ITEM 619.110202MO – PORTABLE DYNAMIC MESSAGE SIGN (PDMS)

DESCRIPTION
Under this item, the contractor shall furnish Portable Dynamic Message Signs (PDMS) in accordance with the contract documents and as directed by the Engineer.

The PDMS standards as listed in the U.S. Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) Section 6F.55 Portable Changeable Message Signs (http://mutcd.fhwa.dot.gov/HTM/2003r1/part6/part6f2.htm) must be met but does not supersede specific requirements stated herein. Equipment functionality will be thoroughly tested to verify complete compliance with all areas of this specification.

MATERIALS
The PDMS units shall employ solar powered LED’s to display dot-matrix or equivalent characters as programmed from a computer keyboard as well as from remote locations by cellular phone. Each unit shall include at least the following components:

- Solar Array Panels with Chargeable Batteries for a DC Power Supply System.
- Signboard and Mast with an Electric or Electro-Hydraulic Lift Mechanism System (or equal).
- Micro-Computer Controller with keyboard, LCD or Video display, Cellular Communication Device and programming Software.
- Heavy-Duty Trailer with a Structural Support System meeting the road standard requirements of The NYS Department of Motor Vehicles.
- Lockable vandal resistant enclosure(s) for the batteries, charger, switches and sign controller

All electronic components shall be installed to withstand the shock and vibration expected with interstate highway traffic. They shall not require air conditioning to function within their enclosures, given the humidity and temperature ranges expected in New York State. The PDMS unit shall operate within the guidelines of the NEMA Standards Publication TS2, Section 2, for Traffic Controller Assemblies, with an ambient temperature range of -34 Deg. C (-30 Deg. F) to 74 Deg. C (165 Deg. F). Surge protection for electronic components is required.

L. E. D. SIGNBOARD:

Dimensions: The PDMS panel size should have dimensions of the following size:

The PDMS referred herein will have a minimum panel size of 28” x 60” and a maximum area of 48” x 72”.

LED: The color of light emitted shall be AMBER, with a peak wavelength centered at 590 (+/-4) nanometers.
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Illumination: The signboards LED’s shall produce brightness greater than 1,000 Candela per square meter at minimum luminous intensity.

The signboard will automatically adjust the LED’s intensity to be dimmer or brighter for optimum viewing as natural ambient light conditions change throughout the course of a day. This feature will include a manual override function in the control system, allowing the operator the ability to select the level of illumination.

Display: The signboard shall be a Full Matrix or Line Matrix type. It shall be capable of displaying three (3) lines of alphanumeric text or characters up to 18” character height.

Each character shall be at least 7 pixels high and variable in width but use a minimum width to height character profile of approximately 70% (ex. 5 x 7 pixels per character, assuming nearly equal horizontal and vertical pixel pitch) to be in accordance with the minimum number of characters per line & character height described herein.

Each pixel shall be formed by a cluster of equally spaced LED’s and the number of LED’s per pixel (typically 3 or 4) shall be determined by the manufacturer as required to produce the LED Illumination and accepted Message Legibility as stated herein.

Message Legibility: Messages shall be legible from a minimum distance of 720 feet by day or night under optimum viewing conditions when displaying 18 inch characters, with a viewing angle of at least 15 degrees to the left and to the right of the signs midpoint.

Design & Materials: The signboard shall pivot and be lockable in any position, with 360° rotation about the vertical axis in a clockwise or counterclockwise direction. The bottom of the signboard, when raised for operation, shall be at least seven (7) feet above the ground. The face of the signboard shall be protected by a UV stabilized, seamless, impact-resistant (Lexan™, polycarbonate, or equal) see-through cover. The entire unit, including LEDs and all electrical circuitry, shall be protected by a weatherproof and lockable vandal resistant enclosure that affords convenient access for maintenance.

POWER SUPPLY:

The PDMS shall operate primarily from a solar powered electrical system that consists of a battery bank and high efficiency solar array panels. Secondary power supply type shall be the capability of the unit to be operable and for the batteries to be recharged from a standard 110-120 VAC (nominal) 60-cycle source outlet. Together, the solar array panels and battery bank should supply power sufficient to operate the complete unit, including integrated accessories YEAR ROUND under normal conditions in New York State.

