support recording of JPEG, MPEG-4 and H.264 IP streams.
		7. The IP video management system shall support Pelco and third-party H.264 Megapixel video streams up to 10 Megapixel resolution with quantities based on a total system of 300 Mbps throughput for recording of analog and IP video streams, playback and export.
		8. The IP video management system shall have a fully open architecture with support for both IP-specific camera as well as cameras with ONVIF compliance.
		9. The IP video management system shall support automatic detection of Pelco IP cameras. Third-party IP cameras shall be automatically detected dependent on IP driver versions and manufacturers specifications.
		10. The IP video management system shall support up to 64 looping analog camera inputs with direct-attached 16-channel encoders; up to four direct-attached units. The direct-attached 16-channel encoders shall support H.264 compression, CIF, 2CIF, and D1 resolutions at maximum 30ips, 16 audio inputs and RS422/485 PTZ control with Pelco P and D protocols and Coaxitron.
		11. The IP video management system shall support an unlimited number of systems connected over a network. Each system shall contain two 1GB network ports; one for IP camera/encoder data, and one to connect to a network for client computer access.
		12. The IP video management system shall be viewed, managed, and played back through a single user interface simultaneously with other Digital Sentry digital video management systems through supplied DS Admin or DS ControlPoint Client software.
		13. The IP video management system shall operate on a 4th Generation Intel® Xeon processor and 8 GB of RAM.
		14. The IP video management system shall contain two DVI-D ports.
		15. The IP video management system shall utilize a Windows® 7 Ultimate 64-bit operating system.
		16. The IP video management system shall support and have an option for an internal DVD+/-RW.
		17. The IP video management system shall allow expansion of IP video channel capacity through a licensing without any hardware modification.
		18. The IP video management system shall be capable of continuous scheduled alarm/event and motion recording. Pre- and post- alarm recording shall also be available and shall be fully programmable on a per channel basis.
		19. The IP video management system shall allow archival of video data to computers or SAN storage devices over a network connection with the optional DS Archive Utility. The archival schedule shall be either automatic at user-defined intervals or manual and shall be configurable per connected camera.
		20. The IP video management system shall support network health and monitoring utilizing third-party SNMP monitoring tools.
		21. The IP video management system shall indicate system performance and operation status utilizing a variety of HTML reports.
		22. The IP video management system shall optionally support on-board video analytics in quantities of two or four channels with Active Alert software and the DS DataPoint interface. The DS DataPoint interface shall provide video analytics monitoring including tracking and counting objects and people.
		23. The IP video management system shall support Lightweight Directory Access Protocol (LDAP).
		24. System Specifications
			1. Processor Intel® Xeon E3-1275 v3
			2. Operating System Windows 7 Ultimate 64-bit
			3. Internal Memory 8 GB DDR3 non-ECC RAM; 16GB DDR ECC RAM for DSSRV2-RD models
			4. Network Interface Gigabit Ethernet (1000Base-T) ports (2x)
			5. User Interface DS Control Point
			6. Internal Storage (JBOD or RAID 5)
			7. DSSRV2 500 GB, 4 TB, 8 TB, 12 TB, 16 TB, 20 TB
			8. DSSRV2-DVD 500 GB, 4 TB, 8 TB, 12 TB, or 16 TB
			9. DSSRV2-RD 12 TB, 16 TB, 20 TB, or 24 TB
			10. Raid Level Internal RAID 5 (requirs DSSRV2-RAID controller card for hot swappable drives)
			11. External Storage Pelco’s DX8100HDDI or third-party SCSI targets (requires optional DSSRV-SCSI)
			12. System Drive SSD
			13. DSSRV2 6, 3.5-inch hard drive bays
			14. DSSRV2-DVD 4, 3.5-inch hard drive bays
			15. Optical Drive DVD±RW with DSSRV2-DVD
			16. USB Ports 3 USB 2.0 (1 front, 2 rear), 2 USB 3.0 (rear)
			17. Power Input 100 to 240 VAC, 50/60 Hz, autoranging
			18. Power Supply Internal
			19. Power Consumption Operating Max Watts Amperes BTU/H
				1. 100 VAC / 50 Hz 222.0 2.22 758.0
				2. 110 VAC / 50 Hz 224.0 2.02 759.4
				3. 110 VAC / 60 Hz 223.0 2.03 761.4
				4. 115 VAC / 50 Hz 217.0 1.89 740.8
				5. 115 VAC / 60 Hz 215.5 1.87 735.7
				6. 220 VAC / 50 Hz 213.0 0.97 727.2
				7. 220 VAC / 60 Hz 204.1 0.93 696.8
				8. 240 VAC / 50 Hz 211.9 0.88 723.4
				9. 240 VAC / 60 Hz 207.6 0.86 708.8
			20. Front Panel Indicators/Functions
				1. Buttons Power
				2. Indicators

