DESCRIPTION
This work shall consist of the furnishing, installing, maintaining, moving, and removing Portable Traffic Surveillance and Detection System in accordance with the contract documents and as directed by the Engineer. The Portable Traffic Surveillance and Detection System is intended to provide uninterrupted traffic data at critical roadway locations to traffic management systems while permanent surveillance and detector are offline for installations and/or modifications.

This work item shall consist of a portable tower trailer capable of rapidly deploying, powering and sustaining surveillance devices and associated processing and communications equipment in such locations where power and an existing structure is unavailable. This portable system shall consist of a telescoping tower, a generator, an autostart engine controller, a set of battery packs all mounted on a heavy duty trailer frame.

MATERIALS
The Portable Traffic Surveillance and Detection System shall consist of:
- Towable Trailer
- Main Telescoping Tower
- Equipment Housing
- Power Supply

The complete portable system shall be capable of supporting a minimum of one Dome Camera Assembly and two Ranging Radar Detector Assemblies, each furnished under separate pay items meeting the requirements as specified in the Contract Documents.

Towable Trailer

The trailer shall be designed to safely transport the entire portable system. The trailer shall be rugged construction suitable for towing at highway speeds and at low speed over rugged construction site terrain.

The trailer shall come equipped with all necessary frame, axle, suspension and brake system, coupler, leveling jacks, tires and wheels, fenders, springs, lights, reflectors, etc. for use on public highways safely in accordance with the NYS Vehicle and Traffic Law. The trailer shall have at least the following features:

- The trailer shall have a single axle and a fixed height tow ring and adjustable height ball or tow ring hitches.
- Trailer frame shall be constructed of heavy gauge steel tubing and structural channel with welded steel plate.
- The trailer shall come equipped with outrigger leveling jacks of adequate strength to conveniently adjust the trailer orientation. These leveling jacks shall be affixed in such a manner that they may be readily placed and locked in a position for traveling without requiring the use of tools.
ITEM 683. 2001NN11 - PORTABLE TRAFFIC SURVEILLANCE AND DETECTION SYSTEM

- The outrigger jacks shall be capable of lifting the trailer frame to provide a wide footprint for trailer to maximize stability of tower.

- Trailer shall be equipped with swivel type screw jacks, mounted on pivoting stabilizing extensions arms, at each corner of the trailer frame.

- The trailer shall not exceed 2.4 meters wide, 2.5 meters high, and 5 m long with the mast stowed in a horizontal travel position.

- The trailer shall be equipped with complete lighting to standard highway specifications.

- The trailer shall come equipped with a removable drawer bar, a stowable wheel lock bar and a minimum of two welded steel loops for ground anchoring to prevent theft.

- Trailer shall be equipped with an independent suspension, torsion-type axle with hydraulic brakes and hydraulic surge brake actuator.

- Trailer shall be equipped with an adjustable height coupler mount capable of accepting a 2-inch ball type hitch.

- Trailer shall be equipped with low density thermoplastic fenders with splash shields.

- Trailer shall be equipped with 1/4-inch safety chains with snap-type hooks for secure attachment to tow vehicle hitch.

- Wheels and tires shall be sized in accordance with load requirements of trailer and axle.

- Tower support superstructure shall provide complete support of the tower in the transport (down) position with positive locking mechanism for transport. Cantilevered support of tower is not acceptable.

- Main telescoping tower shall be attached to a pivoting mount on the main mast assembly to facilitate raising the tower from the transport position to the operating position safely and quickly by an unassisted operator.

- Main mast assembly shall be equipped with a bubble type leveling devices to facilitate proper leveling of trailer over each axis during setup and prior to erection of main tower.

- The main mast assembly shall be equipped with retractable spring-loaded stainless steel locking pins to secure tower in fully erected position.

**Main Telescoping Tower**

- Main tower is to be constructed from Hot Dipped Galvanized Steel tubing.
ITEM 683. 2001NN11 - PORTABLE TRAFFIC SURVEILLANCE AND DETECTION SYSTEM

- The mast shall be hydraulically positioned in a horizontal position for transport or a vertical position for use. The mast shall be telescopically adjustable from a stowed length of 4.8 m to 10.6 m when deployed.

- Tower is to be automatically erected and collapsed by manual or electric winch. Winch shall be rust and corrosion resistant.

- The tower shall have 3 or more segments at about 3 m each.

- An automatic lockout shall prevent the mast from being extended while in the horizontal position or from being lowered to the horizontal position while it is extended from the travel length.

- Each stage of tower is to be designed such that it positively engages and locks with adjacent stages, when fully erected, to provide for a continuous rigid one-piece type structure. No movement between sections shall be allowed when tower is fully erected.

