ITEM 683.030600NA – HD CCTV DOME IP CAMERA ASSEMBLY

DESCRIPTION

This work shall consist of furnishing and installing HD CCTV Dome IP Camera Assemblies in accordance with the contract documents and as directed by the Engineer.

MATERIALS

1. Product Description

- The dome camera system specified herein shall provide an integrated network IP dome positioning system (IPDPS) providing 720p/30 video with H.264/MJPEG compression and encoding for providing low bandwidth, low latency, high quality video images transported over standard Ethernet infrastructure.
- The (IPDPS) shall integrate an HDTV standards 720p resolution @ 30 frames/sec day/night camera with integral 18x motorized zoom optics, an H.264/MJPEG ASIC based encoding engine and network communication circuitry, a wide dynamic range variable speed positioning drive, completely protected by an IP67 sealed and pressurized dome enclosure system.
- The H.264/MJPEG encoded video shall support 30 frames per second @ HDTV 720p resolution with support for uni-cast and multi-cast connections, using RTP/RTSP network layers.
- The (IPDPS) shall provide an integral web HTTP server allowing password protected administration/configuration capabilities along with full camera and positioning system control and viewing functions.
- The (IPDPS) camera manufacturer shall provide a software development kit (SDK) for allowing any 3rd party developers all necessary tools for integrating the (IPDPS) system into the users control system environment.
- The (IPDPS) shall provide hybrid capability delivering both ethernet and analog composite video and RS422 serial connections for external system connections and control.
- The (IPDPS) positioning drive system shall provide wide dynamic range speed capability of 0.1 to 200 degrees per second, with a 0.1 degree repeatability, 360 degree continuous pan rotation, and +5 to –90 degree tilt range as a minimum.
- The (IPDPS) shall include an advanced ID generation capability for indications of viewing direction, compass setting, azimuth/elevation position, location descriptors and user defined image/logo.
- The (IPDPS) shall be designed for use in harsh operational environments conforming to NEMA TS2 requirements for power, shock and vibration as well as IP67 environmental standards.
- The (IPDPS) units shall be fully assembled, pressurized and tested at the original manufacturing facility and shipped as a complete unit, ready for installation and commissioning.

2. Quality Assurance

- Equipment: The HD CCTV Assembly shall have been satisfactorily used in projects of similar size and complexity for not less than two years.
3. Delivery, Storage and Handling Quality Assurance

- Deliver materials in manufacturer's original, unopened, protective packaging.
- Store materials in a clean, dry space, protected from weather.
- Handle in a manner to prevent damage to finished surfaces.
- Where possible, maintain protective covering until installation is complete and remove such coverings as part of final clean up.
- Touch up damage to finishes to match adjacent surfaces, including recoating of galvanized or plated surfaces where damaged, cut, or drilled.

4. Product Specifications

The (IPDPS) shall meet or exceed the following design and performance specifications.

A. Camera Module

1. Image Sensor: Progressive Scan Ex-View ICX445AKA CCD
2. Image Size: Diagonal 6mm (1/3” type)
3. Image Resolution: 1280 horizontal; 720 vertical
4. Picture Elements (total) 1348 (H) x 976 (V)
5. Video Output: 16 Bit Digital YUV: 4.2.0
6. Day/Night Operation: Adjustable (Auto, Color and Mono Modes) via removable IR cut filter
7. Maximum Lens Aperture: f/1.6 (wide) to f/2.8 (tele)
8. Optical Zoom Range: 18X, 4.7mm to 84.6mm
9. Optical Zoom Speed: Two speeds, from approximately 3.5 seconds to 5 seconds full range
10. Horizontal Angle of View: Optical: 55.2° to 3.2
11. Minimum Focus Distance: 0.01m (w); 1.0m (t)
12. Auto Focus: Selectable Auto/Manual; Minimum Scene Illumination for Reliable Auto Focus shall be no more than 50% video output.
13. Manual Shutter: Selectable shutter speeds shall be from 1/30 to 1/10,000.
14. Auto Iris; Selectable auto/manual; Iris shall automatically adjust to compensate for changes in scene illumination to maintain constant video level output within sensitivity specifications.
15. Sensitivity: Scene Illumination; F1.6 @ 50% Video
   a. 1.8 Lux (0.18 fc) @ 1/30 shutter, color mode
   b. 0.02 Lux (0.002 fc) @ 1/4 shutter, mono mode