The solar panel’s output capacity must keep the batteries charged to support all electrical components in full operation (mast, gauges, computers, LED’s, etc). The solar power system
ITEM 619.110202MO – PORTABLE DYNAMIC MESSAGE SIGN (PDMS)

shall be fully integrated into the unit power system and shall be in operation when the solar panels are deployed.

The battery bank itself should have the capacity to run the LED panels minimally at 40% intensity with one-third of the pixels active, CONTINUOUSLY for at least 21 days without recharge via the AC Recharging System. The system should require ideally four and no more than six maintenance charges per year.

Additional features required as follows:

Warning Display: At least five hours prior to battery discharge; the system shall display a caution symbol or other operator selected default message on the signboard and / or the control panel, to alert maintenance personnel that the batteries need recharging.

Battery Charger: The 110-120 volt AC charging system shall initiate charging automatically when a 110-120 volt AC service is connected. The system must fully recharge the battery bank within a 48 to 72 hour period when in a completely discharged state. The recharging system is to be designed so that a fully charged unit can remain plugged-in without damaging the system.

Electrical Connections and Gauges: All wiring from power sources shall utilize locking cable connectors. A voltmeter or LED low-voltage indicator and an ammeter for monitoring the DC current draw shall be provided. A standard negative ground system shall be tied to the sign chassis and lightning protection shall be supplied to the load side of the sign’s system distribution power lines to withstand multiple surges in excess of 600 volts.

Solar Panel Mounting:
The solar panels shall be mounted in a position (preferably above the message board) where it receives the most sunlight, and is adjustable by the operator, is less susceptible to damage from debris on the road. The solar panels should be installed in such a fashion as to deter theft. Features such as vandal resistant hardware, sealed mounting trim, locking frame, non-reversible screws etc. should be utilized to the extent practical.

The PDMS shall be controllable through a computerized interface equipped with an alphanumeric QWERTY keyboard (secured in a lockable enclosure) and an LCD display screen that can be operated under all weather conditions. It shall have the capability of being addressed from a single communications link.

The primary controller may be removable from the control case to allow for short range remote operation of the panel while safely away from traffic.

Solar Panel Positioning Equipment: A motorized or manual system, independent of the sign, to reposition (tilt and rotate) the solar array for optimum reception when deployed.

Solar Panel Anti-Theft System: Additional security system designed to prevent damage and removal of the solar panels.
Operating Software: Five (5) sets of Software per delivery location shall be provided for installation in the controller. The software shall be supplied to allow a remote operator to create, edit, and/or delete messages, and to fully control all capabilities of the system. It shall be Microsoft Windows operating software consisting of Windows 7 or later and shall be compliant with all NTCIP functions specified under Communications Requirements as found herein. The software sets are to be turned over to the New York State Government Agency purchasing the PDMS with nonexclusive, royalty-free, irrevocable, perpetual statewide unlimited seat licensable rights, which shall require no hardware keys for operation. The contractor shall provide free software and firmware upgrades to the most current version for a period of no less than 24 months from acceptance of the changes without any tampering or new restrictions that forbears normal usage and rights.

Any required cooling fans shall be provided to dissipate heat from thermally-sensitive areas.

Additionally, the Software/Sign Controller shall be designed to:

- Allow for message programming to be displayed in a 3 line display format to utilize the full matrix capability of the sign including variable height text, 3 line display etc.
- Allow an exact animated simulation of the LED display in order to permit the dynamic visualization of the message prior to actual display.
- Automatically broadcast specific messages to at least 100 remote variable message signs, according to predetermined schedules, or immediately in case of emergencies.
- Display three sequential messages. On/Off time for each message in a sequence shall be user adjustable within a range of 0 to 5 seconds, in a minimum of half-second intervals.
- Monitor and display the battery status, solar array activities and other devices connected to the system.
- Automate system recovery and have a fail-safe prevention of improper information display after power outages or malfunctioning without any operator intervention.
- Shut down automatically if the system is reaching a perishable state or if the battery power drops below a recommended output level for proper functioning. It should also be able to automatically alert an operator on an interconnected remote device.
- Maintain an up-to-date status if operated from a remote location via a remote device.
- Retrieve all messages stored in a nonvolatile memory.
- Allow simultaneous readouts to external communication devices specified by the end user connected via EIA/TIA/RS-232 ports, Ethernet ports, USB ports or wirelessly.
- Prevent unauthorized access via operator selected password protection at multiple security levels in accordance with the Communications Requirements as specified herein and be consistent on all user consoles.
- Accommodate on board storage of a minimum of 300 messages. These may be either factory programmed, user-programmed, or user-reprogrammable. There shall be sufficient space included within this minimum for the creation and storage of at least 80 user programmed messages. Additionally, full matrix systems will also have within the minimum capacity, storage space for a minimum of 50 pictograms. Standard MUTCD Pictograms should be a part of the factory programmed package.
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CONTROL CASE AND HOUSING:

