item #1112286A – 360 DEGREE Camera assembly

ITEM #1112287A – 360DEGREE VIDEO DETECTION processor

ITEM #1113725A – 23 AWG 4 TWISTED PAIR CATEGORY 6 CABLE

Description:

Furnish and install a 360 Degree Video Image Detection System (360VIDS) as shown on the plans or as directed by the Engineer. The 360VIDS consists of a 360 Degree Camera Assembly (360CA), 360 Degree Video Detection Processor (360VDP) and 23 AWG 4 Twisted Pair Category 6 Cable.

Materials:

All hardware shall be new, corrosion resistant. All equipment shall be current production.

# 360 Degree Camera Assembly:

**Camera:**

* No-aim, no-focus camera
* Downward facing lens and camera shroud
* Single Power Over Ethernet (POE) connection for power and data collection.
* Color image camera with 360 degree point of view (POV)
* Active picture elements (pixels): 2560 (H) x 1920 (V), minimum.
* Signal to noise ratio : ≥55dB
* Heated camera
* IP addressable

**Camera Enclosure:**

* Tamper proof constructed of painted or powder coated aluminum of at least 0.25 inch thickness.
* IP66-rated camera housing.

**Camera Mounting Hardware:**

* Smartmount bracket.
* Junction box.
* Banded bracket.
* 90 degree vertical riser:
* For mast arms, use vertical riser height specified on the plans
* For span poles with horizontal extension brackets, use shortest vertical riser height physically possible
* For span poles with no horizontal extension brackets (Shaft mounted), use vertical riser height specified on the plans

# 360 Degree Video Detection Processor:

Functional:

* Connectivity: Local Area Network (LAN), Wide Area Network (WAN), Camera interfaces.
* NEMA TS1/ TS2, ATC, Type 170, and 2070 compatible
* Four (4) USB 3.0 expansion ports.
* Front panel LED indicators displays calls and light states.
* I/O controller.
* Two (2) camera ports – Up to two (2) 360 Degree Camera Assembly; or one (1) 360 Degree Camera Assembly and four (4) IP video detection camera assembly or thermal detector assembly; or eight (8) IP video detection camera assembly or thermal detector assembly.
* Phase and detection display.
* Shall include at least a built-in 4g modem (or higher) and be Wi-Fi capable
* Power – 110/220 VAC 50/60 Hz
* Point and click zone drawing feature
* Omni-directional vehicle tracking
* Zone level visibility monitoring
* Monitor phases and loops, generates calls to controllers
* Software required to support collection of data
* Environmental : -29F to +165F (-34C to +74C), 0-95% non-condensing
* Fail-safe in the event of loss of video from 360CA or loss of power to 360VDP.
* Shall be able to configure and adjust the detection zone with the cabinet mounted Vehicle Detection Monitor (VDM) or remotely.
* Shall be activated to collect and report traffic data such as turning movements/volume counts, vehicle classification, speed, and red/green occupancy.
* Shall be configured to transmit collected traffic data and alarm events from field devices to remote desktop PC.
* Shall be configured to sync with a cloud network resource to allow for data backup including signal performance metrics data such as the Purdue coordination diagram.