Unit Status Green, amber, red

Primary Network Green, amber, red

Secondary Network Green, amber, red

Software Status Green, amber, red (based on diagnostics)

Hard Disk Status Green, red, off (behind bezel)

* + 1. Video Specifications
			1. Video System Intel HD Graphics P4700 (shared memory)
				1. Maximum Resolution

3840 x 2160 per DisplayPort output (2x)

1920 x 1200 @ 60 hz on DVI-D output

1920 x 1200 @ 60 hz on VGA output

* + - 1. Video Outputs
				1. Supports up to 3 simultaneous displays using any combination of the four outputs
			2. Video Standards
				1. 60 Hz capable for NTSC; 75 Hz capable for PAL
			3. Video Decoding Supported
				1. MPEG-4 ASP; H.264 Baseline, Main, and High profiles
			4. Decoding Performance
				1. 16X real-time MPEG-4 streams at 704 x 480; 12X real-time H.264 Baseline profile streams at 704 x 480; 4X H.264 Baseline profile streams at 720p; 2X real-time H.264 Baseline profile streams at 1080p
		1. Audio Specifications
			1. Audio Decoding: G.711 speech codec
			2. Audio bit-rate: 64 kbps
			3. Audio Levels
				1. Input: Electret microphone
				2. Output: Up to 3 Vp-p, adjustable, minimum load of 8 ohms
			4. Audio Connectors: 2, 3.5 mm stereo jacks
				1. Connector Tip Signal left (input and output)
				2. Connector Ring Signal right (input and output)
				3. Connector Sleeve Common
			5. Audio Inputs Microphone
			6. Audio Outputs Speaker or in line
		2. Environmental Specifications
			1. Operating Temperature 10º to 35ºC (50º to 95ºF)
			2. Operating Humidity 20% to 80%, noncondensing
			3. Maximum Humidity Gradient 10% per hour
			4. Operating Altitude –15 to 3,048 m (–50 to 10,000 ft)
			5. Operating Vibration 0.25 G at 3 Hz to 200 Hz at a rate of 0.5 octave/minute
		3. Supplied Accessories
			1. Power Cord
				1. 1 USA standard, 1 based on country designation; all cables are 3 prong, molded connector, 1.8 m (6 ft)
			2. USB Keyboard and Mouse
			3. Bezel Key
			4. Rack Mount Kit Brackets, rails, and hardware for mounting in a 2 RU rack
			5. DSSRV-LIT Documentation
			6. USB-DS Imaged with DS NVs and includes resource documentation
		4. Certifications
			1. CE, Class A; meets EN50130-4 standard requirements
			2. FCC, Class A
			3. UL/cUL Listed
			4. C-Tick
			5. CCC
			6. KCC
		5. Standards/Organizations
			1. Pelco is a member of the MPEG-4 Industry Forum
			2. Pelco is a member of the Universal Plug and Play (UPnP) Forum, Steering Committee
			3. Pelco is a member of the Universal Serial Bus (USB) Implementers Forum
			4. Pelco is a contributor to the Internal Standards for Organization/Electrotechnical Commission (ISO/IEC) Joint Technical Committee 1 (JTC1). “Information Technology”, Subcommittee 29, Working Group 11
			5. Compliance, ISO/IEC 14496 standard (also known as MPEG-4)
			6. Compliance, International Telecommunication Union (ITU), Recommendations G.711, “Pulse Code Modulation (PCM) of Voice Frequencies”
			7. Pelco is a member of the ONVIF Open Industry Fourm
		6. IP Video Management Client Software requirements
			1. The IP video management system shall provide the capability of running a client application in additional to the video management system.
			2. A client computer with system compatible software shall be the user interface for viewing one or more systems. Live and recorded video and current event video shall be displayed on any client computer using a proper login and password. The client computer shall be able to connect to an unlimited number of recorders simultaneously to display live and recorded video.
			3. Client Software shall be unlicensed and available to be installed on as many clients as required by the user.
			4. Client Software shall be compatible with multiple DVR and NVR platforms to include all Pelco Digital Sentry®, Pelco DX8000/8100, DX4500/4600/4700/4800 and DX4700/4800HD.
			5. Client Software shall be password controlled such that password functionality set at each connected system will be recognized at the client. Password shall limit the ability to access live or recorded video as well as the ability to export video.
			6. Client Software shall allow multiple monitor support for up to four displays per client workstation, providing virtual matrix functionality.
			7. Client Software shall allow the connection of Pelco KBD5000 keyboard controllers to the client workstation to control PTZ operations and camera call-up.
			8. Client Software shall allow video streams to be selectable from a system tree on an individual camera, individual system, client defined local groups, or from predefined recorder based groups.
			9. Client Software shall be a tab based work environment with the ability to undock the tabs creating a virtual workspace on single or multiple monitor clients.
			10. Client tabs shall include system management, live, and search options. Tabs can be displayed simultaneously on the client.
			11. Systems Tab shall display and sort available systems, connection status, system names, system IP addresses, and custom categories. This tab shall additionally allow:
				1. Manual connect and disconnect of systems to the client
				2. Virtual systems naming
				3. Auto Connecting
				4. Adding, deleting, and editing available systems
				5. Live video tab shall have the ability to be created up to four times on a single client workstation providing for video display combinations and simultaneous video streams from as many different systems with consideration for maximum client bandwidth.
			12. Live video tab shall provide the following functionalities:
				1. Quick Review which shall display recorded video from the last 1, 5, 15, 30, 60 or 90 minutes, providing near instantaneous review of recent events
				2. One-week graphical display of recorded video
				3. Borderless display option
				4. Screen layout selection
				5. On the fly on-screen display changes including time, date, camera name, frame rate, frame size, alarm display, and border indicators
				6. Digital zoom
				7. User selectable in-video PTZ control or dashboard style control
				8. Drag and drop audio support associating any audio with any video
				9. Search video tab shall allow for the search of one or multiple cameras from one or multiple systems simultaneously. Search tab shall provide the following functionalities:
				10. Time and date search
				11. Advanced data search with DataPoint interfaced software to Active Alert Intelligent Video and POS
				12. Drag and drop audio support to associate audio with any video
			13. Video export to any system accessible media including locally to HDD, CD/DVD, Flash USB device or to network storage.
			14. Video authentication of exported video via check sum verification.
			15. Alarm video tab shall allow for alarm pop-up and playback of active alarms. Alarms may be based on motion activity, an external software trigger from Active Alert analytics or a preset data alarm from DS DataPoint. An alarm list pane shall be displayed for playback of queued alarms.