At the manufacturer’s option, the power system and/or battery array may be self contained in a similar separate housing. Such an additional housing may be constructed of heavy duty impact and corrosion resistant plastics (or equal). All other specifications pertaining to Control Casings would still apply. Additionally, the display housing lens is to be weather proof and provide full protection for the display unit. All cases and housings are to be lockable.

TRAILER:

The trailer shall be a heavy-duty steel single-axle design, constructed of rectangular structural tubing (ASTM A500-B) or welded steel channel (ASTM A36) equipped with a removable tow bar (tongue), walk-on fenders, and skid resistant material on all walkable surfaces. NOTE: The skid resistant material should either cover all walk-able surfaces entirely or be spaced out on all walk-able surfaces at intervals of no more than 2 inches apart. The tubular frame of the trailer shall have no openings. Trailer size and construction shall be appropriate to safely support, store and transport the PDMS and all operating systems. The trailer shall be provided with radial, 14” - 16”, load range class C tires of adequate size and rating to transport the system safely at normal highway speeds of up to 55mph. The fully equipped trailers shall safely transport the entire system when the signboard is not in operation and all system components are properly secured, and shall be equipped for use on public highways in accordance with NYS Vehicle and Traffic Law; Article 9 - EQUIPMENT OF MOTOR VEHICLES, as found under section VAT- Article 9, on the web at - [http://public.leginfo.state.ny.us/menugetf.cgi](http://public.leginfo.state.ny.us/menugetf.cgi), and as found in the NYS Department of Motor Vehicles Document #MV-529C, entitled: “Equipment Required for Trailers” and reprinted as an attachment to this document.

The following features and performance standards are also required:

**Structural Support:** The framework shall provide sufficient support to prevent damage to any PDMS components when the sign is in the down and locked position during normal highway travel. It also shall supply adequate support to allow complete sign operation that includes raising and lowering the sign panel, and shall remain stable during wind gusts of 75 mph when deployed in the operating position. The face of the signboard shall be a clear, impact-resistant polycarbonate Lexan™ or other similar material, subject to the approval of the State.

**Wiring & Safety:** Lights, reflectors, splash guards and wiring harness for highway towing shall be provided to comply with ICC, NYS Vehicle and Traffic Law and NYS- DMV regulations as noted above. All trailer wiring shall be continuous with no splices and all exposed runs of wire shall be enclosed in plastic flexible conduit and adequately secured, approximately every 18". All connections shall be made in a watertight junction box, using watertight light fixtures and watertight connections (Truck-Lite 50800/50400 or equal). Lamp lens and reflectors shall be Lexan™ or equal. The reflectors shall be mechanically fastened (not stick-on) with at least two red reflectors on each side and 2 amber reflector’s on the front of the trailer. Wiring system shall
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be equal to Truck-Lite (www.truck-lite.com) sealed harness system. Main wiring harness shall be a 7-way cable connector and ATA socket (Pollack #11-714 round pin) or equal. All lights are to be sealed, shock mounted type. Tail, Reverse, Signal and Brake Lights are preferred to be LED Based Arrays that meet the National and State safety guidelines and specifications (conventional incandescent light bulbs are also acceptable). The trailer must be equipped with a standard 110-120 volt AC receptacle as well as a temperature stable 110-120 volt AC battery trickle charger. The necessary provisions shall be incorporated into the unit power system to allow switching the recharging mode between the 110-120 volt AC and the solar panel with minimal effort.

Brakes: Electric brakes (or equal) are required on all trailers weighing in excess of 1,000 pounds unladen, as well as on trailers having a maximum gross weight in excess of 3,000 pounds. Brakes must be adequate to control the vehicle at all times, and must comply with the standards set by the New York State Department of Motor Vehicles, Division of Vehicle Safety Services for brake efficiency.

