



PMX User Guide Rev. C  
October 23, 2008

# **Portable Mesh Exchange 4.0**

## **User's Guide**



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## ***Introduction***

### **PMX Overview**

The Portable Mesh Exchange (PMX), is an embedded device that provides enhanced connectivity for public safety, transportation and other markets. In one unit, SRI delivers the capability to form a 4.9, 5 or 2.4 GHz mesh network with a backhaul data link or connection to a Wi-Fi access points via a second radio link.

As a separate node and access point to a mesh, the PMX provides the user with the ability to expand mesh coverage with the versatility to access the existing networks or attached cameras. The PMX has two primary configurations; Gateway or Camera. In Gateway mode, the PMX serves as an interface between wireless mesh networks and existing IP network via an Ethernet connection. This provides remote drive-up access via wireless mesh to network attached devices such as cameras, etc. In Camera mode, the PMX can support one dedicated camera for wireless transmission on the mesh.

The PMX can be installed internally or externally to buildings, poles or structures using standard mounting hardware. Power can be provided three different ways: over Ethernet (POE), direct DC power, or via a DC Pigtail for the mobile solution.

### **FCC compliance and Safety**

The PMX utilizes components which meet FCC regulations and as a unit has been tested and found FCC compliant.

The PMX 4.0 uses a high power (600mW) radio set from the factory to 29.9 dBm. FCC regulations require that the combined gain between the radio and antenna be at or below a specific limit. For the PMX, the output power must be 27dBm with a 9dB Omni-directional antenna. SRI's proprietary software will be set to decrease the radio power from 29.9 dBm to 27dBm to remain in compliance. If a 6 dB gain antenna is used, the device will be set to the factory standard power output.

### **FCC Compliance Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 45 centimeters between the radiator and your body.

### **FCC PMX Label Statement**

The following FCC compliance statement is visible on the front of a PMX:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

### **Installation Safety Requirements**

Installation of the PMX by certified personnel is recommended in order to comply with local safety regulations. In addition, the antenna(s) used for this transmitter must be with a separation distance of at least 45 cm (18 inches) from all persons during normal operation.

### **Getting Started**

Each PMX unit is packed individually for shipment. The PMX 4.0 has two installation modes: vehicle mount or wall mount. In each case, the RF Cables and Antenna should be installed by a professional to assure proper connection and mounting. The antennas and cables should be connected to the unit before powering up the device. Failure to do so could cause internal damage to the unit.

**Vehicle Mount:** The PMX should first be secured in a safe area that has infrequent traffic (e.g. under a seat or in the trunk). Once the unit is secured the RF and power cables must be attached and properly routed. There are separate instructions for mounting the antennas. Secure the Antennas and cables on the PMX 4.0 before powering up the device. The PMX can be powered via POE Ethernet cable, an external AC power plug, or directly wired to the vehicle's power system with the pigtail cables provided. Once the unit is on, it is working. Verify that it can be seen with a local mesh node before completing installation.

**Wall/Pole mount:** Attach the provided antennas directly to the PMX before installation. Install the unit at the highest point on the wall to ensure maximum range of the system. Orient the unit so the antennas are pointed toward the sky. The PMX can be powered via POE Ethernet cable or an external AC power plug. Choose the easiest option to power the system and plug it in to the plug labeled "PWR".



## Using the System

Once the PMX units are powered on and correctly provisioned in your system they will automatically start working to create your mesh network. In order to verify the system functionality, you must have a computer with the AWARE software installed as well as an approved wireless card or connection to the SMC.

## PMX Inventory, Inspection and Assembly

- 1) Inventory PMX shipping box and inspect for any damage
  - a. Fixed Unit
    1. PMX unit
    2. PMX DC Power Supply
    3. POE block and AC/DC power supply
    4. Installation bracket and mounting hardware
    5. 4.9GHz and 5 GHz antenna Mobile Mark Antennas
    6. Black GPS Antenna with SMA connector
  - b. Mobile Unit
    1. PMX unit
    2. PMX DC Power Supply
    3. POE block and AC/DC power supply
    4. DC Power Pigtail
    5. POE block and AC/DC power supply (if provided)
    6. 4.9GHz and 5 GHz Huber+Suhner Avant fin and puck antennas
- 2) Install 4.9 and 5GHz antenna – the top of the PMX has a 4.9 GHz Label for reference.
  - a. Fixed Unit- Screw on the provided antennas and verify that the antennas are tight- be careful not to cross thread.
  - b. Mobile Unit- Install the provided Antennas on the vehicle. The following cables will be needed to connect the antenna:
    1. N-N connector RF cable goes from the front connector of the fin antenna to the 4.9 GHz connector on the PMX.
    2. N-SMA connector RF cable goes from the back of the fin antenna to the middle GPS connector.
    3. NMO- N connector RF cable goes from the 5GHz puck antenna to the 5GHz connector on the PMX

