**PART 1 GENERAL**

**1.1 SUMMARY**

 A. Provide a complete network HD Fixed Camera System, including engineering, components, installation and commissioning.

**1.2 RELATED SECTIONS**

A. Section 260500 – Common Work Results for Electrical, for interface and coordination with building electrical systems and distribution.

 B. Section 280513 – Conductors and Cables for Electronic Safety and Security, for cabling between system servers, panels, and remote devices.

 C. Section 280528 – Pathways for Electronic Safety and Security, for conduit and raceway requirements.

 D. Section 281300 – Security Management System, for interface and coordination with electronic access control systems.

 E. Section 282323 – Video Surveillance System Infrastructure

**1.3 REFERENCES**

A. Reference Standards: Provide systems which meet or exceed the requirements of the following publications and organizations as applicable to the Work of this section:

1. Electronic Industry Association (EIA)

2. Federal Communications Commission (FCC)

3. National Television Systems Committee (NTSC)

4. Underwriters Laboratories Inc. (UL)

5. Institute for Electrical and Electronics Engineers (IEEE)

6. Open Network Video Interface Forum (ONVIF)

**1.4 SYSTEM DESCRIPTION**

A. The network multi-megapixel and multi-direction camera platform shall provide an all-in-one solution for capturing wide area, multi-direction video surveillance while maximizing the field-of-view flexibility and reducing the total number of camera installations required.

**1.5 SUBMITTALS**

1. Manufacturer’s Product Data: Submit manufacturer’s data sheets indicating systems and components proposed for use, including instruction manuals.
2. Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components.
3. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings not later than Substantial Completion of the project.
4. Operation and Maintenance Data: Submit manufacturer’s operation and maintenance data, customized to the system installed. Include system and operator manuals.
5. Field Tests: Submit results of field testing of every device including date, testing personnel, retesting date if applicable, and confirmation that every device passed field testing.
6. Maintenance Service Agreement: Submit a sample copy of the manufacturer’s maintenance service agreement, including cost and services for a one year period for Owner’s review. Maintenance shall include, but not be limited to; labor and materials to repair the system provide test and adjustments, and regular inspections.

**1.6 QUALITY ASSURANCE**

A. Manufacturer: Shall have a minimum ten years’ experience in manufacturing and supporting IP HD networked Fixed Cameras and video recording systems. Manufacturer shall be capable of providing technical assistance and support.

**1.7 DELIVERY, STORAGE, AND HANDLING**

A. Deliver materials in manufacturer’s labeled packages. Store and handle in accordance with manufacturer’s requirements, in a facility with environmental conditions within recommended limits.

**1.8 WARRANTY**

A. Manufacturer’s Warranty: The warranty period shall be thirty six (36) months from the delivery date of the system under normal use and service.

**PART 2 PRODUCTS**

**2.1 GENERAL**

A. All equipment and materials incorporated shall be standard components that are regularly manufactured and used in the manufacturer's system.

B. All systems and components shall have been thoroughly tested and in actual use.

C. The specified product shall be manufactured by a firm whose quality system is in compliance with the I.S. EN ISO 9001:2008, QUALITY SYSTEM.

**2.2 SYSTEM CAPABILITIES**

A. The multi-directional dome system specified herein shall provide a fully integrated 8MP, 3600 viewing system containing four (4) 1080p30 cameras with 2.8x auto focus zoom optics capability.

B. The multi-directional dome system shall incorporate H.264 compression and encoding technology for providing low bandwidth, low latency and high quality video images transported over standard Ethernet infrastructures

C. The multi-directional dome system shall provide two (2) independently configurable video streams for each 1080p30 sensor. Configurable video stream properties shall include image resolution and frame rate, data bit rate and data rate mode (CBR/VBR).

D. The multi-directional dome system shall include a web server allowing password protected administration/configuration capabilities.

E. The multi-directional dome system shall include OSD capability for viewing location descriptors available for display on each camera sensors view.