Hitch: A 2-inch ball type and pintle combination with safety chains and self-latching safety hooks. If surge activated brakes are installed and preclude the use of a combination hitch, then a pintle ring will be acceptable. A tongue jack is required for removal of the trailer from the tow hitch unless the required Stabilizing Outriggers (see below) are sufficient to remove the trailer from the towing vehicle.

Mast and Lift Mechanism: The mast assembly shall include an electric hydraulic lift mechanism (or equal) to raise or lower the signboard and hold it securely in place, with the bottom of the signboard at a minimum of 7 feet above the ground when raised. The assembly design must also provide that in case of a loss of power to the lift or a failure in the hydraulics, authorized personnel would be able to raise or lower the mast MANUALLY. The mast assembly shall allow a raised signboard to rotate 360-degrees clockwise or counterclockwise about the vertical axis and lock in a desired position via a locking mechanism. A safety feature for the signboard shall be provided to prevent it from dislodging on its own when in a raised position.

Stabilizing Outriggers: Each corner of the trailer shall be fitted with a crank and swivel type screw jack (ideally, a total of 4 jacks) having a 2000 lb minimum capacity; adjustable from at least 18" to 32" with a large steel footpad in order to level and stabilize the trailer, when it is being placed into the operating position. The rigging must be capable of supporting and stabilizing the entire operating unit in winds gusting up to 75 mph when the sign is raised to its full working height. The outrigger jacks shall pivot to a horizontal position for transport. An alternative stabilizing system may be substituted with the approval of the purchasing agency.

Paint: All exterior surfaces of the PDMS and support structure shall be cleaned, primed, and painted in accordance with the paint manufacturer’s recommendations for this application. All paint products are to be lead and chrome free from the same manufacturer. A minimum of two coats of lead free, chromate free, corrosion inhibited paint are to be applied. At time of delivery, Contractor must provide the MSDS, as well as written certification that notes the manufacturer, product code and lead content of all coatings. A 100% lead-free coating system (including
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primers, sub-coats, topcoats and clear coats) is required. The delivered product may be tested for
the presence of lead. Any unit that tests positive for lead may be rejected. Such rejection will be
cause for the purchase of a substitute product at the expense of the contractor.

Paint options available are to include the manufacturer’s standard colors, as well as the following
options, the cost of which shall be included in the bid price of the unit:

- NYSDOT: All exterior surfaces (except the sign face) will be cleaned, primed and
  painted with two coats of corrosion inhibited paint – DuPont Imron Yellow 6578X or
  equivalent for all units ordered for delivery to NYSDOT facilities.

- For non-NYSDOT users, the PDMS shall be furnished in either ‘Omaha Orange’ or other
  manufacturer’s standard color and not NYSDOT colors for approval.

  *Note: Powder Paint is an acceptable coating alternative as long as the color
  requirements herein are met.

Conspicuity Marking: The PDMS requires appropriate conspicuity marking (3M Series 983 or
equal or better) on all four (4) sides of the display unit and trailer, and said marking shall be
included in the price.

COMMUNICATION REQUIREMENTS – FHWA/NYSDOT-ITS System:

For proper functionality, the contractor shall provide the capability for the system to load and
operate up to two protocols for communications between a remote user or Data Communications
Equipment (DCE) and the PDMS controller/Data Terminal Equipment (DTE).

The contractor shall supply the main protocol, which will be the National Transportation
Communications for ITS Protocol (NTCIP), or a Protocol that substantially fulfills the NTCIP
conformity requirements stated herein. If the main supplied protocol only substantially fulfills
NTCIP, the Manufacturer shall provide the State with documentation stating “specific details” of
how and why the protocol substantially meets or exceeds NTCIP conformity requirements. The
State will then determine if the protocol substantially conforms to the Communication
Requirements for it to be acceptable.

The Communication System of the Dynamic Message Sign shall be capable of integrating with a
plug and play Cellular Communication Device (CCD) (ie: IP Modem, Dial-up Modem, etc.),
approved and configured to support a Wireless Cellular Communication Network (ie: CDMA,
GSM, GPRS, EDGE, UMTS, HSDA, etc.).