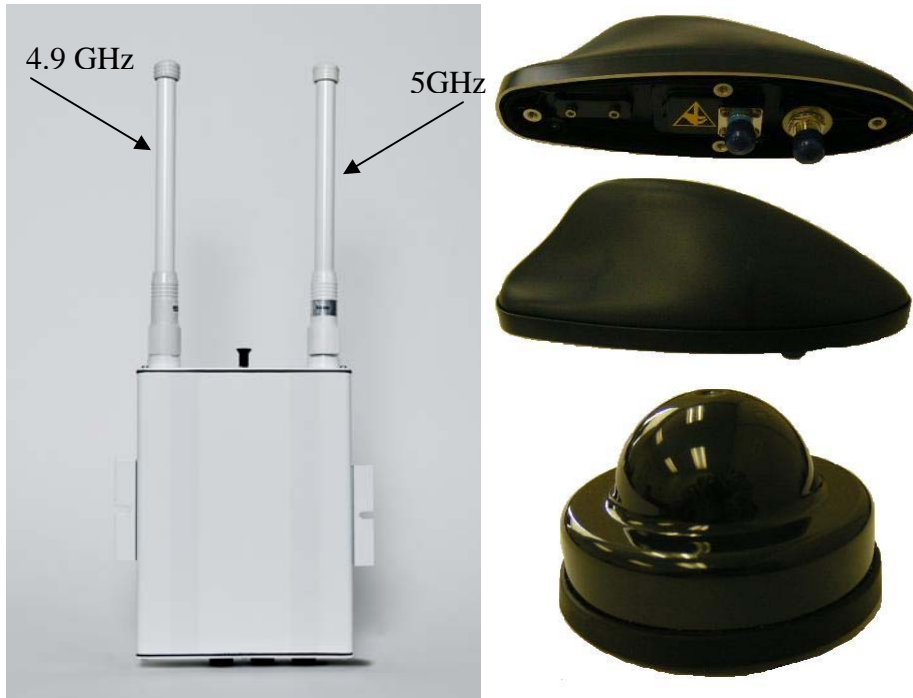


Figure 1- PMX 4.0, and Mobile Antenna Option

- 3) Visually inspect PMX case is tight, and the unit has a continuous gasket seal along the top and bottom edges.
- 4) If required for installation, install mounting brackets
- 5) The PMX can be powered three different ways.
  - a. Power Over Ethernet (POE)
  - b. DC Power Supply
  - c. DC Power Pigtail (for vehicle power)



Figure 2- Three PMX Power supplies: DC Power Pigtail, POE Injector, DC Supply

6) PMX 4.0 Connectors:

