Avoiding the Remote Callout

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- The contents of this presentation reflect the views of the authors who are responsible for the facts and the accuracy of the data herein.
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- **The Problem-** A field element is no longer communicating with the TMC.

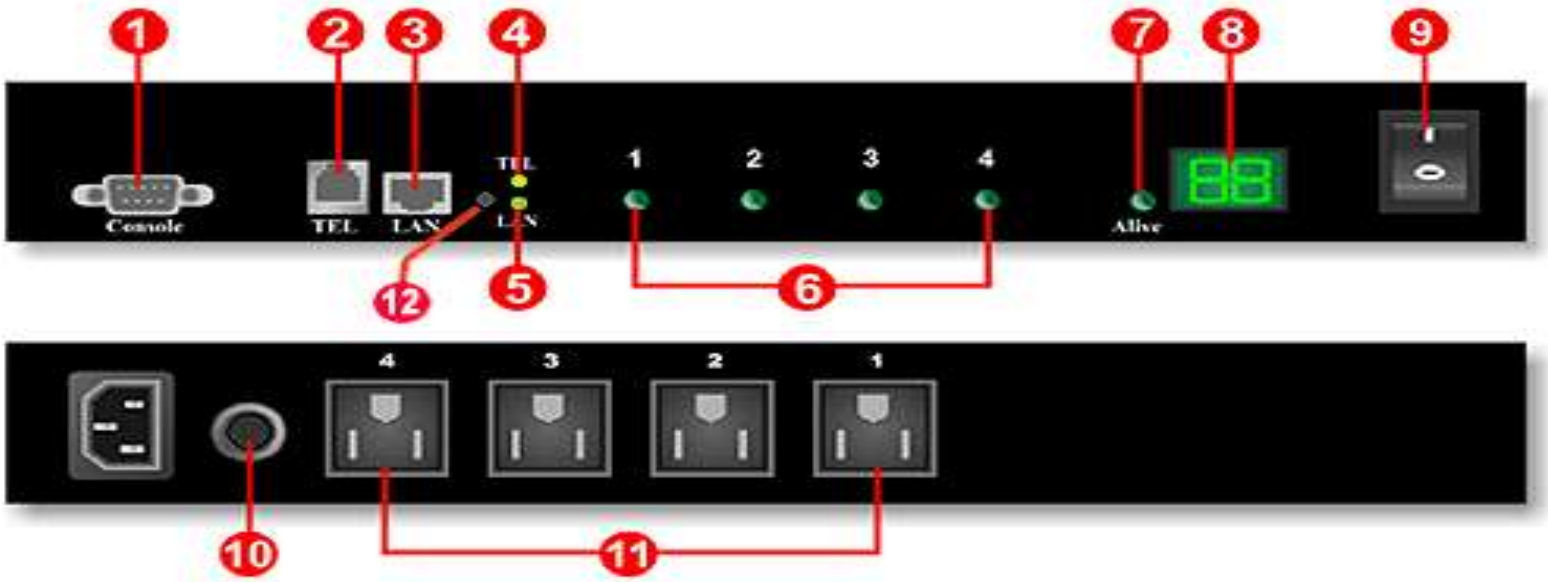
- **In The Past-** The element is verified by Operations and/or Maintenance to be unreachable. A technician is notified and sent to the field to investigate.

- **Current Solution-** Interrogate the Intelligent Power Controller and reset the suspect device.

- There are many devices available that will allow remote power control. For example, the infamous X10 and the popular WebRelay, but there are always drawbacks to these types of devices. The power controller will usually lack Public Switched Telephone Network (PSTN) control or Web control and are rarely hardened.