** The modem must be a VPN capable cellular IP modem purchased under a separate item.

The CCD selected by the end user shall be proven to interface with the Wireless Cellular
Communication Network of the end user's choice. The Wireless Cellular Communication
Network chosen is based on what is available to and/or used by the end user at the time of
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purchase. The installation of the selected device shall be included in the price of the message sign. The Cellular Communication Device and associated connections to power, the sign controller, and external antenna etc shall be adequately secured on the PDMS and be a separate entity of its own. The unit must be provided with one externally mounted 9dbi antenna. Depending on the modem, two antennas may be required.

NTCIP Conformity:

A. The PDMS Central Operating Software and Field (Remote) Controller Software shall comply with the versions of the NTCIP documents and all related errata sheets, as referenced herein unless otherwise stated.

B. The NTCIP communications software shall comply with NTCIP 1101:1996, the Simple Management Framework (STMF), as well as all available subsequent Errata and Amendments, and shall conform, as a minimum, to Compliance Level 1.

Sub-network Profile (C., D., E. & F.)

C. The communications hardware link between a remote user or DCE and the DTE shall include, at a minimum, the following connectors, separately, to conform to the standards in the table below:

<table>
<thead>
<tr>
<th>Connector</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Port (1): Supporting either 10BaseFl (Fiber Optic Cable), 10Base5 (Thin Coax Cable), 10Base2 (Thin Coax Cable) or 10BaseT (Twisted Pair) specified by the end user at the time of purchase</td>
<td>NTCIP 2104</td>
</tr>
</tbody>
</table>

*Note: A DB-9 Connector is an acceptable replacement option for the DB-25 as long as stable and sturdy port converters to a DB-25 connection is included for all applicable ports above. The contractor shall also provide an appropriate port converter for any of the communications port that is specified by the end user.

Additional connections can be supported at the manufacturer's option. At any one time, only one connection shall be in control of the PDMS control system. Other connections not in control of the PDMS control system shall have read-only status. It shall be configurable to allow an end user with administrative security privileges to override an active control connection. Controller output shall provide a visual indication of the currently active control connection. A local override control shall be provided to ensure that commands issued by personnel at the controller cabinet take precedence over remote connections.

D. Physical layer shall conform to NTCIP 2104, EIA/TIA-232 Serial Interfaces defined in NTCIP 2101. It shall also support the following protocols that govern approved modem communication standards and interfaces in the table below:
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<table>
<thead>
<tr>
<th>Layer AT - Command Set</th>
<th>MNP5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNP10</td>
<td>V.42bis</td>
</tr>
<tr>
<td>V.34 or an ITU-T V-Series Interface that allows speeds of at least 19.2 Kbits/s</td>
<td></td>
</tr>
</tbody>
</table>

E. Data Link Layer shall support the Transport and Network Layer Protocols in the Transport Profile and conform to NTCIP 2104 and the Protocols and Standards indicated in the table below:

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMPP</td>
<td>NTCIP 2101</td>
</tr>
</tbody>
</table>

F. IPI implementations shall identify the protocols used at the next higher layer in the Sub-network and/or Application Profile and support the functionality indicated by the following Protocols (other protocol may be supported too) as indicated within the PPP packet (RFC 1661) and conform to their respective reference documents as shown in the table below:

<table>
<thead>
<tr>
<th>Protocol Name</th>
<th>Protocol Field/IPI Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>STMF</td>
<td>0x1C</td>
<td>NEMA TS 3.2, NTCIP 2101 &amp; NTCIP 2201</td>
</tr>
<tr>
<td>IP</td>
<td>0x21</td>
<td>NTCIP 2101 &amp; NTCIP 2202</td>
</tr>
</tbody>
</table>

Transport Profile (G. & H.)

G. Network Layer Definitions shall rely on the referenced protocols in the Sub-network Profile and conform to protocols and standards indicated in the table below:

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null</td>
<td>NTCIP 2201</td>
</tr>
<tr>
<td>IP, ICMP</td>
<td>NTCIP 2202</td>
</tr>
</tbody>
</table>

H. Transport Layer Definitions shall rely on the referenced lower layer protocols conform to protocols and standards indicated in the table below:

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null</td>
<td>NTCIP 2201</td>
</tr>
<tr>
<td>UDP, TCP</td>
<td>NTCIP 2202</td>
</tr>
</tbody>
</table>

Application Profile (I. & J.)