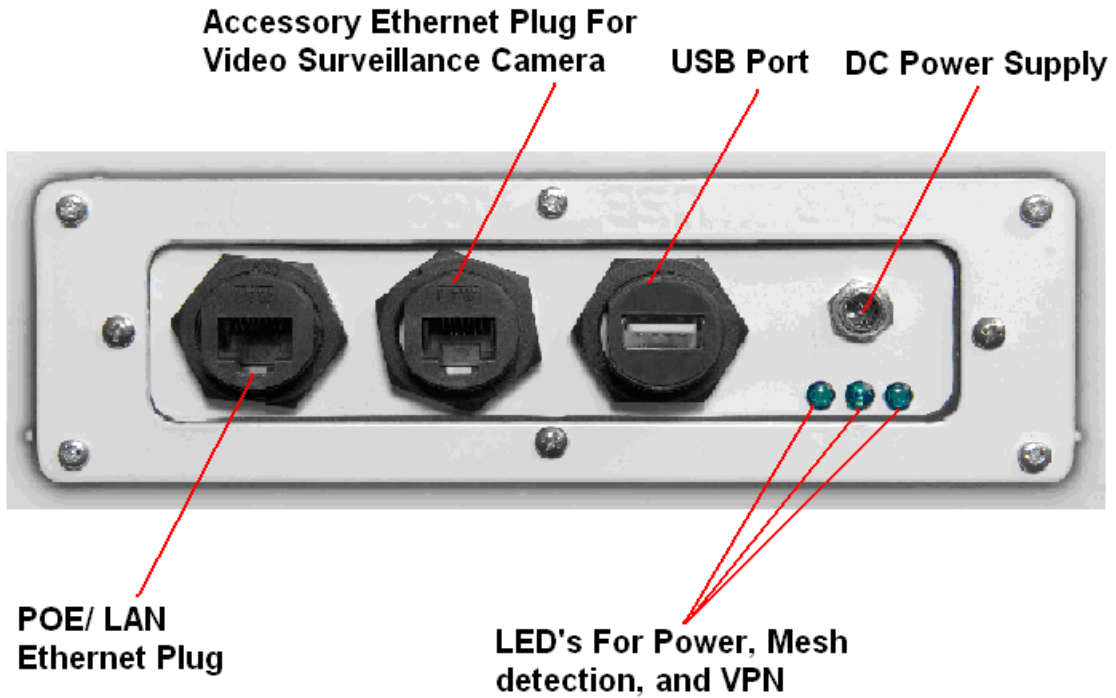


Figure 3- Connector Diagram

**Support Items for Installation**

Prior to PMX installation gather the required CAT 5 cables , RF cables, as well as any mounting equipment and hardware necessary for installation.



## Installation and Set-Up

### Installation

Installation of the PMX is to be performed by the customer using personnel properly certified for installation of equipment. Once installed in desired location, power is provided via Ethernet connection or DC Power Supply. Installation configurations combine both a Camera and Gateway mode together in the following diagrams.