B. H.264/MJPEG Encoding Engine

The (IPDPS) system shall fully integrate within its positioning system enclosure the H.264/MJPEG encoding component with functions as specified below;

1. Video Encoding: H.264 (Main Profile/Level 3.1) and MJPEG standards
2. Video Streams: Two independently configurable streams; (2) H.264 streams or (1) H.264 and (1) MJPEG or (1) H.264 or MJPEG and 1 NTSC or PAL.
3. Video Stream Configuration Properties;
   a. Stream Settings
      1) Video Stream 1: H.264
      2) Video Stream 2: H.264 or MJPEG
   b. Image Resolution: 720p, D1, VGA, CIF
   c. Streaming Mode: CBR or VBRe.
   d. Image Settings: (GOP (M, N)), Quality Value
   e. Frame Rate: 30, 15, 7, 4, 2, 1

4. Data Rate: Adjustable from 256k to 8Mb/sec
5. Connection Types: Uni-cast, multi-unicast or multi-cast
6. IPDPS video latency: <133ms
7. Network Protocol Layers: RTP, RTSP, UDP, TCP, IP, HTTP, IGMPv2, ICMP, ARP as a minimum

C. Positioning Drive
1. Pan Movement; 360 degrees continuous rotation
2. Pan Speed; Variable from 0.1 to 80 degrees/second.
3. Pan Repeatability; +/- 0.1 degree precision
4. Pan Preset Speed; 180 degree movement < 2 Seconds
5. Tilt Movement; Minimum of +5 to –90 degrees
6. Tilt Speed; Variable from 0.1 to 40 degrees/second.
7. Tilt Repeatability; +/- 0.1 degree precision
8. Tilt Preset Speed; 90 degree movement < 2 Seconds
9. Positioning control shall allow variable pan/tilt speeds based on zoom position. This shall scale the maximum pan/tilt speed, while maintaining variable speed capability, throughout the zoom range of the camera.

D. Camera/pan-tilt interface cable (Composite Cable)
1. The Camera/pan-tilt interface cable (Composite Cable) for composite Video, camera control and power shall be furnished by and meet the requirements of the camera manufacturer and be furnished at the lengths required for the installation. The cable shall be furnished and installed with factory-installed connectors to mate to the CCTV Assembly and to the camera controller, modem or switch in the camera cabinet. The Contractor shall verify the required cable length and connector type prior to furnishing.

E. Operational
1. Required camera control functions shall include the features and capabilities as a minimum to control the Day/night Mode, Shutter Speed, White balance, Maximum AGC Level, Wide Dynamic Range, Backlight Compensation, Focus; Auto or manual mode, Iris; Auto or manual mode, Zoom Lens Control, Pan/Tilt Positioning, etc.
2. Presets; Minimum of 64, with each preset consisting of a pan, tilt, zoom and focus coordinate and ID label.
   a. ID Label: Provide 1 line of up to 24 ASCII characters on video for Preset ID description. When a preset position is recalled the corresponding preset ID shall be displayed. The preset ID shall remain displayed until a pan, tilt, zoom or another preset command is received.

3. Preset Tours; Minimum 8 tours required, each tour shall consist of up to 32 pre-programmed presets, with individual dwell time property per preset per tour.
   a. Tours shall stop upon receipt of any pan/tilt positioning command.
   b. Tour data shall be stored in non-volatile memory and shall not be lost if a power failure occurs.

4. Scalable Zoom; Variable speed pan/tilt ranges based off of zoom position. This adds the capability of limiting the maximum pan/tilt speed, while maintaining variable speed capability, throughout the zoom range of the camera.

5. Updates: The (IPDPS) shall allow updates of firmware for new features via the ethernet network communication channel. An internal (IPDPS) web server shall be provided for performing this task.