I. Session Layer and Presentation Layer Definitions shall all be a NULL layer.

J. Application layer shall conform to the rules and protocols of the STMF, NEMA TS 3.2 and rely on the referenced lower layer protocols in the Transport Profile. It shall conform to the protocols and standard indicated in the table below:

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNMP, SFMP</td>
<td>NTCIP 2301 v02</td>
</tr>
</tbody>
</table>
K. Software shall implement all mandatory objects of all mandatory and optional conformance groups as defined in approved versions of NTCIP 1201 and NTCIP 1203, including approved Amendment 1 to both standards. Software shall also implement optional objects to support Full, Standardized Object Range Support (FSOR) or standard requirements (shown in parenthesis) as defined in NTCIP 1201 and 1203.

<table>
<thead>
<tr>
<th>Mandatory Conformance Groups</th>
<th>Security</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign Configuration</td>
<td>Message Table</td>
<td></td>
</tr>
<tr>
<td>Sign Control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional Conformance Groups (Required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Management</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>VMS Configuration</td>
</tr>
<tr>
<td>Default Message</td>
</tr>
<tr>
<td>Illumination/Brightness Control</td>
</tr>
<tr>
<td>Scheduling</td>
</tr>
<tr>
<td>Temperature Status</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional Objects (Required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>globalSetIDParameter</td>
</tr>
<tr>
<td>dmsSWReset</td>
</tr>
<tr>
<td>dmsLongPowerRecoveryMessage</td>
</tr>
<tr>
<td>dmsTimeCommLoss</td>
</tr>
<tr>
<td>dmsMemoryMgmt (normal, clearChangeable Messages)</td>
</tr>
<tr>
<td>dmsCurrentSpeedLimit</td>
</tr>
<tr>
<td>eventConfigLogOID</td>
</tr>
<tr>
<td>dmsShortPowerLossTime</td>
</tr>
<tr>
<td>tempMaxCtrlCabinet</td>
</tr>
<tr>
<td>fanFailures (if applicable)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

L. All objects required shall support all values within a standardized range. The standardized range is defined by a size, range, or enumerated listing indicated in the objects SYNTAX field and/or through descriptive text in the object’s description field of the relevant standard. The following are standard requirements for mandatory objects of the mandatory and optional conformance groups (listed above):
M. The software shall implement the following tags (opening and closing where defined) of MULTI as defined in the NTCIP 1203:

<table>
<thead>
<tr>
<th>MULTI Tag</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>speed (mph), time, temp, date (1-11), defining all display formats</td>
</tr>
<tr>
<td>Flash</td>
<td>0.1 second rate, word by word</td>
</tr>
<tr>
<td>Font</td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td>Justification Line</td>
<td>left, center, right</td>
</tr>
<tr>
<td>Justification Page</td>
<td>top, middle, bottom</td>
</tr>
<tr>
<td>New Line</td>
<td>specify spacing range</td>
</tr>
<tr>
<td>New Page</td>
<td>3 pages total, counting the first page</td>
</tr>
<tr>
<td>Page Time</td>
<td>controllable at 0.1 second increments</td>
</tr>
<tr>
<td>Spacing Character</td>
<td>0 to 99 pixels</td>
</tr>
</tbody>
</table>

N. Software shall be supplied with full documentation (3 copies); including a CD-ROM containing ASCII versions of the following Management Information Base (MIB) files in Abstract Syntax Notation (ASN.1) format:
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- The relevant version of each official NTCIP standard MIB Module referenced by the device functionality.
- If the device does not support the full range of any given object within a Standard MIB Module, a manufacturer specific version of the official Standard MIB Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields of the associated OBJECT TYPE macro. The filename of this file shall be identical to the standard MIB Module, except that it will have the extension “.man”.
- A MIB Module in ASN.1 format containing any and all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
- An MIB containing any other objects supported by the device and firmware/software.

O. The Contractor shall provide the DMS controller firmware as a Non-Volatile Memory, for all protocols (NTCIP or other) supplied with the sign.