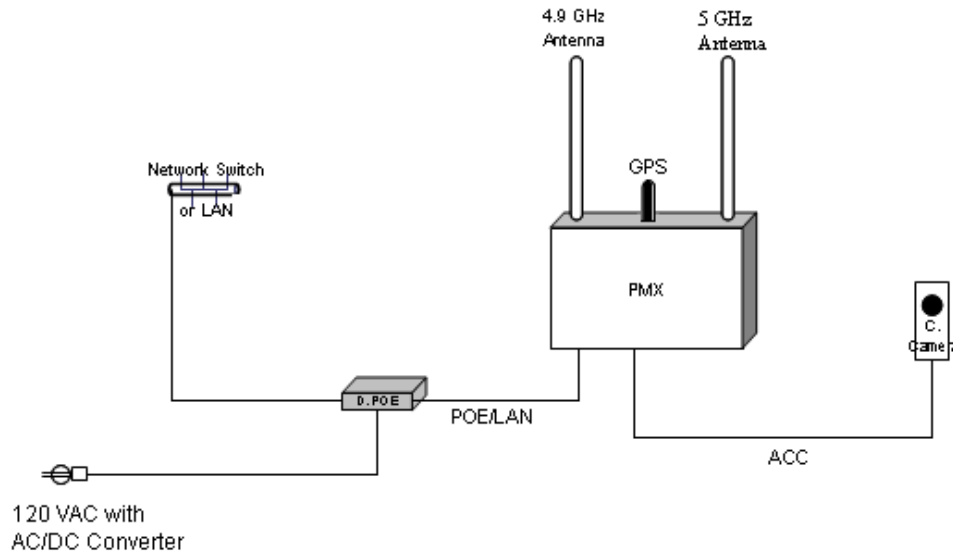


Figure 4 - Installation Configuration #1- POE Power

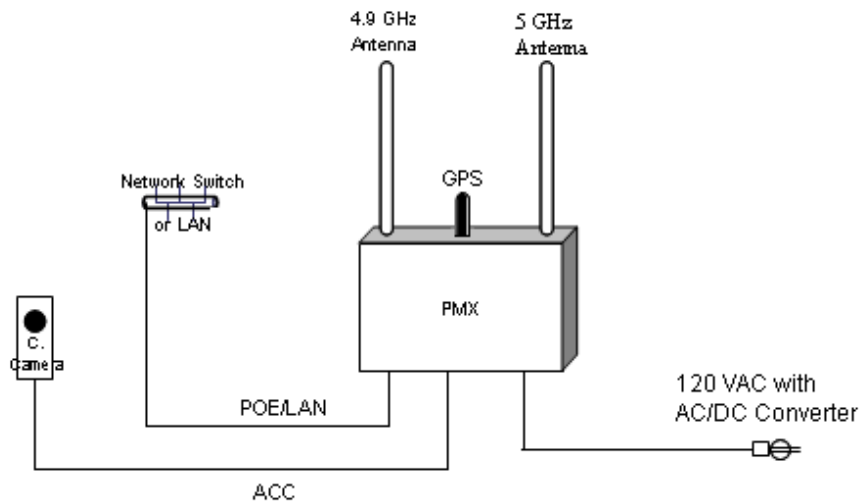


Figure 5 - Installation Configuration #2- DC Power



## PMX Access via Web Interface

The PMX can be accessed through a web interface using a web browser. Using a test laptop configured with Mobile Mesh software, open the **Mesh Topology** in the Aware Mesh Manager. You will see the screen shown below in figure 1. This screen displays the entire mesh networks, connectivity, and statistical data about each node.

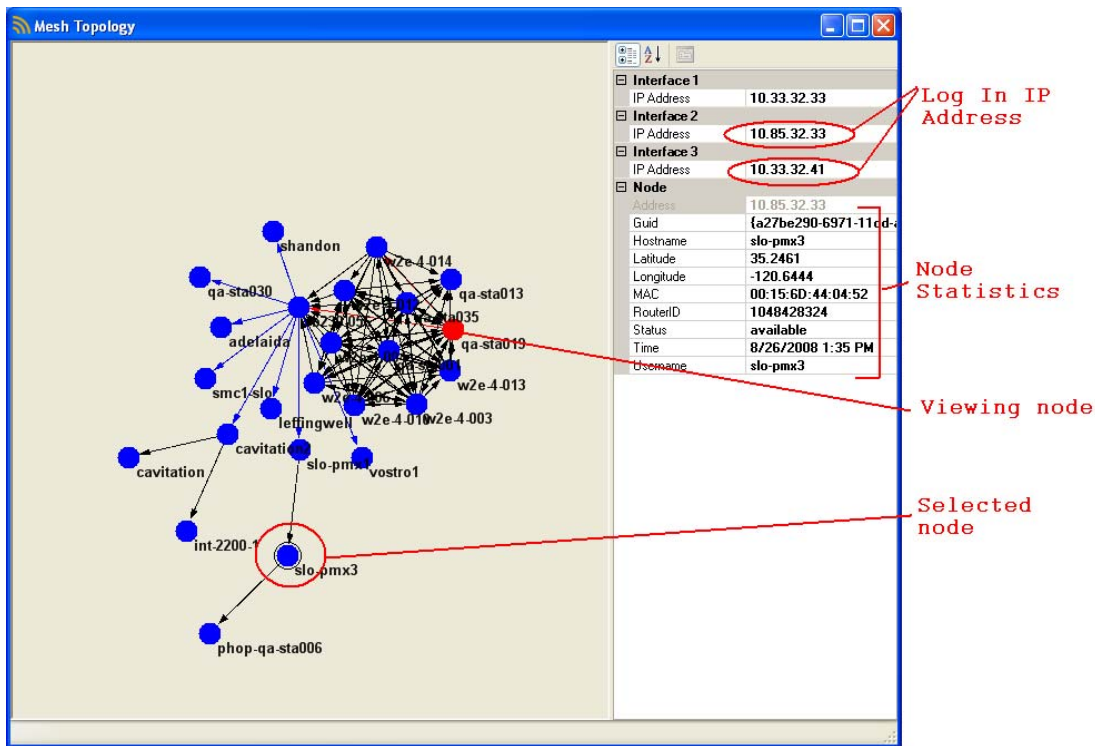
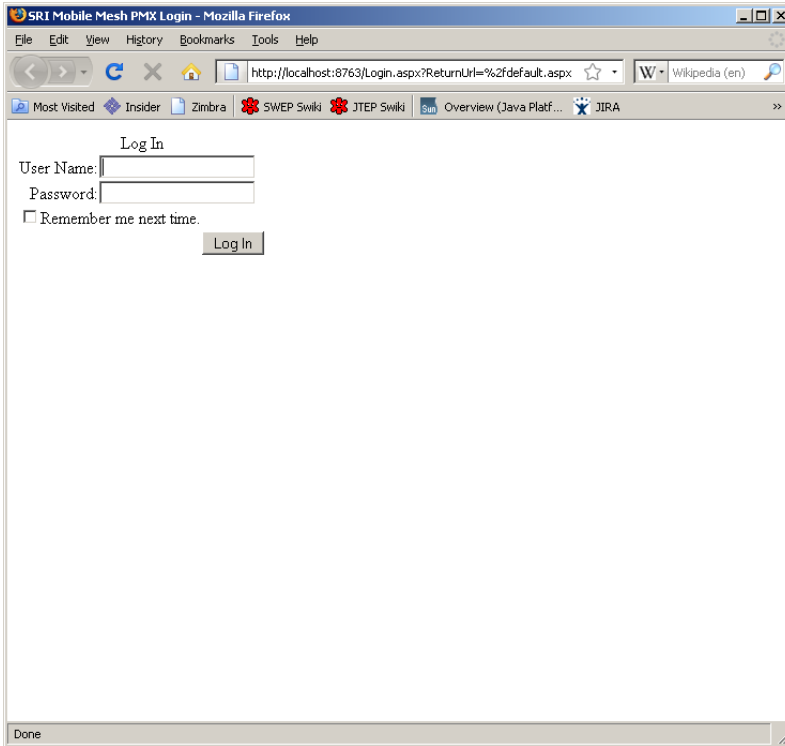