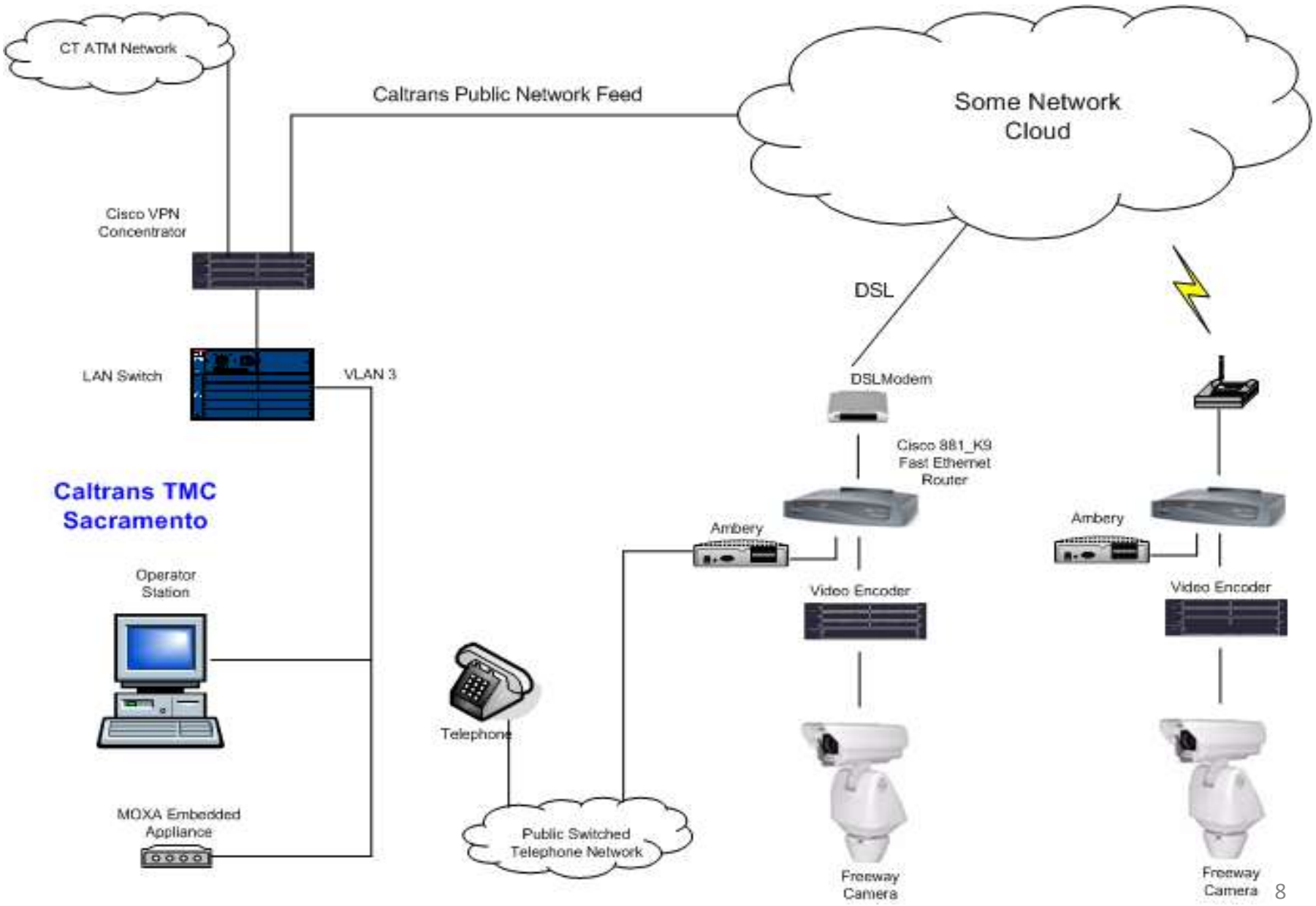
- In the past, an Uninterruptable Power Supply (APC and Tripp Lite) with a switchable outlet via web interface has been used to allow device resets with moderate success. However, there are two problems;
- First, one outlet was switchable by use of the web interface only. So, if the device to be reset was a DSL modem or router the UPS could not be used for reset.
- Second, when the battery voltage decayed to a low enough voltage after approximately three years the UPS would shut down. What does the U mean in UPS again? This requires a strict battery maintenance schedule to keep field elements from shutting down.

- The advantage of this remote power controller over other control units is its telephone control function. If the network locks up or devices become unreachable there is always a telephone option for controlling remote devices.