			16. The Client shall incorporate virtual matrix functionality whereby camera sequences may be created on the monitoring workstation with the following functionalities:
			17. Each sequence shall have a maximum of 500 cameras.
			18. Each camera in the sequence shall have its own individual dwell time, from 1 to 60 seconds.
			19. Each entry in a sequence shall have the capacity to trigger PTZ camera presets, patterns, or auxiliaries.
			20. The Client shall have the capability to display recorded video with full VCR controls. This feature shall display video from multiple cameras simultaneously. The user shall be able to play video as fast as possible (all images), in real time, or by skipping a selectable number of seconds.
			21. The Client shall support simultaneous playback of up to sixteen cameras all synchronized with each other. Non-synchronous playback of multiple cameras shall not be acceptable.
			22. The Client shall support tours of multi-camera displays.
	1. **UNINTERRUPTABLE POWER SUPPLY**
		1. One uninterruptible power supply (UPS) shall give provided to sustain the operation on the IP video management system in the main command center. The UPS shall be provided to sustain the operation of all equipment located in the main command center for a period of twenty (20) minutes.
		2. The UPS shall provide continuous, no-break power during complete or momentary loss of supply power.
		3. In the normal operating mode the UPS shall condition line power protecting against environmental conditions, power surge, power sag, under-voltage, over-voltage, line noise, frequency (variation of the waveform), transients and harmonic distortion.
		4. An external bypass switch shall be provided to allow the UPS to be removed from the incoming power line for service.
		5. The uninterruptible power supply (UPS) shall be manufactured by American Power Conversion (APC).
	2. **INDOOR NETWORK DOME CAMERA**
		1. The indoor network dome camera shall offer multiple simultaneous video streams with up to 2 megapixel (MPx) 1920 x 1080 resolution, auto iris and varifocal lens.
		2. The indoor network dome camera shall provide a manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.
		3. The indoor network dome camera shall provide options for clear and smoked lower dome.
		4. The indoor network dome camera shall provide True Wide Dynamic Range (WDR), low-light performance, anti-bloom technology, 3-D noise filtering, and enhanced tone mapping, all operating simultaneously.
		5. The indoor network dome camera shall feature an unsupervised/supervised alarm input, relay output and line level/external microphone input connections and built-in microphone.
		6. The indoor network dome camera shall provide a removable, local storage medium (Micro SD) for scheduled and event-based recording of images.
		7. The indoor network dome camera shall provide a service video stream in addition to and independent of the video streams.
		8. The indoor network dome camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0.005 lux in color and 0.0013 lux in monochrome.
		9. The indoor network dome camera shall support industry standard Power over Ethernet (PoE) IEEE 802.3af, Class 3 to supply power to the camera over the network.
		10. The indoor network dome camera shall provide True Wide Dynamic Range (WDR) up to 100 dB with dynamic adjustments through the User Interface.
		11. The indoor network dome camera shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable through an embedded Web browser.
		12. The indoor network dome camera shall support H.264 High, Main or Base profiles, using constrained variable bit rate (CVBR) as the default, variable bit rate (VBR), or constant bit rate (CBR) with target range.
		13. The indoor network dome camera shall support two simultaneous, configurable video streams. H.264 and MJPEG compression formats shall be available for primary and secondary streams with selectable Unicast and Multicast protocols.
		14. The indoor network dome camera shall support configurable frame rates, bit rates and group of pictures (GOP) structures for additional bandwidth administration.
		15. The indoor network dome camera shall be conformant to the ONVIF Profile S and Profile G, and support open architecture best practices with a published API available to third-party network video recording and management systems.
		16. The indoor network dome camera shall provide 802.1x port security to establish point-to-point access through a wired or wireless port using Extensible Authentication Protocol (EAP). Supported EAP methods shall include EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP and EAP-FAST.
		17. The indoor network dome camera shall support SNMP v2c and v3.
		18. The indoor network dome camera shall support IPv6 configurations in conjunction with IPv4.
		19. The indoor network dome camera shall provide Auto or Manual exposure settings for adjusting the amount of light detected by the camera sensor.
		20. The indoor network dome camera shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.
		21. The indoor network dome camera shall provide flicker correction.
		22. The indoor network dome camera shall provide motorized zoom capabilities with a Web browser interface for remote configuration and administration.
		23. The indoor network dome camera shall provide autofocus capabilities with a Web browser interface for remote configuration and administration. User-selectable options for full-range auto-focus and quick auto-focus shall be available.
		24. The indoor network dome camera shall support 16 window blanks to conceal user-defined privacy areas that cannot be viewed by an operator.
		25. The indoor network dome camera shall provide I-Frame interval configuration to increase or decrease the number of I-Frames per second.
		26. The indoor network dome camera shall provide User and Group settings to assign permissions and access levels to the camera. The camera shall provide local management where the camera manages the access levels or remote mode where the camera authenticates the user through a Lightweight Directory Access Protocol (LDAP) server.
		27. The indoor network dome camera shall be plenum-rated per 2008 NEC article 300.22(C)(2) for in-ceiling mounted applications.
		28. The indoor network dome camera shall provide a 3/4-inch NPT conduit attachment on the back box for in-ceiling mounted applications.
		29. The indoor network dome camera shall attach to a standard single-gang electrical box for surface mounted applications.
		30. The indoor network dome camera shall provide a 3/4-inch NPT conduit attachment for pendant mounted applications.
		31. The indoor network dome camera shall be capable of firmware upgrades through a network using a software-based device utility.
		32. The indoor network dome camera shall meet or exceed the following design and performance specifications.
			1. Camera Specifications
				1. Imaging Device 1/3-inch
				2. Imager Type CMOS
				3. Imager Readout Progressive scan
			2. Maximum Resolution
				1. 4:3 Aspect Ratio