F. The multi-directional dome system shall provide an operating temperature range of +55C to -20C.

G. The multi-directional dome system shall provide superior IP66 ingress protection.

H. The multi-directional dome system shall support ONVIF Profile S interface for providing a standardized interoperability of 3rd party system equipment.

I. The multi-directional dome system shall provide remote pan/tilt/zoom adjustments for each cameras field of view over IP for efficient installation and configuration.

**2.3 PERFORMANCE SPECIFICATIONS**

**A. CAMERA IMAGING SYSTEM (x4 Cameras)**

1. Image Sensor: Progressive Scan CMOS
2. Image Size: 1/2.9”
3. Image Resolution: 1920 horizontal x 1080 vertical pixels
4. Picture Elements (total) 1920 (H) x 1280 (V)
5. Sensitivity: Scene Illumination;

a. 0.5 Lux (0.05 fc) @ 1/30 shutter, color mode

1. Day/Night Operation: Adjustable (Auto, Color and Mono Modes) via removable IR cut filter.
2. Optical Zoom Range: 2.8x, 2.8mm to 8mm minimum

a. Provide for remote control of zoom in/out functions over IP.

1. Maximum Lens Aperture: f/1.2 (wide) to f/4.6 (tele)
2. Horizontal Angle of View: Optical: 90° to 35°
3. Focus: Focus shall automatically adjust to compensate for changes in scene quality to maintain constant sharpness of image.
4. Iris: Iris shall automatically adjust to compensate for changes in scene illumination to maintain constant video level output within sensitivity specifications.

**B. H.264/MJPEG ENCODING ENGINE**

* 1. The camera system video encoder shall provide two independently configurable video streams. Each video stream shall provide the following configurable properties;
		1. Codec: H.264 BP

b. Resolution:

 1. Primary stream: 1080p, 720p, D1, 2CIF, CIF

 2. Secondary stream: CIF

c. Frame Rate: 10 to 30 Frames

d. Bite Rate control: Variable Bit Rate or Constant Bit Rate

e. Bit Rate: Selectable from 64kbs to 10Mbs

f. GOV Length: Selectable from 1 to 60 in increments of 1

2. Video Streaming Protocols; the camera system shall support the following streaming protocols:

a. RTSP/RTP; The RTSP communication shall occur over a TCP socket. RTP video packets shall be sent over UDP. This mode shall be available at all times for H264 and MJPEG encoded streams.

3. Connection Types: Uni-cast, multi-unicast

4. Camera Video Latency: <135ms (4 frames maximum)

5. Network Protocol Layers: TCP, UDP, IPv4, IGMP, ICMP, RTP, RTSP, NTP, HTTP, ARP and ONVIF Profile S as a minimum

**D. WEB INTERFACE CONFIGURATION REQUIREMENTS**

1. Required camera control functions shall include the following features and capabilities as a minimum; these functions shall be exposed as part of the multi-directional dome system web server.

a. Network Settings

 1. IP, subnet, gateway addresses

b. Time Sync

 1. Sync to PC or NTP Server [IP address]

c. User Management

 1. Assign users and level of access [Administrator or Operator)

d. Media Settings

 1. Bit Rate Control [64k to 10Mb]

 2. Image Resolution [1080p, 720p, D1, CIF]

 3. Bit Rate [64kb to 10mb]

 4. Frame Rate [10 to 30 Frames]

 5. I Frame Interval [1 to 600]

 6. Encoding Priority Mode [Frame or Quality priority]

 7. Encoding Complexity [High, Middle, Low]

e. OSD Settings

 1. Text [32 Characters]

 2. Size [10-100 pixels]

 3. Position [x-y coordinates]

2. Updates: The multi-directional dome system shall allow updates of firmware for new features via the Ethernet network communication channel. An internal HD Fixed Camera System web server shall be provided for performing this task.