- Tower shall include all aluminum mounts, suitable for the specified camera, sensors, etc. which is easily attached and removed from the top section.

- Tower shall (when full extended) be capable of supporting a minimum of 20 kg.

- The mast shall allow wires and cables to be routed inside the telescoping length of the mast to support power and communications to the mounted devices without interfering with the operation of the mast positioning. Strain relief and protection from abrasion to these cables shall be provided.

**Equipment Housing**

The trailer shall be equipped with a rain tight lockable housing for system support equipment and devices designated for use with the portable system. In addition, access to AC and DC power and fiber optic communications shall be available in this housing. The housing shall be protected and secured by a lock and shall be water tight.

A nominal 3 meter length of MC power cable and appropriate mating connectors, containing two (2) stranded # 8 wires and a ground shall be furnished and installed between the power distribution unit and the equipment housing of the portable system. This cable shall be used to power the portable system from commercial electrical power where available.

A fiber optic termination panel, consisting of a 12 fiber splice tray and patch panel shall be furnished and installed in the lockable equipment housing. The fiber optic termination panel shall be rack or shelf mounted, consisting of a bulkhead with feed through fiber optic connectors. The bulkhead jacks shall be ST type. Fiber optic patch cords, hardware, splice trays and any other ancillary equipment required for a complete, neatly assembled, and clearly labeled Fiber Optic Patch Panel installation shall be provided under this item.
ITEM 683. 2001NN11 - PORTABLE TRAFFIC SURVEILLANCE AND DETECTION SYSTEM

The equipment housing shall accommodate the fiber splice tray and patch panel, communication modems, AC charger, DC-AC Inverter, autostart engine controller, power distribution panels, terminal blocks, fuses, adapters, main breaker switch, all receptacles and wires as necessary.

No wiring shall be exposed at ground level. All cabling shall be routed through conduit.

**Power Supply**
The portable system shall operate on selectable AC or DC power input. The power supply system shall comply with the following criteria while operating on AC input:

- Operating Voltage: 120 VAC
- Frequency: 60Hz ±5%
- Operating Load: minimum 130 Watts

The power supply system shall comply with the following criteria while operating on DC input:

- Operating Voltage: 12 VDC nominal
- Energy capacity: minimum 1260 Amp Hours nominal
- Operating Energy Capacity: minimum 250 Amp Hours per day at 12 VDC nominal

**Battery**
Battery shall be sealed, maintenance free, deep cycle, gel lead acid type 6V DC battery. 12 VDC Power Supply will consist of 6-volt, heavy duty, gel cell or lead acid type deep cycle batteries. Pair of these batteries shall be connected in series for 12V configuration and these sets of batteries shall be added in parallel for increased electrical capacity. Battery shall support the following criteria:

- Operating Voltage: 12 VDC
- Number of batteries: 12 (min)
- Battery type: 6-Volt, BCI (Battery Council International) Type GC-2, heavy duty, deep cycle Gel-Cell.
- Energy capacity - 1260 Amp Hours nominal (min)
- Batteries shall be of a maintenance-free and sealed no leak design. Batteries shall be vibration resistant, heavy duty and shall incorporate no corrosion terminals.

**Battery Compartments**
- Battery Compartments shall be constructed of low density thermoplastic with lockable lid(s).
ITEM 683. 2001NN11 - PORTABLE TRAFFIC SURVEILLANCE AND DETECTION SYSTEM

- Compartments shall be designed to completely contain spills from a failed or damaged battery case.

- Battery compartments shall be provided with padlocks and all the locks shall be keyed alike.

- Compartments shall be designed such that the lid automatically latches in the closed position and holds the batteries in place. Lid shall be capable of being locked in the closed position with a standard padlock.

- Lid shall be secured to compartment by an integral plastic hinge that permits the lid to be completely removed from the compartment for service.

- Compartments shall be designed to provide adequate ventilation for the batteries during charging yet prevent the ingress of water during use or transport.

- Compartments shall be capable of supporting 113 kg per sq. cm weight on the top of the battery compartment.

- Battery Compartments shall be NEMA rated and UL listed.