Figure 6- Mesh Topology

The red node in the diagram represents the computer the user is viewing the mesh with, and the node with the black circle around it is the selected node with its specific node statistics displayed on the right side panel.

### LOGGING IN:

In order to log in to the selected node, the user must first bring up a separate internet browser window, and type in the IP address (choose either) of the node in the address bar.



**Figure 7- Login Screen**

Once you have typed in the IP address, you will see the screen above which asks for your username and password. Enter your information and press the login button.

#### FEATURES:

Once you have logged in, you will have access to various settings within the PMX 4.0. The screen below shows you the start page you will see upon login and the following instructions will help you navigate through all the available options.

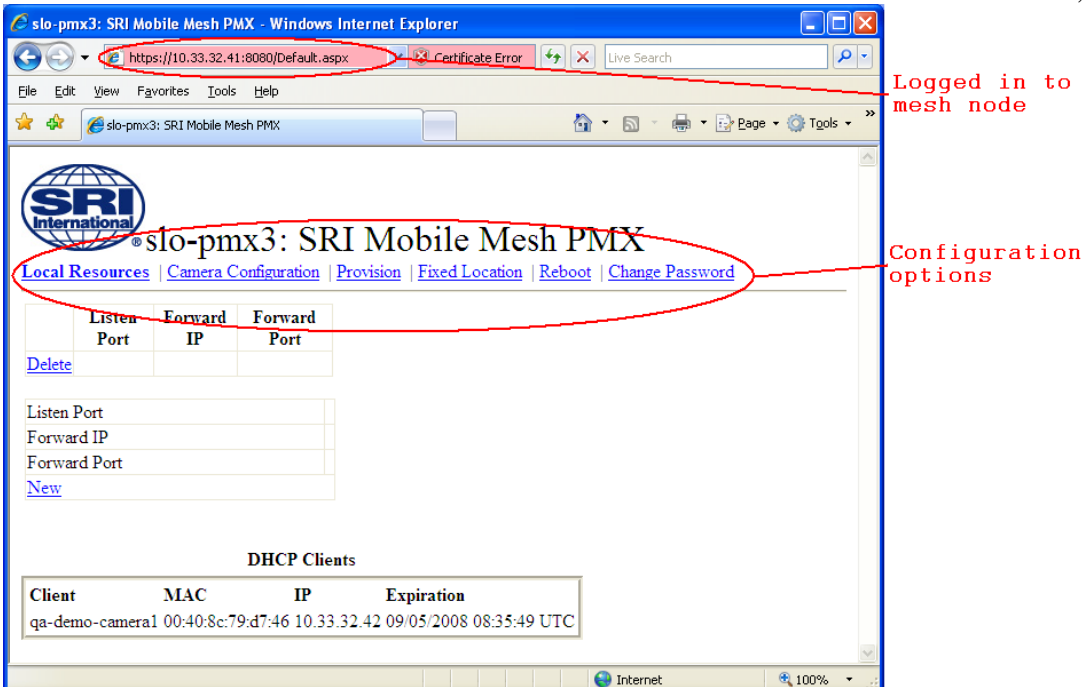


Figure 8- Configuration Options

The PMX currently has six different features available: Local Resources, Camera Configuration, Provision, Fixed Location, ReBoot, Change Password.