P. The DMS shall implement the following “observable behavior” associated with NTCIP Communication:
  - The powerSource object shall report the following enumerated values:
    i)  4 – acLine; when the sign is connected to AC and the batteries are charging
    ii) 6 – solar; when the solar panels are charging the batteries
    iii) 7 – battery; when the solar panels are not charging the batteries
  - Pixel failure objects shall faithfully reflect the actual displayed message (visual appearance) of the sign and accurately report the number and positions of the failed pixels when a pixel failure occurs and simulate:
    i)  An LED failure into the display by removing an LED
    ii)  An LED board failure into the display by removing a LED board
    iii) A power failure into the display by disconnecting the batteries from the LED display boards

OPTIONAL EQUIPMENT:
Equipment should integrate with the unit, operate within the confines of the on board power system, and perform as noted below if offered. ALL devices shall be compatible and inter-connectable with the PDMS and in some cases with each other. They shall not be subject to risk of mechanical damage during normal usage if mounted on it.

Global Positioning System (GPS): A GPS receiver to interface with the PDMS control system so that its location can be determined remotely on a central system such as a laptop, desktop, cell phone or PDA. The sign should be fitted with a GPS receiver that it is not obscured by the DMS
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Sign (or subject to the risk of mechanical damage during normal use of the DMS), to enable the location of the DMS to be obtained remotely from the Central System. The GPS unit shall be a GARMIN GPS 18 or equivalent. The DMS control system shall interface with the GPS receiver, and populate the following NTCIP 1204 (ESS) objects with the correct data retrieved from the GPS:

- essLatitude – Latitude (OID: 1.3.6.1.4.1.1206.4.2.5.2.2.1.0)
- essLongitude – Longitude (OID: 1.3.6.1.4.1.1206.4.2.5.2.2.2.0)

Note: The Latitude and Longitude objects supported shall be from MIB 1204 Version v 2.23 and not from the 1204 Version 1 MIB that describes different OID’s for these objects. Get of essLatitude and essLongitude shall return the correct latitude and longitude of the DMS.

The GPS information may be integrated into the cellular IP modem per the section titled, “COMMUNICATION REQUIREMENTS - FHWA/NYSDOT-ITS Systems.”

Radar Speed Detector: A “radar gun” to determine the speed of oncoming vehicles with the option to automatically initiate a prompt display of the vehicles speed or a default warning message to the motorist. It should be a uni-directional traffic radar, operating in an “approach only” mode, such that only the speeds of approaching vehicles exceeding a user selectable “threshold” or “trigger” speed will be displayed. The Radar Unit shall be FCC Certified, reading 12-degrees with a frequency of K-Band or higher.

Personal Data Assistant (PDA): A PDA or handheld device with wireless cellular capabilities to control the PDMS remotely as a stand-alone system or with a computer system to monitor, change or verify messages and view system status information.

Digital Camera System: A portable camera unit mountable on the PDMS to monitor traffic and/or weather conditions by recording live streaming video and if capable taking snap shots of the vicinity. The camera would transmit data to a modem on the PDMS that would send the data via a cellular phone to a central computer system for deciphering.

Gel-Cel Battery: For systems where conventional lead-acid automotive batteries are the standard configuration, a battery bank upgrade or replacement option to Gel-Cell Batteries would be available.

Training: Provide a training program one time at each delivery location. The training will consist of four hours of operator training and basic technician (troubleshooting and routine maintenance) training.

CONSTRUCTION DETAILS

The Contractor shall provide the manufacturer’s installation instructions for each piece of equipment.
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All incidental parts which are necessary to complete installation, but are not specified herein, shall be provided as necessary to provide a complete and properly operating system.

Documentation Requirements
One (1) complete set of operation and maintenance manuals shall be provided for each unit furnished.

Testing Requirements
The Contractor shall provide testing documentation that demonstrates that the equipment meets the requirements of this specification. A sample unit will be provided upon request for compatibility testing.

METHOD OF MEASUREMENT
The work will be measured for payment as the number of each Portable Dynamic Message Sign (PDMS) unit furnished, installed, tested and accepted by the Engineer.

BASIS OF PAYMENT
The unit price for this bid item shall include the cost of furnishing all equipment, labor and testing necessary to complete the work. Payment shall be per unit item installed and accepted. The Contractor shall receive 70% upon installation of the equipment, 20% upon satisfying the System Acceptance Test and 10% upon Final Acceptance.