1.9 MPx (1600 x 1200)

1.2 MPx (1280 x 960)

0.5 MPx (800 x 608)

0.3 MPx (640 x 480)

0.08 MPx (320 x 240)

* + - * 1. 16:9 Aspect Ratio

1080p MPx (1920 x 1080)

720p MPx (1280 x 720)

0.5 MPx (800 x 448)

0.2 MPx (640 x 352)

0.06 MPx (320 x 176)

* + - 1. Signal-to-Noise Ratio >60 dB
			2. Auto Iris Lens Type DC drive
			3. Electronic Shutter Range 0.5 ~ 1/48,000 sec
			4. True Wide Dynamic Range Up to 100 dB
			5. White Balance Range 2,000° to 10,000°K
			6. Sensitivity 3~9 mm f/1.2; 2,850°K; SNR >20 dB
			7. Color (33 ms) 0.1 lux
			8. Color (500 ms) 0.005 lux
			9. Mono (33 ms) 0.05 lux
			10. Mono (500 ms) 0.0013 lux
			11. Day/Night Capabilities Yes
			12. Mechanical IR Cut Filter Yes, (ON/OFF/AUTO selectable), with different set points on lux
			13. Available Languages Chinese, English, French, German, Italian, Portuguese, Russian, Spanish, and Turkish
			14. Lens Specifications
				1. Lens Type Built-in; varifocal
				2. Focal Length f/1.2, 3 ~ 9 mm
				3. Focus Autofocus, motorized
				4. Zoom Remote
				5. Auto Iris Type DC drive P-iris lens
			15. Video Specifications
				1. Video Streams

Multiple simultaneous streams with up to 2 different configurations plus service stream; the second stream is variable based on the setup of the primary stream

* + - * 1. Available Resolutions Two configurable streams as follows:

4:3 Aspect Ratio

1.9 MPx (1600 x 1200)

1.2 MPx (1280 x 960)

0.5 MPx (800 x 600)

0.3 MPx (640 x 480)

0.08 MPx (320 x 240)

16:9 Aspect Ratio

1080p MPx (1920 x 1080)