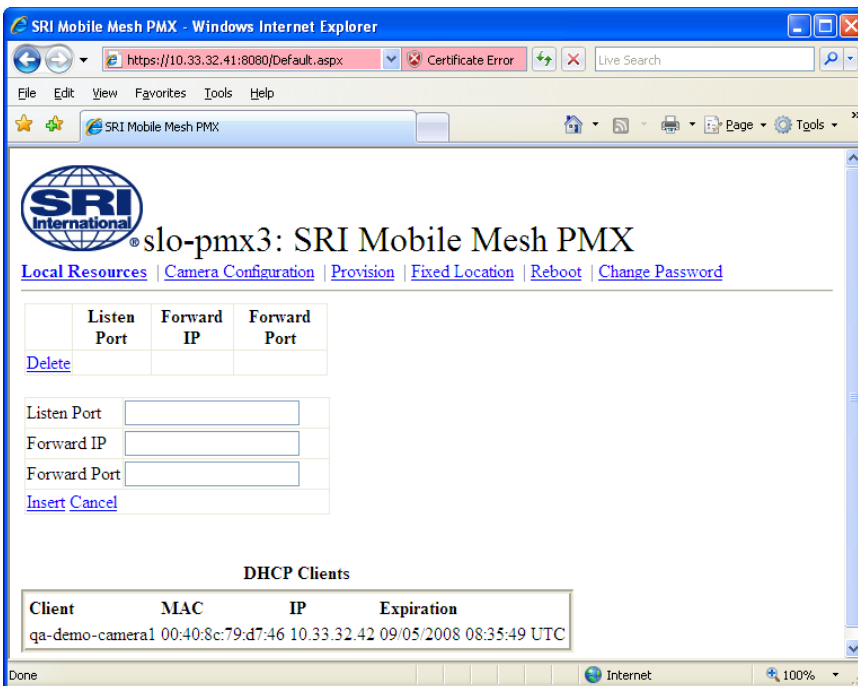
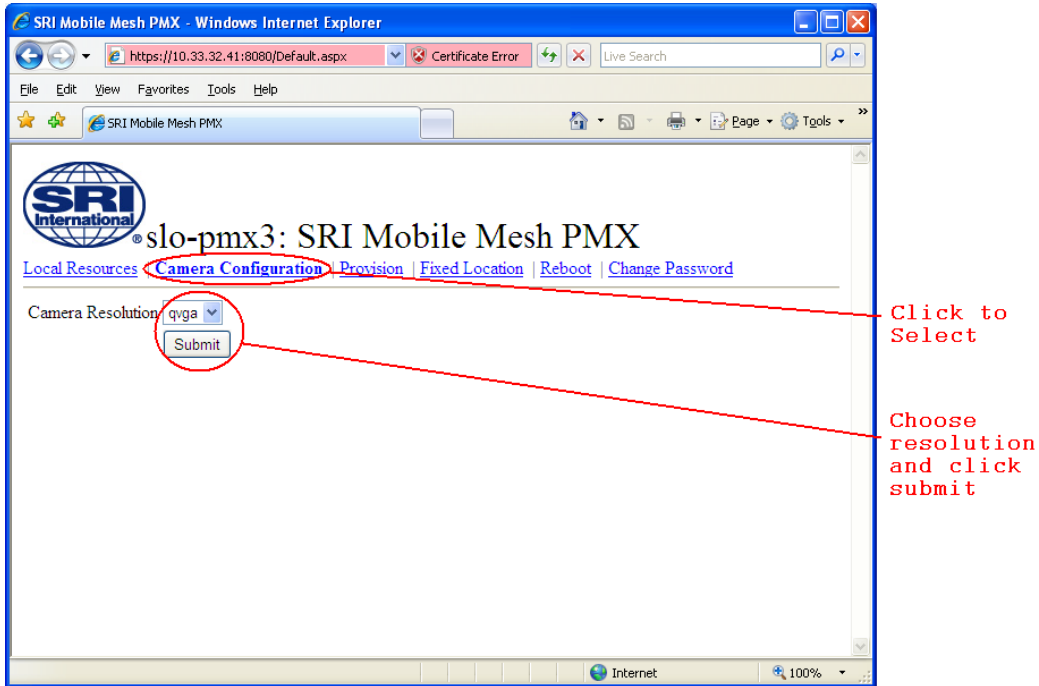