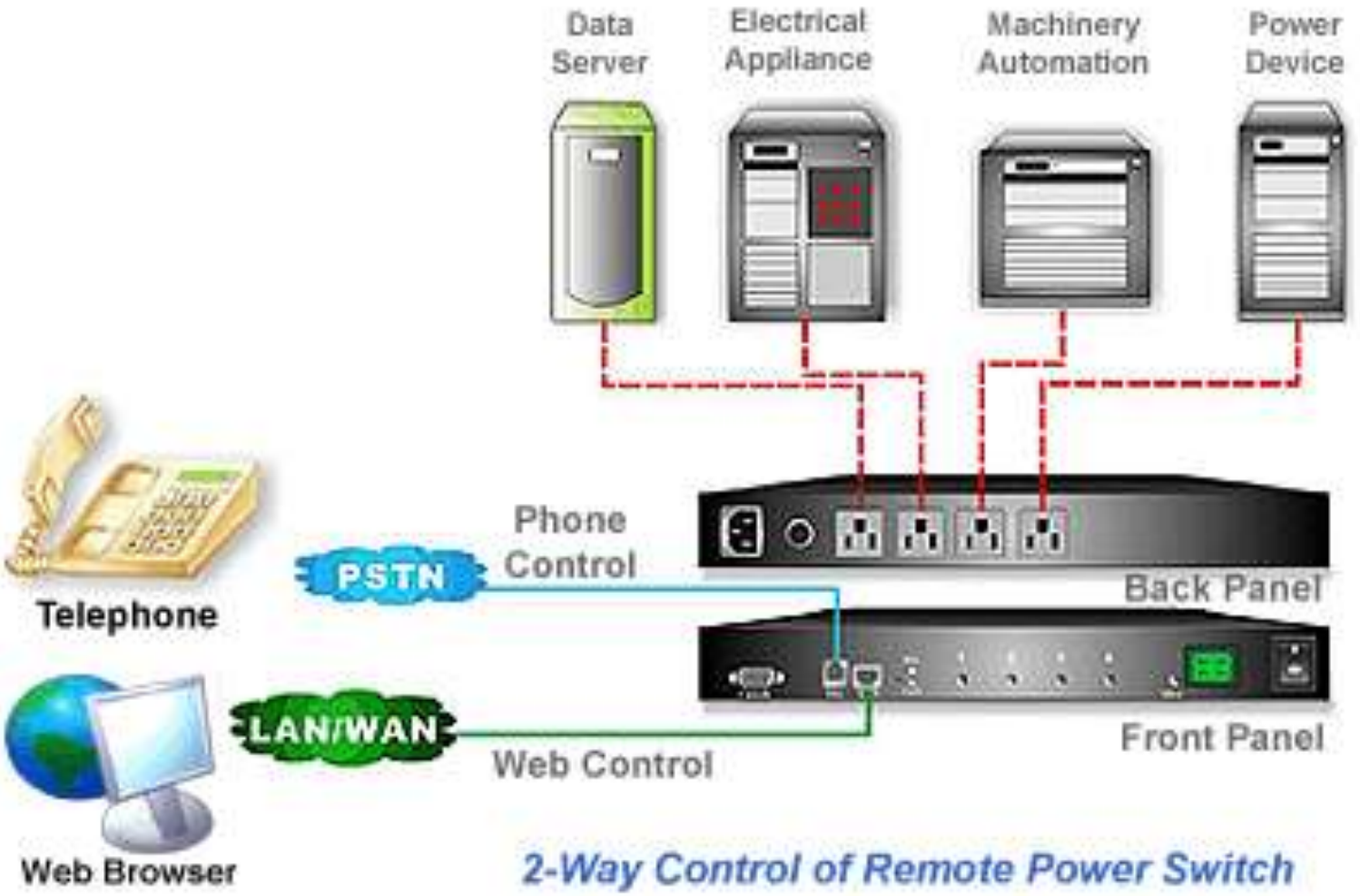
1	RS232 Port For Connection With Remote Console	7	Operating LED Indicator
2	Telephone Jack	8	Total Electrical Current Reading Monitor
3	RJ-45 Network LAN Port	9	Local Manual Power On/Off
4	Phone Control Mode LED Indicator	10	Circuit Breaker Protector
5	Web Control Mode LED Indicator	11	4 AC Power Sockets
6	Power Outlet Channel LED	12	Reset Button