6. The (IPDPS) system shall return to previous position and state of operation upon power loss and restoration.

F. On Screen Display

1. Camera ID
   a. Two Lines of up to 24 alpha-numeric characters
   b. Enable / Disable Mode

2. Logo Display
   a. Maximum logo size of up to 128x128 pixels
   b. Shall be a 24-BPP Bitmap
   c. Enable / Disable Mode
   d. Selectable X/Y Position
   e. Selectable Foreground Opacity Setting

3. Time/Date Display
   a. Enable / Disable (ON/OFF)
   b. Selectable X-Y Position
   c. Date: DD/MM/YY or MM/DD/YY
   d. Time Format: 24 Hour or AM/PM

4. Network Time Protocol (NTP) (CENTRAL TIME SERVER)
   a. Enable / Disable NTP
b. NTP Server IP Address

5. Internal Temperature Display
   a. Metrics (US or Europe (Ft or M; °F or °C)

G. Maintenance Functions

The camera system shall support maintenance features as defined below;

1. The camera system shall support querying of camera parameters via the Ethernet connection. The camera parameters shall consist of the following items.
   a. Serial number
   b. Software revision
   c. Assembly date
   d. Camera Model Number

2. Internal Temperature Monitoring and Reporting
3. Remote Software Upload/Updates via ethernet
4. Camera Device Auto Discovery of IP address
5. Camera System Auto Re-connect
6. Camera System Reset
7. Save and Restore camera system start-up configuration

H. IP Management

The (IPDPS) shall provide at minimum the following network configuration properties;

1. IP Configuration: DHCP or Static IP address entry
2. Net mask address entry
3. Gateway address entry
4. Domain name entry
5. DNS server entry

I. Power Input

The (IPDPS) system shall fully comply with and include independent laboratory test results confirming compliance with the following electrical operating conditions;

1. Power; <40 Watts (exclusive of PT Heater Option)
2. Operating Voltage; 89 to 135Vac +/-3hz. Shall comply with NEMA-TS2 para 2.12 and 2.1.3
3. The (IPDPS) system shall NOT require any external to Camera System step-down power supply transformer/interface box for accepting the specified operating voltage. Products requiring this shall not acceptable.

J. Mechanical

1. Connectors; 18 Pin MS style PT06E-14-18S(SR) weatherproof non-corrosion
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2. Weight; Maximum 14.0lbs
3. Dimensions; Maximum 11.05" D x 13.74" W.
4. Construction; Powder Coated 6061 T6 aluminum; all internal and external parts corrosion protected, stainless steel fasteners. Faceplate shall be optically correct 0.230" thick glass.
5. Camera Mount; 6" Base plate with (4) 1/4-20 threaded holes 4.75 BC. Options for larger base plates with 7.00" BC shall be available.

K. Environmental

The (IPDPS) system shall fully comply with and include independent laboratory test results confirming compliance with the following environmental operating conditions;
1. Temperature; -29 F to 165 F tested across low and high voltage ranges per NEMATS2 paragraphs 2.1.2 and 2.1.3.
2. Vibration; Per Nema-TS2 paragraphs 2.1.9, 2.2.3, 5-30Hz sweep @ 0.5g applied in each of 3 mutually perpendicular planes.
3. Shock; Per NEMA-TS2 paragraphs 2.1.10, 2.2.4, 10g applied in each of 3 mutually perpendicular planes.
4. Water Spray; Per IEC 60529+A1, 1999, Para 14.2.6, Solid water stream delivered thru 12.5mm nozzle @ 25 gallons/minute @ 9ft for 3 minutes
5. External Icing; Per NEMA-TS2 250-2003, paragraphs 5.6
6. Corrosion Protection; Per Nema 250-2003, paragraphs 5.10
7. Humidity; 0-100% N.C per MIL-E-5400T, paragraphs 3.2.24.4
8. Standards; IP67, ASTM-B117 Marine

L. Certifications

1. Safety; CE (24Vac)
2. Emissions; FCC Class A

CONSTRUCTION DETAILS

This item will consist of furnishing and installing a HD Closed Circuit Television (CCTV) Dome IP Camera Assembly at locations shown on the plans or as directed by the Engineer. The HD CCTV Dome Camera Assembly (CCTV Assembly) shall be installed on poles as shown in plans. Poles shall be existing or provided under other contract items. All materials, labor, workmanship, equipment, testing, documentation, and incidental items required to install and test a complete and operational Furnish and Install CCTV Dome Camera Assembly shall be supplied including but not limited to the following:

1. HD CCTV Dome IP Camera Assembly
   • Camera with optical and digital zooms, automatic iris and daylight and nightlight sensitivity.
   • Environmental enclosure
   • Pan-tilt unit with preset
   • Pole Top Camera Mount
   • Camera / pan-tilt interface/ power cable (Composite cable) of the length required from the camera to the camera cabinet.