**Engine-Generator Set:**
The contractor shall provide a trailer-mounted, standby gasoline-fueled engine-generator set including a main circuit breaker, cables with plugs and receptacles, a weather-proof NEMA rated engine-generator enclosure, and a fuel tank as required. The generator shall be used to recharge the battery banks automatically. The engine-generator set shall meet the following requirements:

**Generator:**
Rated Maximum Continuous Power Capacity 3600 Watts
Rated Voltage 120 VAC
Rated Maximum Continuous Load Current at 120 Volts 30 Amps
Main Line Circuit Breakers 30 Amp
Phase 1
Number of Rotor Poles 2
Rated AC Frequency 60Hz
Power Factor 0.95
Engine RPM 3600
Rotor RPM 3600
Unit Weight 77 kg
Dimensions; L (cm) x W (cm) x H (cm) 75 x 48.2 x 34.3

**Engine:**
Rated Horsepower 7.8 (min)
Displacement 220cc
Cylinder Block: Aluminum w/CastIron Sleeve
Valve Arrangement: Overhead Valve
Ignition System: Solid-state w/Magneto
Governor System: Mechanical Fixed Speed
Compression Ratio: 8.5:1 (min)
Starter: 12 VDC
Fuel Consumption
- Liters per hour: Gasoline
- 10% Load: 0.90 (max)
- 50% Load: 1.32 (max)
- 100% Load: 2.08 (max)

The engine shall be furnished complete with all accessories and features including Overhead Valve Industrial engine design, aluminum with cast iron cylinder block, spin-on-oil filter, solid-state ignition, efficient fuel supply system for reduced oil consumptions, automatic electronic choke, full pressure lubrication system, low oil pressure shutdown system, high temperature shutdown, solid-state frequency compensated voltage regulator and evaporative port.

The engine shall be furnished with an engine safety control switch which shall be arranged to give an alarm on shut down of the engine under the condition of low oil pressure, high temperature, or over-speed. The engine shall be capable of starting and attaining rated KW output within 10 seconds. The engine shall be certified by RVIA, CARB, EPA, and U.S. Forest Service.

The generator shall have a single roof air conditioner with all-steel enclosure. The generator shall include displaced phase excitation to maximize motor starting capability and automatic voltage regulation to regulate the output voltage to ±2% to prevent voltage spikes.

Generator shall have mainline line circuit breaker to protect generator from overload and a mechanical governor to enable the generator react to changing loads.

The generator, exciter, and voltage regulator shall be a package unit capable of supplying electric power to the load controlled by an autostart engine controller.

The engine-generator unit shall be in a durable, Rhino Industrial coated environmentally protected enclosure. It shall include enclosed critical grade muffler, spark arrested exhaust, and mounting trays for the trailer.

The fuel tank shall be UL listed, internal to the generator enclosure and constructed from minimum 2.5 mm thick aluminized steel with continuously welded seams. The tank shall have a minimum fuel capacity of 57 liters and shall have supports compatible for trailer mounted generator sets. The fuel tank shall be equipped with all necessary fuel filters and rigid and flexible fuel lines for the operation of the engine-generator set, and with a UL listed stainless steel overspill box. The fuel tank shall be air-pressure tested using a leak detection solution. Means for tank grounding shall be provided. The fuel tank shall be labeled by product, capacity and manufacturer.
Engine Controller:
An engine controller shall be provided by the contractor which shall start the engine automatically when the batteries reach a low voltage level as specified by the manufacturer. The engine controller shall be equipped with all the necessary relays, fuses, and connectors. Autostart engine controller shall be resistant to electrical interference, voltage fluctuation, vibration, physical shock, temperature extremes and moisture. The autostart engine controller shall have a LCD panel with LED's to indicate supplying load, low oil pressure, high engine temperature, low coolant, over-crank, over-speed, engine running, battery voltage warning, not-in-auto warning, preheat, failure. The autostart engine controller shall be connected and configured to the engine-generator and the batteries output so that it shall provide as much power to the batteries as is being used by the systems when the batteries reach engine start voltage. Engine controller shall be programmable manually via front panel buttons or with a PC software interface for the control settings.

The autostart engine controller shall have the features of programmable digital inputs and outputs, analog inputs, programmable engine exerciser, and adjustable settings and parameters for battery status, speed sensing and logics of the engine-generator.

Battery Charger:
A battery charger shall be provided and connected by the contractor to the generator and the batteries as specified by the manufacturer. The battery charger shall convert nominal 108 to 132 VAC to 12 to 13.4 VDC. This battery charger unit shall provide AC to DC conversion up to 75 amps. The battery charger unit shall maintain the battery by delivering its full-rated current when the battery capacity falls sufficiently low. The voltage shall set to deliver its maximum current for the necessary period of time to minimize undue stress to the battery caused by heating of its cells to ensure the longest possible life of the battery. When the battery nears its full capacity, the charger shall automatically drop the current, providing a float-charge to the battery to prevent self-discharge of the cells. Battery Charger shall have the following basic criteria:

- Input Voltage: 108-132 VAC
- Input Frequency: 47-63 Hz.
- Max. Amp Draw (AC): 17 Amp
- Output Voltage: 13.4 VDC
- Output Amperage: 75 Amps
- Typical Efficiency: >80%

Inverter:
The contractor shall provide a 12 VDC to 120 VAC Inverter @ 60 Hz, 1200 Watts continuous, 2400 Watts peak with multiple outlets and thermal cooling fan. It shall include over voltage shutdown, under voltage shutdown, low voltage alarm, overload shutdown, thermal shutdown, and short circuit shutdown. The contractor shall supply all the necessary receptacles to connect the inverter to the battery output and to the load.