**Application Software:**

* Shall be freely available for installation on any number of computers used to manage the 360VIDS.
* Shall be capable of point and click zone drawing
* Shall support the assignment of a detector output(s) to each zone. These assignments can be modified at any time through the software.
* Shall have the ability to digitally flatten CA image
* Shall have the ability to mask objects that occlude the camera field of view and/or disrupt the camera automatic gain and exposure control.
* Shall store detection zone data non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
* Shall have the ability to import and export program database to notebook PC or remote desktop PC. The program database shall also be allowed to be transferred via an external storage device.
* Shall be capable of superimposing detection zone on real time video image from selected camera with time stamping capabilities.
* Shall be capable of monitoring real time video and adjusting zones in field or remotely while 360VDP is actuating the traffic controller.
* Shall provide visual confirmation of detection by highlighting detection zone symbols.
* Shall allow for remote display of site/camera status for all connected sites.
* Shall provide visual indication of the light state for each zone within the graphical user interface.
* Shall be capable of searching the network for other 360VDP.
* Shall be compatible with Windows operating system supported by the Department.
* Shall maintain a historical log of all configurations when site is modified
* Shall feature the ability to digitally pan, tilt, and zoom within the camera assembly’s field of view without movement of the camera.
* Shall support quad view video monitoring.
* Shall be capable of syncing with a cloud network resource to allow for group site sharing of site program database information and historical traffic data report generation.
* Shall maintain a database of current and historical traffic data
* Shall allow users to create reports for turning movements/volume counts, vehicle classification, speed, red/green occupancy, and site alerts remotely via the software and online reports/performance measures via the web.
* Shall display data in a graph, chart, and table format.
* Shall display data in 15, 30, and 60-minute intervals.
* Shall provide a means by which alerts can be configured to be delivered to different individuals via email
* Report output formats shall include at minimum PDF, rich text format, and Microsoft Excel formats.

**Physical:**

* Either shelf mounted, stand-alone design or modular card rack design.
* Aluminum card rack frame capable of accepting four (4) 360VDP modules.
* TS1 harness cable.
* Standard Ethernet and USB connectors for video input and video output.
* Female metal shell connector with latching clamp for NEMA TS 1 detector outputs and inputs.
* LED indications to monitor all detector outputs.
* Side or rear mounted connectors and controls are not allowed on stand-alone units.
* NEMA FR-4 glassepoxy or equivalent circuit boards.

**Antenna:**

* Shall be mounted externally on top of traffic cabinet
* Shall be “Multiple-Input and Multiple-Output” (MIMO)
* Shall cover the Cellular, WIFI, DSRC, GPS, and Bluetooth networks
* Shall connect to the 360VDP

**Ethernet Repeater:**

* Utilize Ethernet repeater if CAT6 cable distance is over 300’.

**Ethernet Switch:**

* Power Over Ethernet (POE) switch
* Ports for up-to four (4) traditional or thermal cameras.
* Powder coated aluminum.
* Dual purpose LED port lights.
* RJ-45 CAT6 connectivity.
* Environmental: -29F to +165F (-34C to +74C).
* NEMA TS2 compliant.

**Video Encoder:**

* Power Over Ethernet (POE)
* Video: H.264 (MPEG-4 Part 10/AVC) Baseline and Main Profile
* Compression: Motion JPEG
* Resolutions: 176x120 to 720x576, 176x120 to 1536x1152 for quad view.
* Frame rate:
* H.264: 25/30 (50/60 Hz) fps,
* 15fps in quad view in full resolution,
* Motion JPEG: 25/30 (50/60 Hz) fps,
* 15fps in quad view in full resolution.
* Video Streaming: Multi-stream H.264 and Motion JPEG: One H.264 and one JPEG stream on each channel (8 streams in total) in full frame rate individually configured streams in max. resolution at 25/30 fps; more streams if identical or limited in frame rate/ resolution. Controllable frame rate and bandwidth; VBR/CBR H.264.
* Environmental: -40F to +167F (-40C to +75C), 10-95% non-condensing.
* NEMA TS2 compliant.

**Ethernet Protection Module:**

* Either shelf mounted or stand-alone design.
* Protect 360CA, IP video detection camera assembly, thermal cameras and 360VDP in the event of a surge or lightning.

**Environmental:**

* Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
* Pass following NEMA TS 2 tests and applicable test procedures.
* Vibration: Section 3.13.3, Section 3.13.8.
* Shock: Section 3.13.4, Section 3.13.9.
* Transients, Temperature, Voltage and Humidity: Section 3.13.7.
* Power Interruption: Section 3.13.10.

Peripherals:

* Separable Keypad & Joystick or Computer Mouse including all necessary cables for connectivity to 360VDP.

