

# EXPECTED IMPLEMENTATION JANUARY 2011

## 782 INTELLIGENT TRANSPORTATION SYSTEMS–VIDEO EQUIPMENT. (REV 5-12-10) (FA 6-22-10) (1-11)

SUBARTICLE 782-1.2.1 (of the Supplemental Specifications) is deleted and the following substituted:

**782-1.2.1 Camera:** Furnish a CCTV camera that is compatible with the current version of the Department’s SunGuide® Software System, and any other camera operating software indicated on the plans or in the contract documents. Use either a dome-type or external positioner-type CCTV camera assembly. Ensure that the appropriate type is used at the location(s) shown on the plans. Use only equipment and components that meet the requirements of these minimum specifications, and are listed on the Department’s Approved Product List (APL).

For analog cameras, ensure that the camera produces National Television System Committee (NTSC) composite video output of 1 volt peak-to-peak (Vp-p) at 75 ohms ( $\Omega$ ). In addition, ensure analog and IP cameras provide the following features and capabilities:

1. Day (color)/night (monochrome) switchover and iris control, with user-selectable manual and automatic control capabilities.
2. Minimum resolution of 470 horizontal and 350 vertical TV lines.
3. Ability to produce clear, detailed, and usable video images of the areas, objects, and other subjects visible from a roadside CCTV field site. Ensure that video produced by the camera is true, accurate, distortion free, and free from transfer smear, oversaturation, and any other image defect that negatively impacts image quality under all lighting and weather conditions in both color and monochrome modes.
4. User-selectable automatic gain control (AGC) that is peak-average adjustable to 30 decibels (dB).
5. A minimum signal-to-noise ratio of 50 dB.
6. Automatic color balance that references the white areas of the scene through the lens.
7. An automatic electronic shutter that is user selectable from 1/60 to 1/10,000 of a second.
8. A digital signal processor that provides a minimum 10x digital zoom.
9. Programmable azimuth and compass display with ability to display pan and tilt position with a 1 degree resolution.

Furnish a CCTV camera that provides titling and masking features, including, but not limited to, programmable camera title, programmable preset titles for each preset position, and programmable privacy zones. Ensure that programmable titles are a minimum of 18 characters per line.

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**D** SUBARTICLE 782-1.2.3 (of the Supplemental Specifications) is deleted and the following substituted:

**782-1.2.3 Pan/Tilt Mechanism for Dome Type Cameras:** Ensure that dome type CCTV cameras include an integrated pan/tilt mechanism capable of providing 360-degree continuous pan with a minimum 90-degree tilt range (i.e., 0 to -90 degrees); provide variable speed control; have a preset position return accuracy of  $\pm 0.36$  degree, or less than 0.10% or better; support a minimum of 64 presets; support a minimum of one tour with a minimum of 32 presets; and support a minimum of eight programmable blackout zones.

**R** Ensure that the positioner within the dome type CCTV camera has a minimum automatic pan speed of 240 degrees per second to a preset camera position; that maximum manual pan and tilt speeds are programmable; that the maximum manual pan speed range is adjustable from 1 degree to a minimum of 80 degrees per second; and that maximum manual tilt speed range is adjustable from 1 degree to a minimum of 40 degrees per second.

**A** SUBARTICLE 782-1.2.4 (of the Supplemental Specifications) is deleted and the following substituted:

**782-1.2.4 Pan/Tilt Mechanism for External Positioner Type Cameras:** Ensure that external positioner-type CCTV cameras include a pan/tilt mechanism capable of providing 360-degree continuous pan with a minimum 115-degree tilt range (i.e., -90 to +25 degrees); provide variable speed control; have a preset position return accuracy of  $\pm 0.36$  degree, or less than 0.10% or better; and support a minimum of 32 presets.

**F** SUBARTICLE 782-1.2.5 (of the Supplemental Specifications) is deleted and the following substituted:

**782-1.2.5 Communication:** Ensure that the CCTV camera supports the NTCIP 1205 v1.08 communication protocol. Ensure that the camera is capable of communication with other devices using EIA-232 or EIA-422/485 at a rate of 9600 bps, TCP/IP, or UDP/IP. Ensure that the CCTV camera supports the communication links shown in the plans.

**T** SUBARTICLE 782-1.2.7 (of the Supplemental Specifications) is deleted and the following substituted:

**782-1.2.7 Mechanical Specifications:** Provide camera housings and hardware that are light in color or as noted in the plans.

Ensure that the camera housing has a sunshield to reduce the solar heating of the camera. Ensure that the total weight of dome type CCTV cameras (including the housing, sunshield, and all internal components) is less than 17.0 pounds. Ensure that the lower dome of the camera housing is distortion free clear plastic.

Ensure that pressurized dome-type housings are capable of pressurization at 5 pounds per square inch (psi) using dry nitrogen, that they have a low-pressure alarm feature, and carry a NEMA 4X/IP-67 rating.

