ITEM #1112210A – CAMERA ASSEMBLY

ITEM #1112259A – VIDEO DETECTION PROCESSOR

ITEM #1113901A - CAMERA CABLE

Description:

Furnish and install an Iteris Versicam Video Image Detection System (VIDS) as shown on the plans or as directed by the Engineer. The VIDS consists of a Camera Assembly (CA), Video Detection Processor (VDP), Video Detection Monitor (VDM) and Camera Cable. The cameras will be mounted on an extended signal support bracket also used for support of a signal on the respective mast arm structure.

Materials:

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

Camera Assembly:

Camera:

- Monochrome (Black and White) or Full Color camera.
- Fixed mount pan and tilt unit bracket.
- Image Sensor: 0.3-inch (7.62mm) to 0.5-inch (12.7mm), charge-coupled device (CCD).
- Sensitivity: Full peak-to-peak video with 2 lux 2854 K incandescent illumination on the image sensor faceplate.
- Active picture elements (pixels): 720(H) x 480 (V), minimum.
- Resolution: Minimum 470 lines horizontal and 330 lines vertical, NTSC equivalent.
- Automatic white balance: Automatic white balance sensor through the lens for color balancing.
- Video Signal format: EIA-170 composite video output at 1 Volt peak-to-peak.
- Output impedance: 75 Ohms nominal.
- Signal to noise ratio: Greater than 50dB.
- Lens mount – standard 16 mm C-mount and compatible with the camera.

Camera Enclosure:

- Tamper proof constructed of painted or powder coated aluminum of at least 0.06-inch (1.59-mm) thickness.
- Environmentally sealed housing.
- Adequate adjustable sunshield should be provided.
- Internal Heater, window defroster, and an adjustable thermostat to control both. Turn-on point from 0° to 5° C (32^{o} to 41^{o} F). Metal oxide varistor (MOV), or equivalent, surge suppression connected to ground, on the switched outputs of all

thermostats. Prior approval by the VDP manufacturer and the Engineer is necessary for any deviations to the above specifications.

Extension Bracket:

Use of an extended bracket simultaneously used for the support of an overhead traffic signal on the same mastarm structure.

Video Detection Processor:

Functional:

- Receive inputs from a minimum of two cameras.
- Sense vehicle activity from minimum eight detection zones per camera.
- Sense departing vehicle activity as well as approaching vehicle activity.
- Emulate minimum four (4) "contact closure" loop amplifier outputs in pulse, presence, delay, delay inhibit, and extend mode as specified in NEMA TS 1, Section 15.
- Include image stabilization that corrects for video movement caused by average wind speed of 20 mph (32 kph).
- Include automatic shadow cancellation of stationary shadows and moving shadows.
- Fail-safe in the event of loss of video from CA or loss of power to VDP.
- Accept standard analog NTSC color or monochrome video signal (1 volt peak to peak, 75 ohm) from the CA or a video recording device.
- Provide output of standard analog NTSC color or monochrome video signal through a video out female RCA/BNC style connector (1 volt peak to peak, 75 ohm) which may be switched to any video input.

Accuracy (Compared to actual vehicle observation of video over ½ hour time period).

- Occupancy: 20% true occupancy.
  Example: If observed occupancy is 20%, reported occupancy must be between 16% and 24%.
- Volume: 95% true counts under normal weather conditions.
  90% true counts under adverse weather conditions (rain, snow, fog).
- Demand (presence) at stop bar: 98 % under all weather conditions.
- Speed: 20% true speed as measured by radar gun.
- Maintain above accuracy throughout nighttime and day-night-day (dusk-dawn) transition.

Detection Zone Programming:

- Serial communication with the PC through front panel mounted EIA-232 port.
- Menu driven procedure on the PC, using Windows 95, 98, NT 4.0, or 2000 system.

- Configure and adjust the detection zone with the cabinet mounted Video Detection Monitor (VDM), using a standard detachable keyboard/mouse. Capable of displaying a NTSC or PAL formatted signal.
- Minimum data rate of 9600 bits/second.
- Detection zone data stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Ability to upload and down load program database to notebook PC or remote desktop PC.
- Superimpose detection zone on real time video image from selected camera with time stamping capabilities.
- Ability to monitor real time video and adjust zones while VDP is actuating the traffic controller.
- Visual confirmation of detection by highlighting detection zone symbols.