# 23 AWG 4 Twisted Pair Category 6 Cable:

* Supply the 360CA power and return the video signal to the 360VDP.
* Outdoor Aerial CAT6 cable with UV insulation.
* Rated for 48VDC
* 250MHZ, shielded, gel-filled (flooded core) direct burial grade.
* Shall be equipped with a drain wire.
* Terminate with compatible connector.
* Polyethylene insulation.
* Shall be installed continuous between the 360CA and 360VDP.
* Cable shall be installed according to TIA/EIA-568-B.
* Other type cable may be substituted at the request of the 360VDP manufacturer with the Departmet’s approval.

**Documentation: (360VDP and 360CA)**

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

* Installation and operation procedures.
* Performance specifications (functions, electrical, mechanical and environmental) of the unit.
* Schematic diagrams (point to point wiring).
* Pictorial of component layout on circuit board.
* List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
* Troubleshooting, diagnostic and maintenance procedures.
* Testing results of grounding, voltage, and cable length measurements as indicated on the installation best practice verification at the end of this document.

**Site Survey:**

Perform a site survey with the 360VDP manufacturer representative at all 360VIDS locations prior to installation. The site surveys must be conducted in the field to accurately assess the existing conditions at each location. The purpose of the survey is to optimize the performance from the 360VIDS equipment when it is installed. Prior to installation, submit the results of this survey to the Engineer in a report, which lists all 360VIDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

**Warranties and Guarantees: (360VDP and 360CA)**

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

Construction Methods:

Install 360VIDS equipment in accordance with the manufacturer instructions. Detection zones shall be replicated as shown in the plans. The Contractor shall install vehicle-counting zones for each lanes as shown in the plans. The Contractor shall ensure the vehicle counting zones be as accurate as possible. The Contractor shall contact the Engineer to confirm detection zone and vehicle counting zone locations. The Contractor shall refer to the “Installation Best Practices Guide” attached below to this specification and the Intersection Design Guide located on the Manufacturer’s website Note that all references to “Cat5e cable” in the attached “Installation Best Practices Guide” shall refer to “23 AWG 4 Twisted Pair Category 6 Cable” as specified above in this specification. In addion, any references to the SMARTMOUNT 7’ extension on the “System overview and Installation Guidance” shall follow the Camera Mounting Harware section of this specification. The location of the 360CA shown on the plan may be revised as a result of the Site Survey. Peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearance(s) surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

The Contractor shall forward the configuration file in electronic format to the Traffic Signal Lab’s Mr. Don Assard at [Donald.Assard@ct.gov](mailto:Donald.Assard@ct.gov) or Mr. Mark Zampini at [Mark.Zampini@ct.gov](mailto:Mark.Zampini@ct.gov), immediately upon completion of configuration of the detection zones. The Contractor shall address any comments/corrections identified by the Traffic Signal Lab.

Method of Measurement:

The 360 degree Camera Assembly will be measured for payment as the number of 360 degree cameras furnished, installed operational and accepted.

The 360 degree Video Detection Processor will be measured for payment as the number of units including all additional work and materials listed in Basis of Payment, furnished, installed, operational and accepted.

23 AWG 4 Twisted Pair Category 6 Cable will be measured for payment as linear feet, furnished, installed and accepted.

Basis of Payment:

The unit bid price for each 360 degree Camera Assembly includes the 360 degree camera, enclosure, vertical riser and hardware used to attach the 360CA to a support structure, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the 360VDP.

The unit bid price for each 360 degree Video Detection Processor includes the manufacturers’ site survey, unlimited number of any necessary 360VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, necessary peripherals such as Ethernet repeater, Ethernet switch, video encoder, Ethernet protection module, documentation, warrantee, labor, tools and equipment necessary to make the 360VIDS fully operational.

The unit bid price per linear foot for 23 AWG 4 Twisted Pair Category 6 Cable includes all connectors, labor, tools and equipment necessary to install the cable between the 360CA and the 360VDP.

## Pay Item Pay Unit

360 Degree Camera Assembly Ea.

360 Degree Video Detection Processor Ea.

23 AWG 4 Twwisted Pair Category 6 Cable LF