Cables and Wiring:
The contractor shall provide all the cables, wiring, power distribution panel with fuses, and terminal blocks as required. All cables shall be in weather tight conduit with sealed connections to equipment boxes. Main power wiring shall be #8 AWG minimum. The contractor shall provide the entire external conduit, wiring cable and conductors as necessary between the following:
- Power distribution panel to the ITS devices
- Batteries to power distribution panel
- Wiring between components in the cabinets

CCTV Camera Assembly:
Integrate one “DOME TYPE CCTV CAMERA ASSEMBLY” furnished and installed under separate item number.

Ranging Radar Detector Assembly:
Integrate two “RANGING RADAR DETECTOR ASSEMBLY” furnished and installed under separate item number.

CONSTRUCTION DETAILS
The Portable Traffic Surveillance and Detection System shall be placed and operated by the Contractor as shown in the Contract Documents. The devices shall be operated from the Joint Traffic Management Center. The Contractor shall provide all labor and material to connect to the JTMC as incidental to this work.

The contractor shall prepare and submit the Portable Traffic Surveillance and Detection System shop drawings 30 days after NTP to the Engineer for review and approval. The shop drawings shall include but not be limited to:

- Details of the complete installation of the portable system and all the components to be supplied
- Details of all connections between the portable system components
- Instruction sheets and wiring diagrams for the equipment to be installed
- The manufacturer specifications, catalog cuts and parts lists
- The manufacturer installation and operation guides
Proposed contractor’s maintenance schedule in accordance with manufacturer recommendations.

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 deviations from these specifications that are identified during such testing shall be corrected prior to shipment of the portable system to the project site.

The Operational Test shall be performed for each portable system. The Operational Test shall verify the portable system is fully operative and can support the deployed devices in accordance with these specifications. The contractor shall provide an Operational Test schedule and checklist to the Engineer for review and approval prior to the test.

All equipment shall be located and mounted as detailed in the plans and as ordered by the Engineer.

Within 10 calendar days of delivery, the contractor will furnish, at no additional cost, on-site complete assembly, demonstration, and training of up to ten Department Personnel and representatives designated by the Engineer, in proper storage, transport, and use of the equipment. Two copies of training material and operating manuals shall be provided for each portable system provided.

The Operation and Maintenance Manual shall include, but not be limited to, the following:

- General information and safety precautions
- Operational and functional descriptions of the generator set, the control module and associated accessories
- Maintenance procedures, instructions and schedules of systems and subsystems
- Internal and interconnecting wiring and control diagrams with data and detailed explanations of the system and equipment operation
- Elementary circuit diagrams and pictorial illustrations of the equipment and the overall portable system
- Testing methods, and performance data
- Part list indicating sources of supply, recommended spare parts, name, address, and telephone numbers of servicing organization
- Manufacturer's warranties on equipment, materials or products purchased for the project.

The Contractor shall be responsible for maintenance, repair, and continuous operation of the portable system until progress of work no longer requires their use, as determined by the
Engineer. As a minimum, the contractor shall field check the portable system at least once per week, while deployed in the field. The contractor shall make all necessary adjustments or repairs to the portable system that are found necessary during the field inspection. This field check shall include inspection of battery electrolyte levels, cleaning and tightening battery cable harnesses and fill in the tank with gasoline as required to guarantee that the portable system is fully operational. The contractor shall also inspect that the required work zone traffic control (WZTC) procedures are implemented in accordance with the Contract Documents to protect the portable system from vehicular traffic.

At the conclusion of the project, the portable system shall be delivered as designated by the engineer and become the property of NYSDOT.

All components to be supplied under this specification shall be warranted for a minimum of five-year from the conclusion of the system acceptance test. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. A warranty certificate shall be supplied at the conclusion of the system acceptance test.

**METHOD OF MEASUREMENT**

This work will be measured as the number of Portable Traffic Surveillance and Detection System satisfactorily furnished, installed, maintained, moved, and removed. Each actual unit shall be measured once regardless of the number of relocations performed, including removal, storage and return to the work site as required by the Contract Documents.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work.