System Diagram

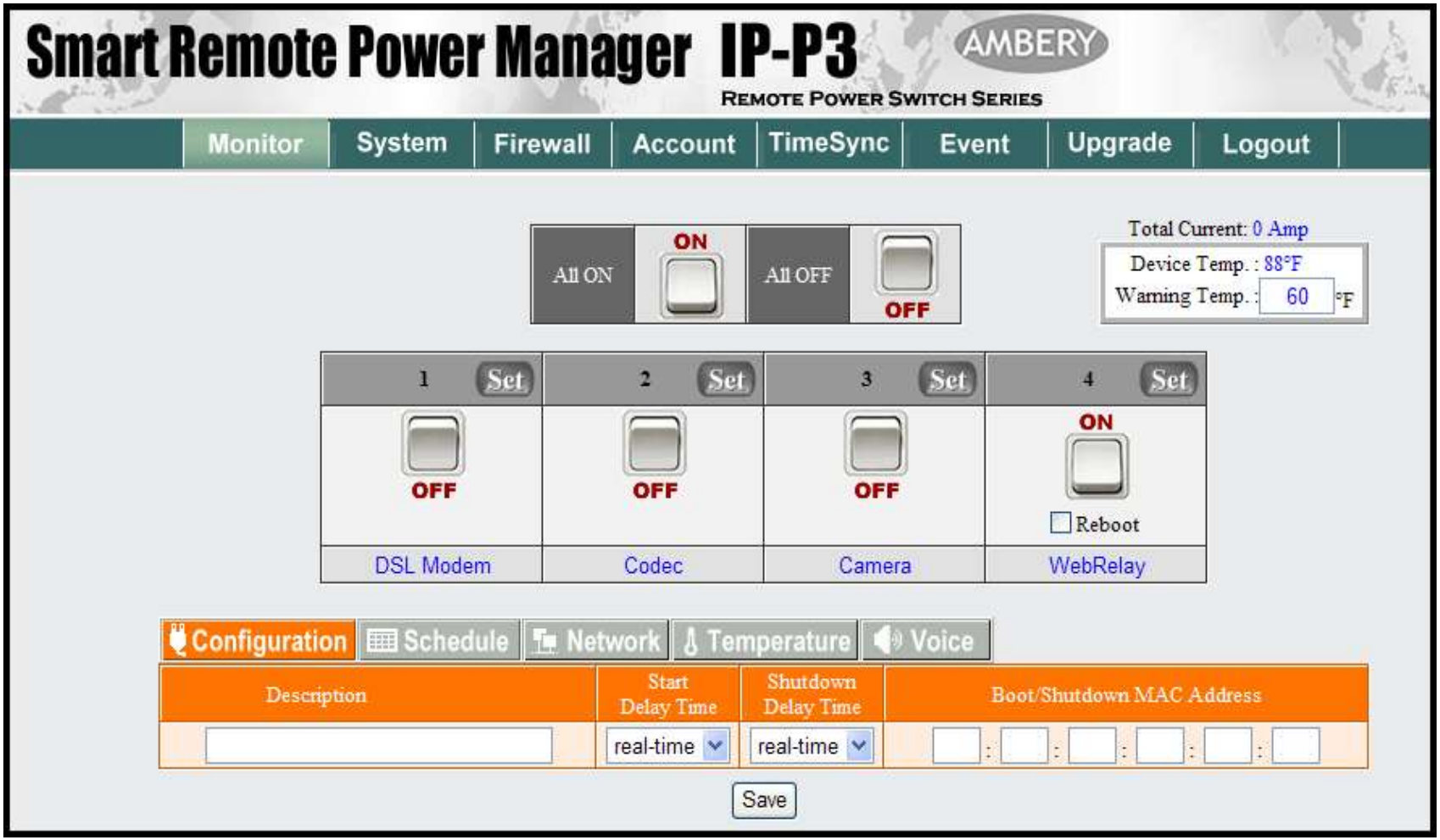


Cabinet Picture

Location Picture


Data Server
Electrical Appliance
Machinery Automation
Power Device
Telephone
PSTN
Phone Control
Back Panel
Front Panel
LAN/WAN
Web Control
Web Browser
2-Way Control of Remote Power Switch

