ITEM 683.1045  09    ITS EQUIPMENT IN TOC

DESCRIPTION
This work shall consist of connecting the new ITS network equipment (furnished and installed under other contract bid items) in the NYSDOT Region Traffic Operations Center (TOC). Under this item the Contractor shall include all equipment, materials including cables, cable trays, connectors, conduits, raceways necessary to complete the installation of both the new and existing ITS equipments in the TOC that will connect the Field Communications Network TOC ITS equipments including operator positions as shown in the plans and described in the Contract Documents. This work shall also include furnishing and installing a notebook personal computer and rearranging existing TOC equipment including connections to the operator workstations, video controls, desk monitors and video wall monitors as shown in the plans or as directed by the Engineer.

MATERIALS
Equipment Room Cabinets
The Equipment Room Cabinets will be paid for other another Bid Item. These standard EIA 483mm (19”), pre-installed electronic equipment cabinets shall be used to mount all of the TOC Equipment Room equipment supplied by the Contractor as shown in the plans and described in the Contract Documents.

The Contractor shall supply all necessary interconnecting plenum rated cables and incidental hardware to mount all of the components into the rack(s), connect the equipment to power, and interconnect all of the components as outlined in the contract documents and as shown in the plans.

Cable Trays Risers and Cable Ladders
The Contract shall furnish and install a vertical cable ladders, cable risers, ceiling cable trays and all related mounted materials to provide a physical connection path between the TOC Equipment cabinet(s) in the Communications Equipment Room and the TOC Room areas including operator consoles, video wall and offices as shown in the plans or as directed by the Engineer.

Connection of LAN cables to the Network Router
The Contractor shall furnish and install all network wiring to connect the network router (Layer 3 Ethernet Switch) furnished and installed under a different contract bid item as shown in the Plans or as directed by the Engineer to the ITS equipments installed in the Communications Equipment Room cabinets and other ITS equipments in the TOC areas. All copper network cables (LAN cables) shall be UTP Category 6, rated for use in an IEEE 802.3 100 Base-TX (Fast Ethernet) network, provided with an RJ45 modular plug. Plenum rated cables shall be provided for installation in the ceiling mounted cable trays shown in the plans.

Connection of TOC Network to the Field Broadband Networks at the TOC Facility
The Contractor shall furnish and install all network wiring between the Network Router in the Communications Equipment Room Cabinet and the Leased Broadband Network interface equipment, furnished and installed under different contract bid items.
Notebook PC Workstation
A Notebook PC (NPC) workstation complying with the following hardware and software specifications shall be supplied:

The NPC workstation shall be a standard product of an established brand name company with a good track record of providing long term support and maintenance service. The company shall have been producing leading edge PC based components for a minimum of five years prior to the bid. The company shall be able to provide nation-wide service and support on 7 days a week, 24 hours per day basis and shall maintain a toll-free customer support service. All major components such as the mother board, power supply, processor, memory, hard disk, DVD, integrated network interface card, audio and video components, shall be designed, assembled and warrantied by the manufacturer. The NPC workstation, as configured, shall be a standard model number of the manufacturer. Computers that are assembled from brand name components by system integrators or re-sellers shall be considered “Clones” and are not acceptable.

Each NPC workstation shall be equipped with the following:

- **Operating System:** Windows XP Professional
- **Processor:** 3.0 GHz (minimum), dual processor
- **Hard Disk:** 80 GB minimum
- **Memory:** 1 GB
- **Video Screen:** 15” Active Matrix Color Display capable of displaying a minimum of SVGA (800 X 600) resolution or above
- **Battery Time:** Two smart lithium ion batteries with advanced power management
- **CD-ROM:** Internal 8X DVD±RW
- **Pointing Device:** An integrated 2- button mouse trackball and external PS/2 3-button wheel mouse
- **Multimedia:** Integrated 16-bit sound card
- **Network Interface:** Combination PC modem (56 bps) and 10/100/1000BaseT LAN PC card
Carry Case: Soft carrying case suitable for notebook and accessories shall be provided

Interface Ports: One 9-pin, RS232 (or USB adapter) port one USB port, one infrared port, and one parallel Centronics port

The Contractor shall furnish and install a NPC Workstation shelf in the Equipment Cabinet. The NPC shall be used both in the field and TOC for configuration and maintenance of the video cameras and other ITS equipments as described in the Contract Documents. In addition to the major components comprising the NPC Workstation as listed herein, the Contractor shall provide all incidental components, including all interconnecting cables, adapters, utility software, and other minor components which are required to provide a fully operational system.