2. Examination
Inspect all System equipment and accessories prior to installation. Replace any damaged items.

Ensure that the spaces where any electronic equipment is to be stored and/or installed is completely free from any foreign substances, such as concrete dust, water, or any other material that may otherwise be harmful to electronic equipment and connections. No allowances shall be made to the Contractor for equipment damage, or delays due to environmental/security damage.

3. Preparation

The Contractor shall be responsible for field verification of dimensions and coordination of conduit entry and all other mounting conditions with the entity manufacturing the equipment.

The entity manufacturing the equipment shall provide on-site technical supervision and assistance during installation and interconnection of the system equipment installed by the Contractor. Said supervision is to insure the safety of the proper installation and operation of the system equipment, prior to the installed system beginning the 30-day operational test.

An on-site inspection will be made by the Engineer after the system equipment has been delivered. If any equipment has been damaged or for any reason does not comply with the requirements of this Section, the Contractor will be notified in writing, and shall be required to replace the equipment at his own cost and expense, even though the equipment has been previously inspected, tested, and approved for shipment. After such satisfactory replacement, the Contractor shall install the system.

4. Installation Details

The Contractor shall install the specified HD CCTV assembly at locations shown on the plans and as directed by the Engineer. The equipment shall be installed on a pole at locations shown in the Contract Documents and Specifications. Particular care shall be given to the interconnection of all the components and the cabling, especially cabling through the conduit in the pole.

All incidental parts which are necessary to complete the installation, but are not specified herein or on the plans, shall be provided as necessary to provide a complete and properly operating system. The Contractor shall prepare a shop drawing that details the complete Camera assembly and all components to be supplied.

Install all System equipment in accordance with the manufacturer’s written instructions in the locations shown on the Contract Drawings.

All control power and data communications wire shall be wired and harnessed within the equipment enclosures to meet the NEC requirements and utilize standard industry practices.

All wiring shall be clearly labeled with function and wire identification number corresponding to the manufacturer's wiring diagrams and/or approved Shop Drawings.

Where external circuit connections are required, terminal blocks shall be provided and the manufacturer's drawings must clearly identify the interconnection requirements including...
wire type to be used.

- All wiring required to externally connect equipment lineups shall be installed by the electrical contractor.
- Contractor interconnection wiring requirements shall be clearly identified on the "AS-BUILT" system drawings.

5. Testing Requirements

The HD CCTV assembly shall be subjected to several levels of testing (post installation, and 30-day operational acceptance) as described in these Specifications. The Engineer reserves the right to inspect and/or factory test any completed assemblies prior to delivery of the material to the project site. Any deviation from these specifications that are identified during testing shall be corrected prior to shipment of the assembly to the project site.

A post installation test shall be performed for each completed Camera assembly. The test shall be conducted from the field equipment cabinet utilizing PC diagnostic to be supplied. The Contractor shall verify that the camera can be fully used and moved through the entire limit of Pan, Tilt, Zoom, and Focus. The test shall also verify capabilities that all cabinet alarms (door open, temperature, etc) are operable, controllable and the appropriate status can be read via the control port of the control receiver driver. In addition, with the use of a monitor the video signal shall be demonstrated to be according to specification.

30-day operational acceptance shall be performed for the completed Camera system. The test shall be conducted from the field equipment cabinet and central operations. The Contractor shall verify that the camera can be fully used and moved through the entire limit of Pan, Tilt, Zoom, and Focus. The test shall also verify capabilities that all cabinet alarms (door open, temperature, etc) are operable, controllable and the appropriate status can be read via the control port of the camera controller module. In addition, with the use of a monitor the video signal shall be demonstrated to be according to specification.