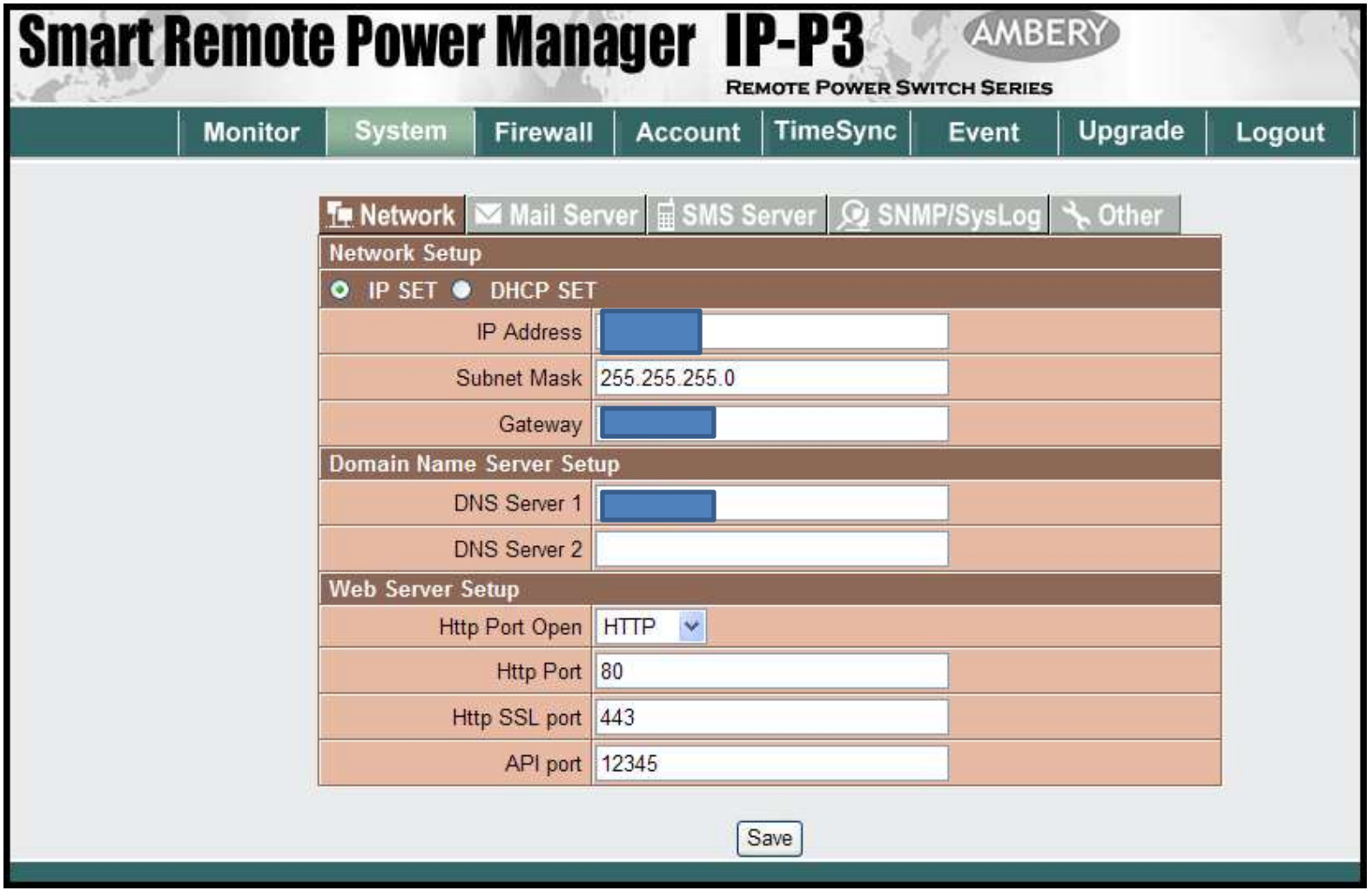
Ambery Monitor Page



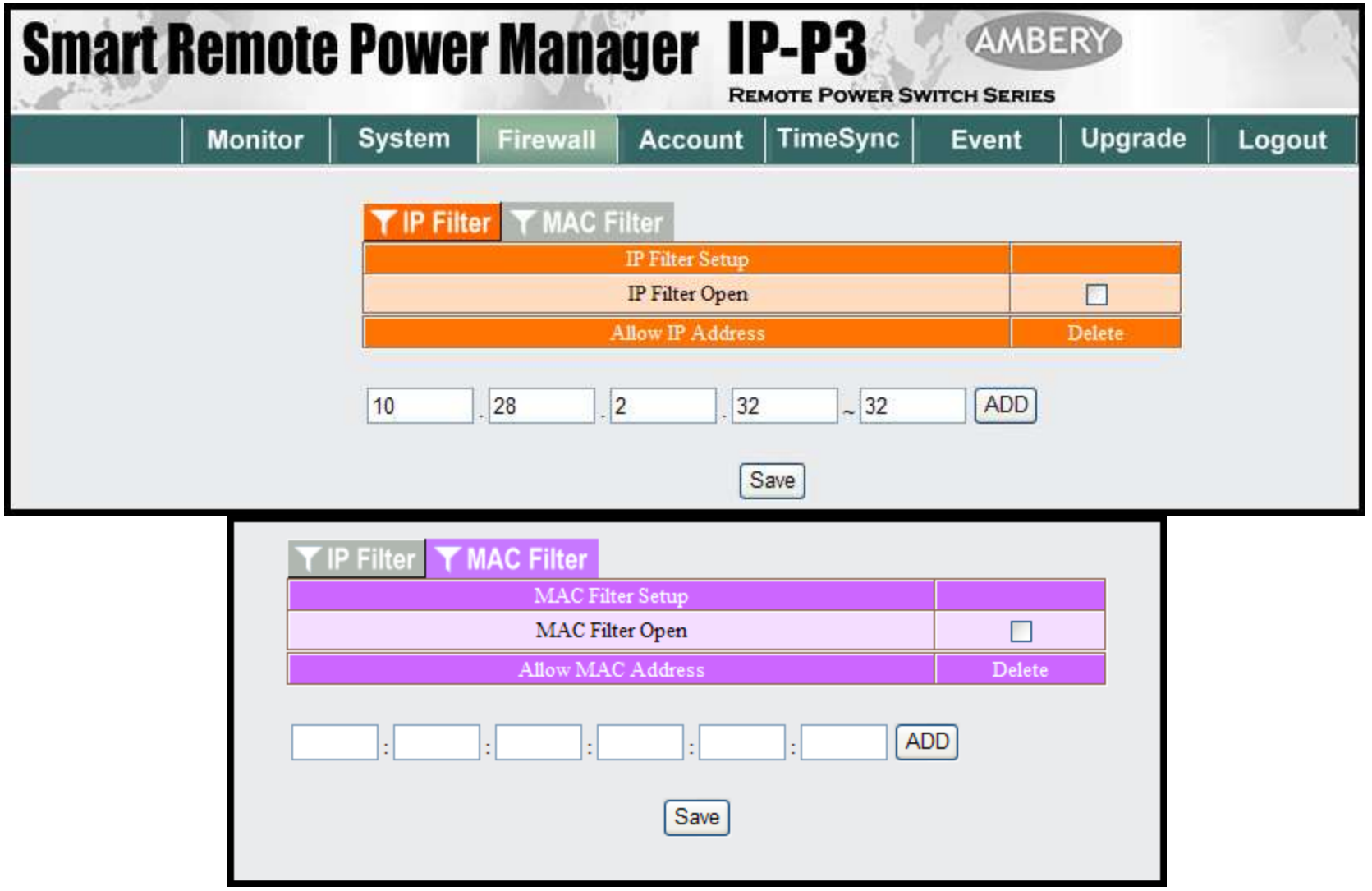
Ambery Demonstrations

- Front page demo (control page)
- Scheduling page demo
- DTMF demo

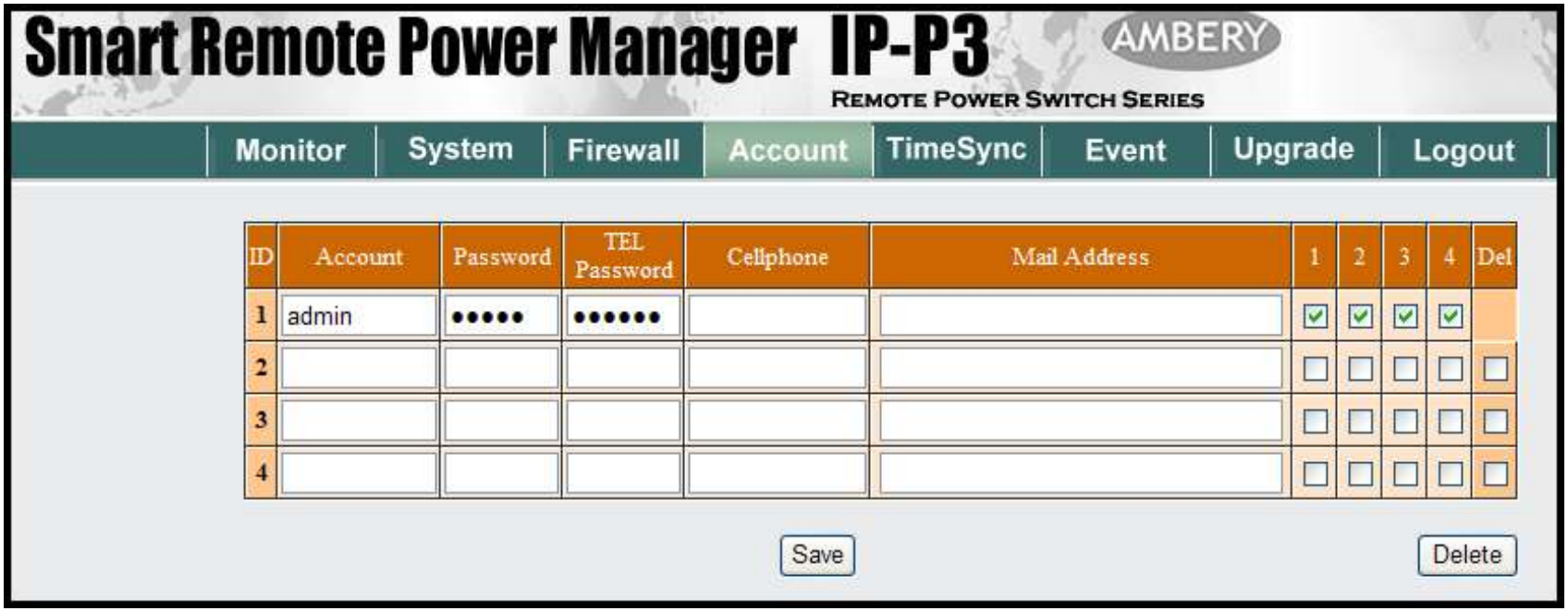
Network Page