720p MPx (1280 x 720)

0.5 MPx (800 x 448)

0.2 MPx (640 x 352)

0.06 MPx (320 x 176)

* + - * 1. Frame Rate

Up to 30, 25, 15, 12.5, 10, 5, 1 (depending on the coding, resolution, and stream configuration)

* + - * 1. Video Encoding

H.264 High, Main, or Base profiles and MJPEG

* + - * 1. Bit Rate Control

Constrained variable bit rate (CVBR), constant bit rate (CBR), and variable bit rate (VBR) with target range

* + - * 1. Service Stream

JPEG stream; the aspect ratio will be consistent with the independent streams

* + - 1. Supported Protocols - TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, ARP, ICMP, and 802.1x (EAP)
			2. Users
				1. Unicast - Up to 20 simultaneous users depending on the resolution settings
				2. Multicast- Unlimited H.264
			3. Security Access - Password protected
			4. Software Interface - Web browser view and setup
			5. Open API - ONVIF Profile S and Profile G
			6. Web Browser - Internet Explorer® 7.0 (or later) or Mozilla® Firefox® 3.5 (or later)
			7. Media Player - Pelco Media Player or QuickTime® 7.6.5 for Windows 7, XP, or Vista; or QuickTime 7.6.4 or Mac OS X 10.4 (or later)
			8. Electrical Specifications
				1. Network Port - RJ-45 for 100Base-TX, Auto MDI/MDI-X
				2. Accessory Port - Micro B USB connector for Pelco accessories
				3. Cable Type - Cat5 cable or better for 100Base-TX
				4. Input Power - PoE (IEEE802.3af, Class 3)
				5. Power Consumption - 8.5 W nominal
				6. Current Consumption - 350 mA maximum
				7. Local Storage - Micro SD, SDHC
				8. Alarm - Unsupervised/supervised modes
				9. Unsupervised - Detects open or closed alarm state
				10. Supervised - Detects open and short alarm state with external 1 kohm resistor
				11. Input - 3.5 VDC maximum, 3.5 mA maximum
				12. Relay Output - ±32 VDC maximum, 150 mA maximum
				13. Audio

Streaming - Bidirectional; full or half duplex

Input/Output - Line level/external microphone input; 600-ohm differential, 1 Vp-p max signal level; built-in microphone