Post-Installation Tests

After installation, a post installation test of the equipment shall show compliance with this Section and the manufacturer’s specifications. The Contractor shall submit the proposed testing procedure to the Engineer for approval two weeks prior to proposed start of test. Said testing shall continue until the results surpass the test criteria and are satisfactory to the Engineer. The Contractor shall perform any repairs, construction, or modifications as required complying with this Section without additional cost to the County.

The Contractor shall completely check out, calibrate and test all connected hardware and software to insure that the system performs in accordance with the requirements of this Section, the manufacturer’s specifications and sequences of operation submitted. Correct any malfunctions as they occur, said malfunctions shall include, but not be limited to, equipment failure or failure of the system to comply with the requirements of this Section and to the manufacturer’s specifications.

The Contractor shall submit a test report detailing compliance with the requirements of post-installation testing.

After satisfactory completion of post installation testing and after construction is complete, a 30-
day operational test shall commence on the entire CCTV surveillance system.

30-Day Operational Test

The 30-day operational test shall commence with the approval of the engineer after post installation testing of all components and the complete CCTV surveillance system is operational.

The Contractor shall submit the proposed testing procedure to the Engineer for approval two weeks prior to proposed start of test. Said testing shall continue until the results surpass the test criteria and are satisfactory to the Engineer. The Contractor shall perform any repairs, construction, or modifications as required complying with this Section without additional cost to the County.

Testing shall be performed to verify compliance with the requirements of this Section and the manufacturer’s specifications and shall be performed in accordance with the approved testing plan. Correct any malfunctions as they occur, said malfunctions shall include, but not be limited to, equipment failure or failure of the System to comply with the requirements of this Section and to the manufacturer’s specifications.

Malfunctions shall stop the 30-day operational test for repair of the equipments. After corrections have been made, the 30-day operational test shall restart a new 30-day period and shall continue until the results are satisfactory to the Engineer for a period of 30 consecutive days.

Maintain a log during all operational testing. Include a narrative description of corrective measures required and items required or replaced.

6. Documentation Requirements

- Five (5) complete sets of operation and maintenance manuals shall be provided. The manuals shall include detail and complete information as follows:
  - Equipment operation
  - Installation procedures
  - Accurate schematic diagrams
  - Performance specification (functional, electrical, mechanical, and environmental)
  - Accurate troubleshooting, diagnostic and maintenance procedures
  - Parts list including names of vendors for parts not identified by universal part numbers such as JEDEC, RETMA, or EIA
  - Communications protocol
  - One copy of the final pole mounted cabinet-wiring diagram shall be placed in the cabinet and one reproducible and two copies delivered to the Engineer.

7. Training Requirements

- Prior to installation of any specified equipment, the Contractor’s personnel shall have received training from the vendor/supplier on installation, operations, testing, maintenance, and repair procedures of all equipment.
- In addition, training shall be provided for up to 10 individuals designated by the Engineer. The training shall include all material and manuals required for each individual. The training shall be as follows:
  - Engineering Training - A minimum of 8 hours of training for up to ten (10) engineering and
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operations personnel shall be provided. The training shall include both classroom and hands on CCTV equipment assembly operation and all equipment capabilities including interface to the TMC and the Video Switching and Control Equipment.

Maintenance Training - A minimum of 8 hours of training for ten (10) maintenance personnel shall be provided. The training shall include both classroom and hands on equipment operation and maintenance. It shall include the CCTV equipment theory of operation, operation instructions, circuit description, and troubleshooting, preventative maintenance, including interface to the TMC and Video Switching and Control Equipment for diagnostics

METHOD OF MEASUREMENT

This work will be measured as the number of HD CCTV Dome IP Camera Assemblies satisfactorily furnished and installed.

BASIS OF PAYMENT

The unit bid shall include the cost of furnishing all labor, materials, tools and equipment necessary to satisfactorily complete the work including camera assemblies, camera enclosure, controller module, composite Video and camera control/ power cable, integrations, testing, training, cable. All miscellaneous hardware required for the installation of the unit, including but not limited to coaxial cables, fiber optic jump cables, control and power cabling, connectors, terminations, and mounting hardware, between the video and communication equipment. Payment for all documentation, testing, and test equipment used for the testing of the HD CCTV Dome IP Camera Assembly shall be included in this item.