Firewall Page

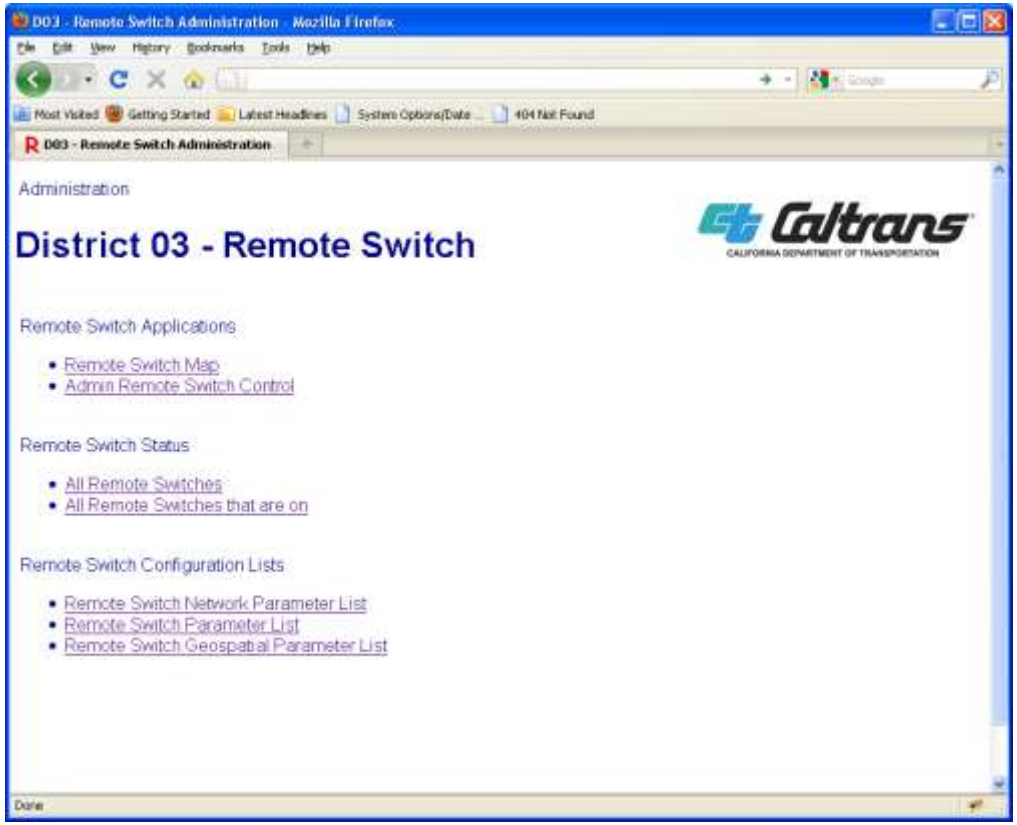


Account Page



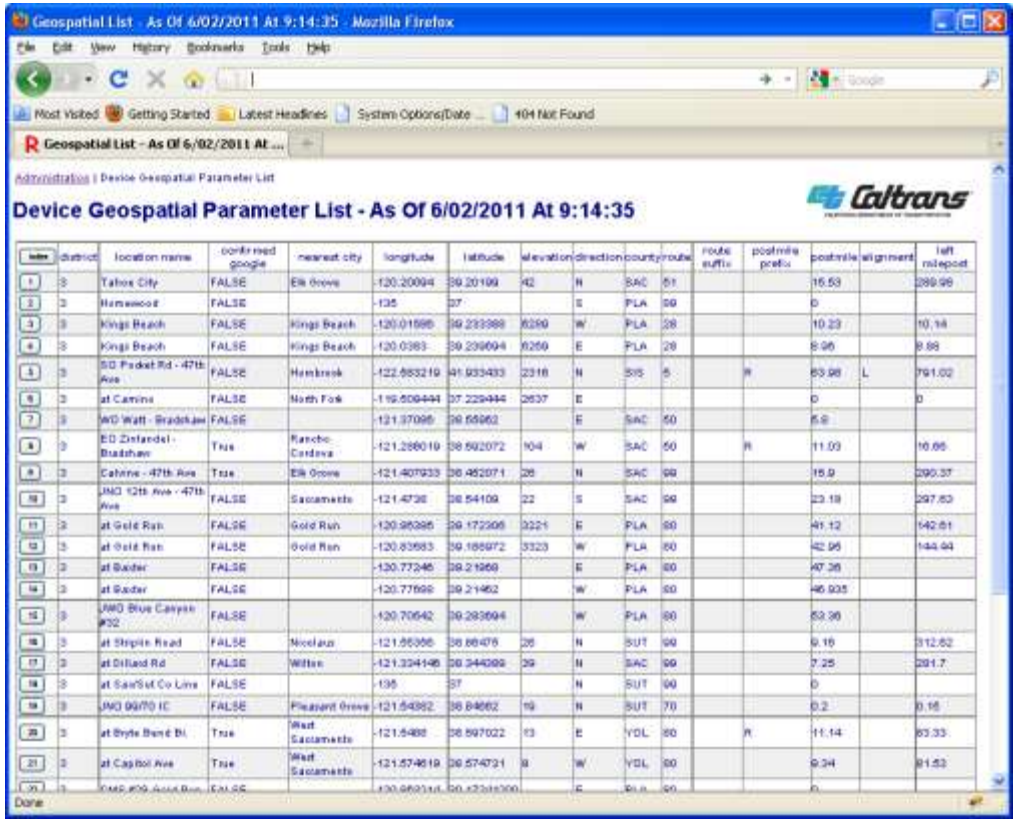
Remote Switch Interface

- This is the administration page
- All of the main pages are referenced off of this page
- Administrator / operator can click into the two remote switch applications
- Administrator / operator can click into the status of the remote switch fleet
- Administrator can configure the remote switch fleet based on network parameters, geospatial parameters or general parameters