3. The multi-directional dome system shall return to previous position and state of operation upon power loss and restoration.

4. The multi-directional dome system shall provide an IP66 ingress protected dome enclosure system.

**F. COMMUNICATION PROTOCOLS AND FORMATS**

1. The multi-directional dome system shall include integrated video camera system communication drivers for flexibility and system interoperability using ONVIF Profile S

**G. ON-SCREEN DISPLAY (OSD)**

1. The multi-directional dome system shall support displaying an OSD element. The OSD element shall include at a minimum;

1. Custom Location Descriptor
2. OSD Size Property
3. OSD Position Coordinate

**H. MAINTENANCE FUNCTIONS**

The multi-directional dome system shall support maintenance features as defined below;

1. The multi-directional dome system shall support querying of camera parameters via the Ethernet connection. The camera parameters shall consist of the following items

a. Software revision

b. Camera Model Number

 2. Remote Software Upload/Updates via Ethernet

3. Camera Device Auto Discovery of IP address

 4. Camera System Reset

1. **IP/NETWORK MANAGEMENT**

1. The HD Fixed Camera System shall provide at minimum the following network configuration properties;

a. IP Configuration: Static IP address entry

b. Net mask address entry

 c. Gateway address entry

 **I. POWER INPUT**

1. Power; 15 Watts

2. Operating Voltage; The camera system shall provide flexible power input options as required by the installation to include;

 1. Power over Ethernet (802.3af)

**J. MECHANICAL SPECIFICATIONS**

1. Connectors; The multi-directional dome system shall provide CAT5e pigtail cable terminated into a RJ45 male connector for power and Ethernet data. The outer jacket shall be sunlight resistant industrial grade PVC suitable for outdoor use. An IP67 or better RJ45 coupler shall be included for protection of the

2. Weight; 13.8 pounds (6.3 kg) maximum

3. Dimensions; 12.8” (325.12 mm) W x 9.5” (241.3 mm) H

4. Construction; Powder Coated 6063 T5 aluminum; all internal and external parts corrosion protected, stainless steel fasteners.

5. Camera Mount; 1.5” NPT

**K. ENVIRONMENTAL REQUIREMENTS**

1. The multi-directional dome system shall fully comply with and include independent laboratory test results confirming compliance with the following environmental operating conditions;

a. IP66 Ingress Protection

2. Temperature; The system shall operate correctly in the temperature range of --20°C (-4°F) through +55°C (+131°F).

**2.4 CERTIFICATIONS**

A. FCC Class B

B. IEC/CE CISPR 22 24

C. RoHs

 **2.5 WARRANTY INFORMATION**

A. Manufacturer’s Warranty: The warranty period shall be thirty six (36) months from the delivery date of the system under normal use and service.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. Examine areas to receive devices and notify adverse conditions affecting installation or subsequent operation.

B. Do not begin installation until unacceptable conditions are corrected.

**3.2 PREPARATION**

* + - * 1. Protect devices from damage during construction.

**3.3 INSTALLATION**

A. Install devices in accordance with manufacturer’s instruction at locations indicated on the floor drawings plans.

B. Perform installation with qualified service personnel.

C. Install devices in accordance with the National Electrical Code or applicable local codes.

D. Ensure selected location is secure and offers protection from accidental damage.

E. Location must provide reasonable temperature and humidity conditions, free from sources of electrical and electromagnetic interference.

**3.4 FIELD QUALITY CONTROL**

A. Test snugness of mounting screws of all installed equipment.

B. Test proper operation of all video system devices.

C. Determine and report all problems to the manufacturer’s customer service department.

**3.5 ADJUSTING**

A. Make proper adjustment to video system devices for correct operation in accordance with manufacturer’s instructions.

B. Make any adjustment of camera settings to comply with specific customer’s need.

**3.6 DEMONSTRATION**

* + 1. Demonstrate at final inspection that video management system and devices functions properly.

END OF SECTION