Figure 9- Local Resources

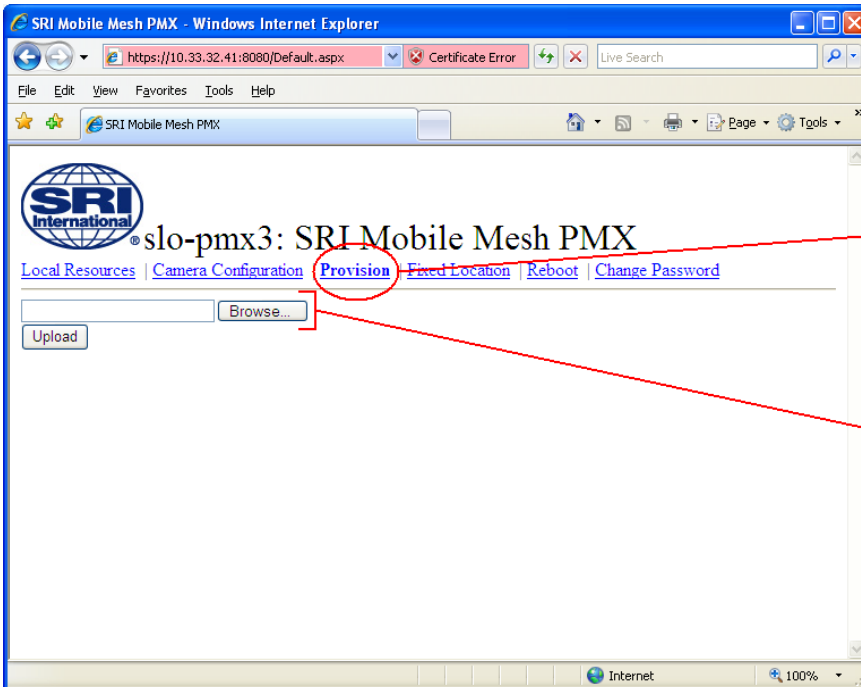


The local resources link allows you to change the Listen Port, Forward IP, and Forward Port of the device.



**Figure 10- Camera Configuration**

Clicking on the Camera Configuration link allows you to select the Camera Resolution from a drop down menu to optimize your system.

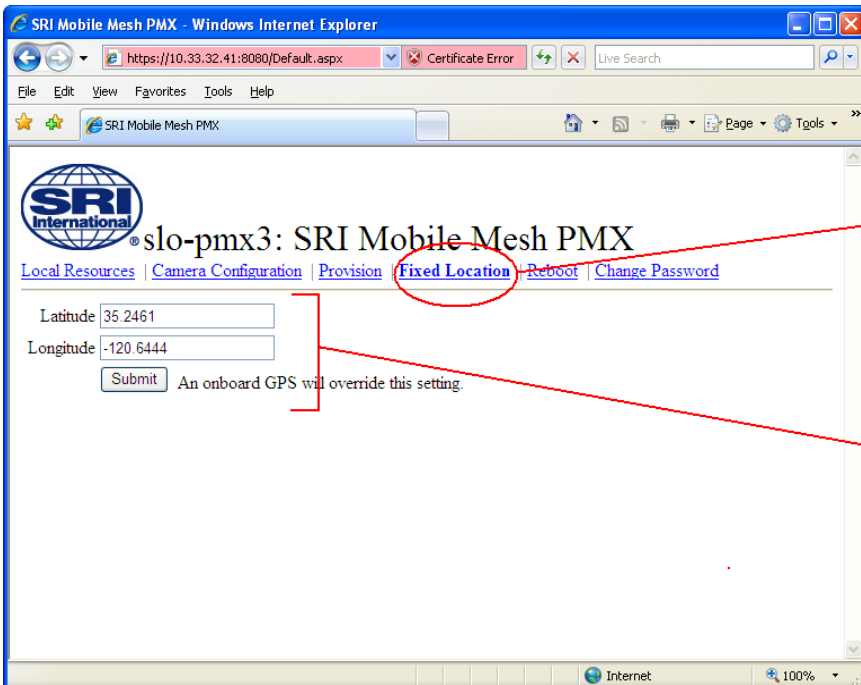


Click to select

Browse to find new provisioning software and push upload to install

Figure 11- Provision

The Provision Link allows you to upload new provisioning software into the PMX via the wireless link.