Physical:

- Either shelf mounted, stand alone design or modular card rack design.
- Aluminum card rack frame capable of accepting four (4) VDP modules.
- Double row 22 pin (44 terminal) edge connector, Cinch Jones 50-44A-30M or equivalent, which mates with NEMA TS 1 detector rack system.
- Standard BNC connectors for video input and video output.
- Female metal shell connector with latching clamp for NEMA TS 1 detector outputs.
- 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.

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.

Video Detection Monitor:

Physical:

- Compact and easily accessible LCD Flat Panel Display.
- Diagonal screen size minimum 9” & maximum 14”.
- Weigh <10 pounds (4.5kg).
- Withstand temperatures ranging from -30 to 74 degrees Celsius (-22 - 165 ^{o}F), 90% non-condensing.
- Withstand mechanical shock of 10 G’s peak acceleration (11 ms, half sine wave).

- Accept vibrations of 5 to 500 Hz at 1 G RMS random vibration.

Functional:

- Compatible with Color or Monochrome Detection systems.
- Compatible with male RCA inputs or male BNC connector from a minimum of one VDP.
- Industrial grade (grade A) video panel employing thin film transistor (TFT) technology.
- ANSI contrast ratio of 300:1 minimum.
- Minimum brightness level: 300 candelas per square meter (300 lux).
- Computer resolutions: 720 (horizontal) x 480 (vertical) minimum, 1024 (horizontal) x 768 (vertical) maximum.
- Support 16.2 million display colors.
- Support both NTSC and PAL video formats with auto-sensing.
- Pixel rise time: ≤ 2 milliseconds. Pixel fall time: ≤ 6 milliseconds.
- Minimum pixel pitch: 0.064 (horizontal) x 0.2025 (vertical) millimeters.
- Minimum viewing angle: 140 degrees horizontally, 120 degrees vertically.
- On-Screen Display (OSD) controls brightness, contrast, phase, clock, color as well as horizontal and vertical positioning.
- Compatible with processor output (VGA analog RGB, S-Video and composite video interfaces)
- Operable on 110 VAC or 220 VAC, 50 or 60 Hz.
- Battery operation capabilities but not to require use of any batteries(s).
- FCC, VCCI, EMC, and CE approved. UL listed. Energy Star efficient.
- MTBF Rating: 50,000 hours minimum.

Peripherals:

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

Camera Cable:

- Supply the CA power and return the video signal to the VDP.
- Siamese construction RG-59/U, or as recommended by camera manufacturer.
- Coaxial:
  - 20 AWG, solid conductor.
  - Polyethylene foam dielectric.
  - Bare copper braid shield.
- Twisted pair:
  - 18 AWG, 7 strand conductor.
  - Aluminum foil shield.
  - Color code red and black.
- Polyethylene or polyvinyl chloride jacket.
- Other type cable may be substituted at the request of the VDP manufacturer.

Documentation: (VDP, VDM and CA):

Provide to the **Department of Transportation Office of Maintenance** and the **City's Division of Traffic Maintenance** each 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.
- 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.

Site Survey:

Perform a site survey with the VDP manufacturer representative at the VIDS location. The purpose of the survey is to optimize the performance from the VIDS equipment when it is installed and insure that it will meet the accuracy requirements specified previously. Submit the results of this survey to the Engineer in a report, which lists the VIDS location with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Warranties and Guarantees: (VDP and CA)

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** and the **City's Signal Maintenance Division** 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 24 months following successful completion of the entire intersection acceptance test.

Construction Methods:

Install VIDS equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. The location of the CA shown on the plan may be revised as a result of the Site Survey. VDM and 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.

Method of Measurement:

The Camera Assembly will be measured for payment as the number of cameras furnished, installed operational and accepted.
The 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.
Camera Cable will be measured for payment as linear feet (meters), furnished, installed and accepted.

Basis of Payment:

The unit bid price for Camera Assembly includes the camera, attachment to an extended traffic signal support bracket on the same mastarm structure, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the VDP.

The unit bid price for Video Detection Processor includes the manufacturers' site survey, unlimited number of any necessary VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, Cabinet Mounted Video Detection Monitor with necessary peripherals, documentation, warrantee, labor, tools and equipment necessary to make the VIDS fully operational.

The unit bid price for Camera Cable includes all connectors, labor, tools and equipment necessary to install the cable between the CA and the VDP.

Pay Item	*Pay Unit*
Camera Assembly	Ea.
Video Detection Processor	Ea.
Camera Cable	LF