Compression - G.711 PCM 8 bit, 8 kHz mono at 64 kbit/s

* + - 1. Mechanical Specifications
				1. Dome Attenuation
				2. Clear - Zero light loss
				3. Smoked - f/1.0 light loss
				4. Pan/Tilt Adjustment - Manual
				5. Pan - 355°
				6. Tilt - 180°
				7. Rotation - 360°
			2. Environmental Specifications
				1. Operating Temperature –10° to 50ºC (14° to 122°F)
				2. Cold Start –10ºC (14ºF)
				3. Operating Humidity 20% to 80%, RH noncondensing
			3. Certifications
				1. CE, Class A
				2. FCC, Class A
				3. ICES-003, Class A
				4. UL/cUL Listed
				5. KCC
				6. C-Tick
				7. CB
				8. Compliant with applicable immunity sections of EN 50155, EN 50121-3-2, and EN 50121-4
				9. ONVIF Profile S and Profile G Conformant
	1. **ENVIRONMENTAL NETWORK DOME CAMERA**
		1. The environmental network dome camera shall offer multiple simultaneous video streams with up to 2 megapixel (MPx) 1920 x 1080 resolution, auto iris and varifocal lens.
		2. The environmental network dome camera shall provide a manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.
		3. The environmental network dome camera shall provide options for clear and smoked lower dome.
		4. The environmental network dome camera shall provide True Wide Dynamic Range (WDR), low-light performance, anti-bloom technology, 3-D noise filtering, and enhanced tone mapping, all operating simultaneously.
		5. The environmental network dome camera shall feature an unsupervised/supervised alarm input, relay output and line level/external microphone input connections and built-in microphone.
		6. The environmental network dome camera shall provide a removable, local storage medium (Micro SD) for scheduled and event-based recording of images.
		7. The environmental network dome camera shall provide a service video stream in addition to and independent of the video streams.
		8. The environmental network dome camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0.005 lux in color and 0.0013 lux in monochrome.
		9. The environmental network dome camera shall support industry standard Power over Ethernet (PoE) IEEE 802.3af, Class 3 to supply power to the camera over the network.
		10. The environmental network dome camera shall provide True Wide Dynamic Range (WDR) up to 100 dB with dynamic adjustments through the User Interface.
		11. The environmental network dome camera shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable through an embedded Web browser.
		12. The environmental network dome camera shall support H.264 High, Main or Base profiles, using constrained variable bit rate (CVBR) as the default, variable bit rate (VBR), or constant bit rate (CBR) with target range.
		13. The environmental network dome camera shall support two simultaneous, configurable video streams. H.264 and MJPEG compression formats shall be available for primary and secondary streams with selectable Unicast and Multicast protocols.
		14. The environmental network dome camera shall support configurable frame rates, bit rates and group of pictures (GOP) structures for additional bandwidth administration.
		15. The environmental network dome camera shall be conformant to the ONVIF Profile S and Profile G, and support open architecture best practices with a published API available to third-party network video recording and management systems.
		16. The environmental network dome camera shall provide 802.1x port security to establish point-to-point access through a wired or wireless port using Extensible Authentication Protocol (EAP). Supported EAP methods shall include EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP and EAP-FAST.
		17. The environmental network dome camera shall support SNMP v2c and v3.
		18. The environmental network dome camera shall support IPv6 configurations in conjunction with IPv4.
		19. The environmental network dome camera shall provide Auto or Manual exposure settings for adjusting the amount of light detected by the camera sensor.
		20. The environmental network dome camera shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.
		21. The environmental network dome camera shall provide flicker correction.
		22. The environmental network dome camera shall provide motorized zoom capabilities with a Web browser interface for remote configuration and administration.
		23. The environmental network dome camera shall provide autofocus capabilities with a Web browser interface for remote configuration and administration. User-selectable options for full-range auto-focus and quick auto-focus shall be available.
		24. The environmental network dome camera shall support 16 window blanks to conceal user-defined privacy areas that cannot be viewed by an operator.
		25. The environmental network dome camera shall provide I-Frame interval configuration to increase or decrease the number of I-Frames per second.
		26. The environmental network dome camera shall provide User and Group settings to assign permissions and access levels to the camera. The camera shall provide local management where the camera manages the access levels or remote mode where the camera authenticates the user through a Lightweight Directory Access Protocol (LDAP) server.
		27. The environmental network dome camera shall be vandal and tamper resistant with an impact resistance exceeding rating of K10++ (50 Joules) per IEC 62262.
		28. The environmental network dome camera shall be plenum-rated per 2008 NEC article 300.22(C)(2).
		29. The environmental network dome camera shall be NEMA-4X, IP66 rated.
		30. The environmental network dome camera shall provide a 3/4-inch NPT conduit attachment on the side and top of the back box for in-ceiling and surface mounted applications.
		31. The environmental network dome camera shall attach to a standard 4-inch square box or standard 2-gang electrical box for surface mounted applications.
		32. The environmental network dome camera shall provide a 1.5-inch NPT conduit attachment for pendant mounted applications.
		33. The environmental network dome camera shall be capable of firmware upgrades through a network using a software-based device utility.
		34. The environmental network dome camera shall meet or exceed the following design and performance specifications:
			1. Camera Specifications
				1. Imaging Device 1/3-inch
				2. Imager Type CMOS
				3. Imager Readout Progressive scan
			2. Maximum Resolution
				1. 4:3 Aspect Ratio

1.9 MPx (1600 x 1200)

1.2 MPx (1280 x 960)

0.5 MPx (800 x 608)

0.3 MPx (640 x 480)

0.08 MPx (320 x 240)

* + - * 1. 16:9 Aspect Ratio

1080p MPx (1920 x 1080)

720p MPx (1280 x 720)

0.5 MPx (800 x 448)

0.2 MPx (640 x 352)

0.06 MPx (320 x 176)

* + - 1. Signal-to-Noise Ratio >60 dB
			2. Auto Iris Lens Type DC drive
			3. Electronic Shutter Range 0.5 ~ 1/48,000 sec
			4. True Wide Dynamic Range Up to 100 dB
			5. White Balance Range 2,000° to 10,000°K
			6. Sensitivity 3~9 mm f/1.2; 2,850°K; SNR >20 dB
			7. Color (33 ms) 0.1 lux
			8. Color (500 ms) 0.005 lux
			9. Mono (33 ms) 0.05 lux
			10. Mono (500 ms) 0.0013 lux
			11. Day/Night Capabilities Yes
			12. Mechanical IR Cut Filter Yes, (ON/OFF/AUTO selectable), with different set points on lux
			13. Available Languages Chinese, English, French, German, Italian, Portuguese, Russian, Spanish, and Turkish
			14. Lens Specifications
				1. Lens Type Built-in; varifocal
				2. Focal Length f/1.2, 3 ~ 9 mm
				3. Focus Autofocus, motorized
				4. Zoom Remote
				5. Auto Iris Type DC drive P-iris lens
			15. Video Specifications
				1. Video Streams

Multiple simultaneous streams with up to 2 different configurations plus service stream; the second stream is variable based on the setup of the primary stream