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**D** If a nonpressurized dome-type housing enclosure is used, ensure that the unit is vented with a thermostat-controlled heater and blower. Ensure that the nonpressurized enclosure has a NEMA 4/IP-66 rating.

Ensure that the total weight of external positioner-type CCTV cameras (including housing, sunshield, all internal components, and external pan and tilt mechanism) is less than 35 pounds.

SUBARTICLE 782-1.2 (of the Supplemental Specifications) is expanded by the following:

**782-1.2.9 Additional Requirements for Internet Protocol (IP) Cameras:** The following sub-articles provide additional requirements for IP Enabled cameras.

**782-1.2.9.1 Video Encoding:** The camera must utilize the Moving Picture Experts Group's MPEG-2 video compression technology in accordance with the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) requirements detailed in the ISO/IEC 13818 standard or the Moving Picture Experts Group's MPEG4 part 10 (H.264) video compression technology in accordance with the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) requirements detailed in the ISO/IEC 14496-10:2009 standard.

**A** Ensure that the camera is capable of unicast and multicast operation, and that it supports the Session Announcement Protocol (SAP) as recommended by the Internet Engineering Task Force (IETF) RFC 2974, and Differentiated Services/Quality of Service (DiffServ/QoS) software components. Ensure that the camera provides 99.999% error-free operation. If the camera supports MPEG-2 encoding, ensure the encoded video can be transmitted utilizing programmable bit rates from 1Mbps to 8 Mbps, If the camera supports H.264 encoding, ensure the encoded video can be transmitted utilizing programmable bit rates from 64kbps to 8 Mbps. Ensure the camera supports, at a minimum, fixed bit rate mode.

**782-1.2.9.2 Encoded Video Interoperability:** Ensure the camera's encoded video is interoperable with hardware and software decoders from other manufacturers. Ensure the camera's encoded video can be decoded by a minimum of two other manufacturer's software decoders and a minimum of two hardware decoders.

**782-1.2.9.3 Encoded Video Specifications:** Ensure that the camera's encoded video supports resolutions that include, but are not limited to, those defined in Table 3.1. Ensure that the camera is capable of delivering color and monochrome video at 30 fps regardless of resolution.

**F**

Table 1.1 – Resolution Requirements	
Format	Resolutions
MPEG-2	352 x 240, 352 x 480, 720 x 480
H.264	176 x 120, 352 x 240, 720 x 480

**T** Note: The resolutions attained depend on the data transmission rate.

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**D** **782-1.2.9.4 Network Interface:** Ensure that the camera's local area network (LAN) connection supports the requirements detailed in the IEEE 802.3 standard for 10/100 Ethernet connections. The camera shall have a minimum of one Ethernet port, which shall be a 10/100 Base-TX connection. Ensure that the connector complies with applicable EIA and TIA requirements.

Ensure that all Category 5E, unshielded twisted pair/shielded twisted pair network cables are compliant with the EIA/TIA-568-A standard. Ensure that the network communication conforms to Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Version 4 of the Internet Protocol (IP), Real Time Streaming Protocol (RTSP), and Version 2 of the Internet Group Multicast Protocol (IGMP) at a minimum. Ensure the camera can be controlled via NTCIP using either TCP/IP or UDP/IP.

**R** **782-1.2.9.5 Configuration Management:** The camera shall support local and remote configuration and management. Configuration and management functions shall include access to all user-programmable features, including but not limited to network configuration, video settings, device monitoring, and security functions. Ensure that the camera supports configuration and management via serial login, telnet login, or a Web-based interface.

SUBARTICLE 782-1.3 (of the Supplemental Specifications) is deleted and the following substituted:

**A** **782-1.3 Installation Requirements:** Install the CCTV camera on a pole in accordance with Index Nos. 18100 through 18111 and as shown in the plans.

Furnish and install the power supplies, local control equipment and any other camera-related field electronic equipment, and transient voltage surge suppressors within a pole- or base-mounted lockable cabinet. Ensure that the cabinet protects these electrical and electronic devices from rain, dust, dirt, and other harmful elements of nature.

Furnish and install all power, video, and data cables necessary to provide connection points for camera video and PTZ control signals within the cabinet. Furnish and install any and all ancillary equipment required to provide a complete and fully operational CCTV camera. Verify that all wiring meets NEC requirements where applicable.

**F** Ensure that data and video cables from the pole or support structure to the camera are routed inside the mounting hardware and protected from exposure to the outside environment.

Coat the exterior of the dome-type enclosure's lower half with a clear, rain repellent product prior to final acceptance.

SUBARTICLE 782-1.4.1 (of the Supplemental Specifications) is deleted and the following substituted:

**T** **782-1.4.1 General:** Subject the equipment covered by these specifications to a field acceptance tests (FATs). Develop and submit a test plan to the Engineer for review and approval. Ensure that the test plan demonstrates each and every functional requirement specified for the device or system under test. The Engineer reserves the right to witness all tests.