**Diagnostic Software**
The Contractor shall install licensed copies diagnostic software for each Item in the Contract Documents or as directed by the Engineer. This software shall program or configure as required all equipment furnished and paid for in other respective Bid Items as prescribed in the Contract Documents. The respective application software for these equipments shall provide but not be limited to the following network management capabilities:

- configure ports of equipment
- program Ethernet Switches
- program Ethernet Switch/Router(s)
- program IP Addresses
- monitor the alarm status of all equipment
- configure UPS equipment
- download current configuration of equipment
- Control and display the video from the Field Network Cameras using the NTCIP Protocol specified in the contract documents for installation and diagnostic purposes.

**CONSTRUCTION DETAILS**
The Central ITS Equipment in TOC shall include all components described in the materials specifications and shall be configured as indicated in the contract documents.

Prepare a shop drawing which details the complete assembly of all components to be supplied. Particular emphasis shall be given to the interconnection of components and cabling. The Engineer reserves the right to inspect or factory test any completed assemblies prior to delivery of the material to the project site. Any deviation from these specifications that is identified during such testing shall be corrected prior to shipment of the assembly to the project site.
The submittal shall include a complete layout of the TOC Equipment Room Cabinets or alternate configuration as directed by the Engineer. Select components that shall fit the space allocated in the contract documents. If the space requirements for the proposed components exceed the capacity of the cabinet rack space allocated for this project, the submittal shall be rejected. If components are to be mounted on both sides of the rack, sliding rails shall be used to gain access to the rear connectors, if access cannot be achieved from the rear door.

Mounting and installing cables and equipment in the existing equipment racks shall be compliant with the manufacturer’s directives for each component and shall use methods that match the existing equipment installation.

The Contractor shall furnish, install, label and test all DVI, coaxial (75 ohm) including RS-232 cables and Category - 6 LAN cables. All cables shall be labeled with the circuit number and arranged using a cable management system. The Contractor shall provide complete documentation of all TOC and Equipment Room wiring.

All components proposed for this bid item shall be mounted into the Equipment cabinets and connected to standard AC power available within the or directed by the Engineer. Interconnection cables shall be prepared and installed according to the port assignment tables in the contract documents or as provided by the Engineer. A test shall be performed to verify that the equipment has been installed properly. The Contractor shall furnish and install shelves or other hardware for any components that are not designed to be rack mounted; and the Contractor shall secure the equipment in the racks. This approach will require the approval of the Engineer and shall only be used if no suitable rack mounted equipment is available.

The NPC Workstation shelf shall be located in the rack in a position which is optimum for a standing individual to access the keyboard and the display. The shop drawings shall include specific details of the installation of all of the materials listed in this specification including cable lengths, connector types, gender and connector pin outs. All cables shall be labeled with permanent, indelible marking tags. All terminals on other patch or convenience panels if needed shall be permanently marked with identifiers which clearly indicate the channel being serviced.

The Contractor shall install diagnostic software furnished under other contract bid items that configures controls and monitors the respective bid item equipment. This software shall include but is not limited to the software required to configure the field equipment, the TOC ITS equipment, and display the equipment status, alarms or other information specific to the software provided by the respective contract bid item.

The Operational Stand-Alone Test milestone shall have been reached after all components at the TOC have been installed and tested successfully. After the Operational Stand-Alone Test is complete and the Layer 3 Ethernet Switch and video decoders (furnished and installed under different bid items) has been installed and configured, the Contractor shall demonstrate that all data and video can be exchanged and processed at the Central TOC including other alternate
locations as directed by the Engineer. This test shall verify that full TOC central control and display of all field the ITS field equipment is possible. This test shall use OEM software including additional application SW furnished under the respective contract bid items or by the Engineer.

The ITS Equipment In TOC shall be integrated and tested using the philosophy and procedures included in the Project Special Note, the Contract Documents or as directed by the Engineer. The Contractor shall also provide manuals, documentation and training in accordance with the Special Note.

All components supplied under this specification shall be warrantied in accordance with Section 105-18 Warranties and Guarantees of the Standard Specification.

**METHOD OF MEASUREMENT**
The work under ITS EQUIPMENT IN TOC will be measured for payment on the lump sum basis.

**BASIS OF PAYMENT**
The lump sum bid price ITS EQUIPMENT IN TOC shall include the cost of all equipment, materials, and labor necessary to complete the work.

ITS EQUIPMENT IN TOC will be eligible for progress payments in accordance with the following items after each milestone is reached.

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval of Shop Drawings</td>
<td>10%</td>
</tr>
<tr>
<td>Installation and successful Operational Stand-Alone Test</td>
<td>35%</td>
</tr>
<tr>
<td>Satisfactory completion of Remote Site Verification Test</td>
<td>35%</td>
</tr>
<tr>
<td>System Acceptance (See System Integration) and delivery of approved final documentation and manuals</td>
<td>20%</td>
</tr>
</tbody>
</table>