* + - * 1. Available Resolutions Two configurable streams as follows:

4:3 Aspect Ratio

1.9 MPx (1600 x 1200)

1.2 MPx (1280 x 960)

0.5 MPx (800 x 600)

0.3 MPx (640 x 480)

0.08 MPx (320 x 240)

16:9 Aspect Ratio

1080p MPx (1920 x 1080)

720p MPx (1280 x 720)

0.5 MPx (800 x 448)

0.2 MPx (640 x 352)

0.06 MPx (320 x 176)

* + - * 1. Frame Rate

Up to 30, 25, 15, 12.5, 10, 5, 1 (depending on the coding, resolution, and stream configuration)

* + - * 1. Video Encoding

H.264 High, Main, or Base profiles and MJPEG

* + - * 1. Bit Rate Control

Constrained variable bit rate (CVBR), constant bit rate (CBR), and variable bit rate (VBR) with target range

* + - * 1. Service Stream

JPEG stream; the aspect ratio will be consistent with the independent streams

* + - 1. Supported Protocols - TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, ARP, ICMP, and 802.1x (EAP)
			2. Users
				1. Unicast - Up to 20 simultaneous users depending on the resolution settings
				2. Multicast- Unlimited H.264
			3. Security Access - Password protected
			4. Software Interface - Web browser view and setup
			5. Open API - ONVIF Profile S and Profile G
			6. Web Browser - Internet Explorer® 7.0 (or later) or Mozilla® Firefox® 3.5 (or later)
			7. Media Player - Pelco Media Player or QuickTime® 7.6.5 for Windows 7, XP, or Vista; or QuickTime 7.6.4 or Mac OS X 10.4 (or later)
			8. Electrical Specifications
				1. Network Port - RJ-45 for 100Base-TX, Auto MDI/MDI-X
				2. Accessory Port - Micro B USB connector for Pelco accessories
				3. Cable Type - Cat5 cable or better for 100Base-TX
				4. Input Power - PoE (IEEE802.3af, Class 3)
				5. Power Consumption - 8.5 W nominal
				6. Current Consumption - 350 mA maximum
				7. Local Storage - Micro SD, SDHC
				8. Alarm - Unsupervised/supervised modes
				9. Unsupervised - Detects open or closed alarm state
				10. Supervised - Detects open and short alarm state with external 1 kohm resistor
				11. Input - 3.5 VDC maximum, 3.5 mA maximum
				12. Relay Output - ±32 VDC maximum, 150 mA maximum
				13. Audio

Streaming - Bidirectional; full or half duplex

Input/Output - Line level/external microphone input; 600-ohm differential, 1 Vp-p max signal level; built-in microphone