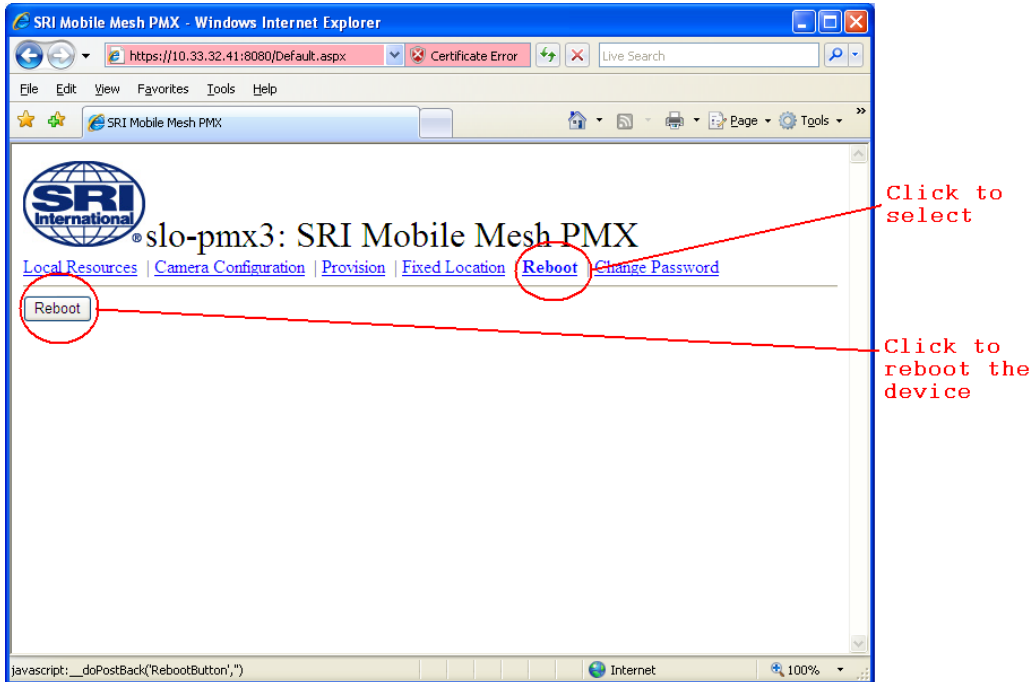
Click to set a fixed location

Enter desired lat/lon information and click submit

Figure 12- Fixed Location

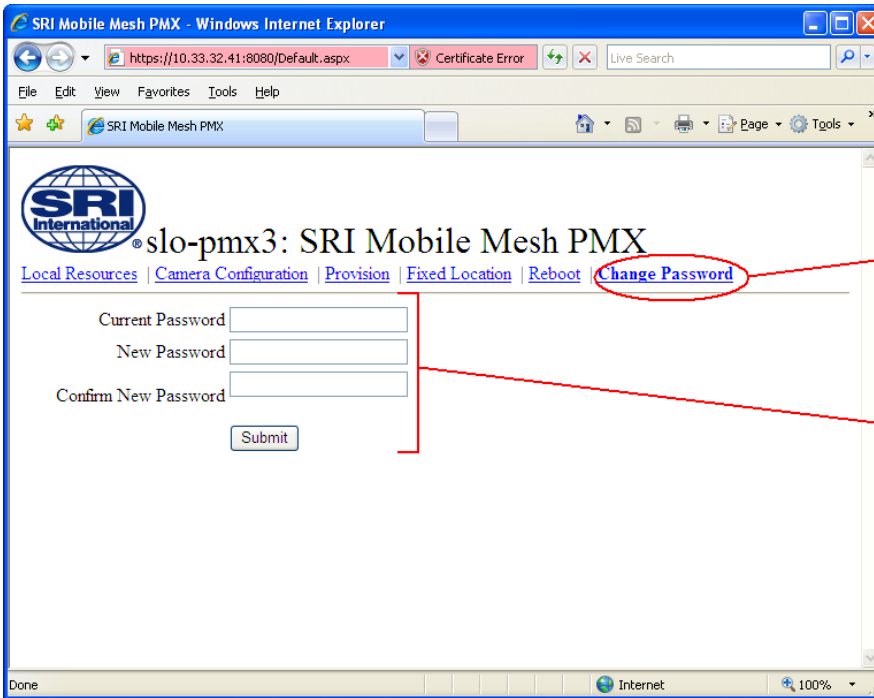


Clicking on the fixed location link allows you to set a fixed GPS position for the PMX. If the PMX is receiving a GPS signal, it will automatically override the fixed position.



**Figure 13- Reboot**

The Reboot link allows you to reboot the PMX wirelessly. This is necessary if you re-provision the unit.



Click to  
Select

Type  
password  
information  
and click  
submit

**Figure 14- Password change**

The final link allows you to change your login password for the PMX 4.0.



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## ***NOTES***