Compression - G.711 PCM 8 bit, 8 kHz mono at 64 kbit/s

* + - 1. Mechanical Specifications
				1. Dome Attenuation
				2. Clear - Zero light loss
				3. Smoked - f/1.0 light loss
				4. Pan/Tilt Adjustment - Manual
				5. Pan - 355°
				6. Tilt - 180°
				7. Rotation - 360°
			2. Environmental Specifications
				1. Operating Temperature –40º to 50ºC (–40º to 122ºF)
				2. Cold Start –20ºC (–4ºF)
				3. Operating Humidity - 10 to 95%, RH condensing
				4. Impact Resistance - K10++ 50 Joules per IEC 62262
				5. Shock and Vibration - EN50155 Category 1, Class B; 60068:2-6 and 2-27
			3. Certifications
				1. CE, Class A
				2. FCC, Class A
				3. ICES-003, Class A
				4. UL/cUL Listed
				5. KCC
				6. C-Tick
				7. CB
				8. Meets NEMA Type 4X
				9. IP66 standards
				10. IP56 standards
				11. Compliant with applicable immunity sections of EN 50155, EN50121-3-2, and
				12. EN 50121-4
				13. ONVIF Profile S and Profile G Conformant
1. **EXECUTION**
	1. APPROVED MANUFACTURERS
		1. Pelco
		2. Axis
		3. All substitutions must be submitted within 14 days of the bid date and show a line for line comparison of this specification highlighting and differences in red. Using any product not meeting the requirements of this specification and not approved in writing by the owner or owner’s representative is not allowed.
	2. INSTALLATION
		1. Cable shall be CAT5e cable. No single length of wiring will exceed 300 feet. All cable shall be tested and a written report given to the owner indicating cable lengths.
		2. Video and control data cable shall not be contained in any conduits with high voltage.
		3. All wire shall meet code. Circuitry powering and connecting the camera units and the monitoring equipment shall be concealed within building confines, conduit or wire troughs. No wiring shall be left exposed and accessible to tampering or the harsh elements of the environment. Conduit, greenfield or junction boxes will be used where necessary to conceal the wiring. All cable utilized shall be identified with descriptive labels or keying system.
		4. Final code and local requirements for all security related equipment is the responsibility of the contractor and vendors. This includes but is not limited to National Electric Code, ANSI standards, ADA requirements, state and local codes and others required. Client no responsibility for these issues or their correction.
		5. All wire will be tagged for its purpose, origination and termination. Conduit will be required where necessary to protect wire, prevent interference and for code issues.
		6. The security vendor will be responsible for final calculations of power and signal runs to insure the wiring supplies a non-degraded signal and power requirements that meets manufactures specifications for the equipment.
		7. Bending and pulling tensions will not be exceeded per the cable manufacturer specifications. Contact manufacturer for specific requirements of the cable to be pulled.
		8. All wiring/cabling must be clearly labeled and easily accessible with the beginning and termination point with correct identification.
		9. The security vendor shall ensure that the equipment in the main command center provides the lowest resistance path to ground.
	3. NETWORK DISTRIBUTION
		1. All cable runs shall be of CAT 5e with matching RJ-45 crimp type connectors, and shall be installed with a control crimp tool, specified by the connectors’ manufacturer.
		2. All video signals from cameras in the system shall be home run to a POE switch dedicated for the video surveillance system with a minimum of 20% spare power and port capacity secured in an electrical room or in a separate secured rack, connected to the IP Security Network and recorded on the network storage manager.
	4. ENVIRONMENTAL REQUIREMENTS
		1. The installation site shall be completely clean and devoid of the dust and debris created during the construction process.
		2. The operating environment must comply with the environmental specifications of equipment (Ambient Temperature, Storage Temperature, Operating Humidity, Maximum Humidity Gradient, Operating Altitude and Operating Vibration)
		3. Upon completion of the work, remove excess debris, materials equipment, apparatus, tools and the like and leave the premises clean neat and orderly.
	5. QUALITY ASSURANCE
		1. All systems and components shall be provided with the availability of a toll-free (U.S. and Canada), 24-hour, technical assistance program (TAP) from the manufacturer. The TAP shall allow for immediate technical assistance for either the dealer/installer or the end user at no charge for as long as the product is installed.
		2. All systems and components shall be provided with a one-day turnaround repair express and 24-hour parts replacement. The repair and parts express shall be guaranteed by the manufacturer on warranty and non-warranty items.
	6. WARRANTY
		1. All security system components, Software, Hardware, and are to be fully warranted for parts and labor for a minimum of one year from the final successful acceptance of the IP Video Surveillance system. In the event any component manufacturer warranties the item for longer than one year, the vendor will repair or replace parts and/or labor per the warranty for the length of this warranty at no cost to the client. Software/Firmware versions or other replaceable programming and revisions are guaranteed to be the latest versions/revisions for this one year.
	7. SUBMITTALS
		1. Product Data: Include detailed manufacturer’s product specifications for each component specified. Include data sheets reflecting the model numbers, features, ratings, performance, power requirements, and dimensions
		2. Shop Drawings: For the IP Video Surveillance System equipment shall include plans, elevations, sections, details, and attachments to other Work.
		3. Include dimensioned plans and elevation views of components and enclosures. Show access and workspace requirements. Shop drawings shall include mounting details for all racked equipment. Such details shall include all mounting brackets, hardware, and connections to the building.
		4. Wiring Diagrams: Wiring point-to-point diagrams. Differentiate between manufacturer-installed and field-installed wiring.
		5. It is the Contractors’ responsibility to submit for approval the complete designed system configuration and layout showing all devices, wiring, conduit, and locations along with other required information as specified herein for the completely integrated system proposed for installation
		6. Maintenance Data: Maintenance Data for Distributed Network Video Surveillance System equipment and components shall be a part of the maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section “Contract Closeout,” include the following:
			1. Detailed operating instructions covering operation under both normal and abnormal conditions.
			2. Routine maintenance requirements for system components.
			3. Lists of spare parts and replacement components recommended are to be stored at the site for ready access.
			4. Calculations and Parameters; Contractor shall submit for approval by the Owner, the calculations used and plans and diagrams for the Field of View calculations, and bandwidth calculations for the IP Video Security System. Submission as a minimum shall include and address Low Level Lighting. Backlight compensation, and Lens conformance with this Specification.
	8. TRAINING
		1. The entire system shall be tested and demonstrated in the presence of owner representatives.
		2. The Contractor shall promptly make all corrections and adjustments necessary for intended operation to the satisfaction of the owner. Vendor will be required to provide training in the complete use of all parameters of the system to the staff as part of this contract, at no additional cost.
		3. Training should be configured so as to take a person to a level of competence that will permit their being melded into the ongoing daily console operations with a minimum of disruption to the integrity of their normal daily functions.
		4. Training is to be provided at the site or a facility maintained either by the vendor or manufacturer.