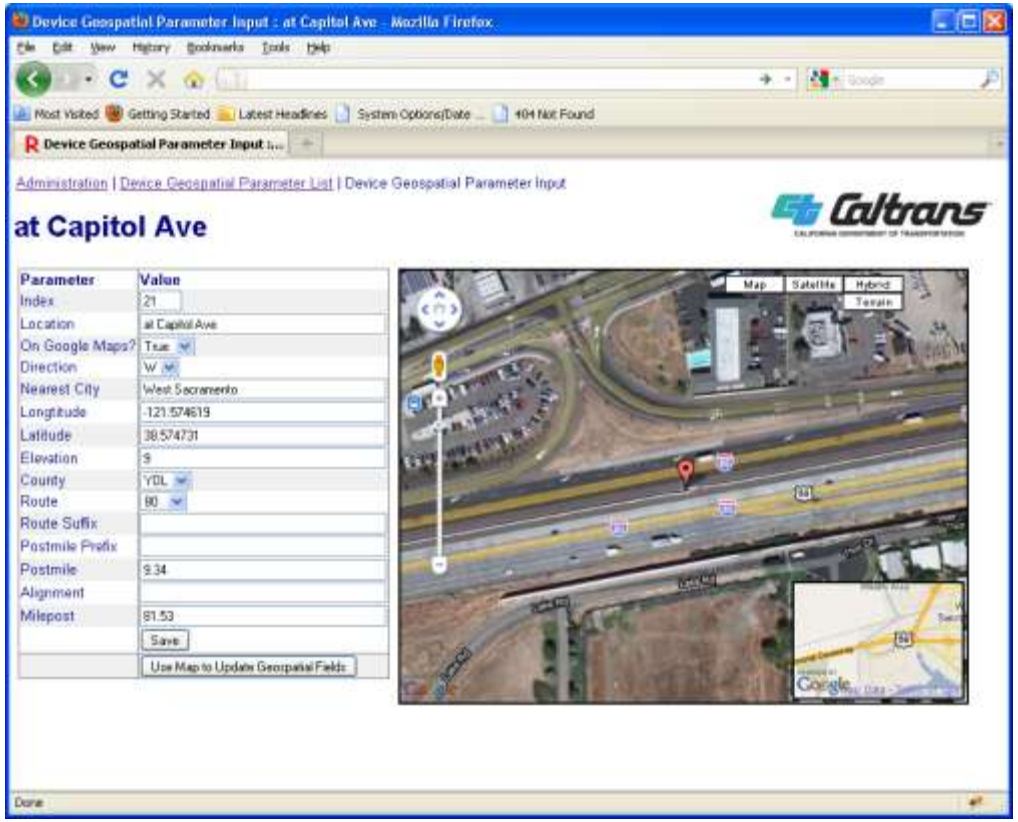
Remote Switch Interface

- Here is an example of one of the parameter pages for the remote switch, the Geospatial Parameter List
- All of the remote switches in the fleet are listed, along with the respective parameters in a spreadsheet fashion.
- The administrator can pick a remote switch location and edit the parameters.



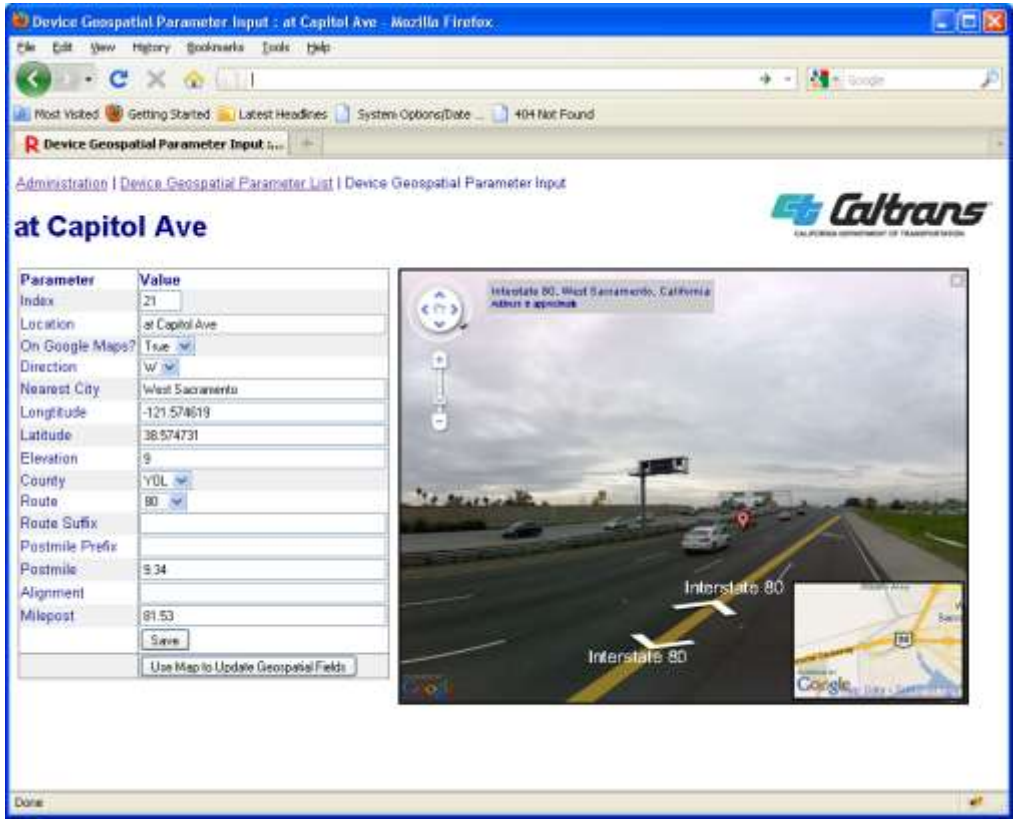
Remote Switch Interface

- These are the geospatial parameters at I-80 Capitol Avenue in West Sacramento, CA.
- The administrator can manually edit the parameters as necessary.
- Using the Google Map API, the administrator can also drag the marker to fine tune the geospatial parameters.
- Clicking on the “Use Map to Update Geospatial Fields” sends the marker’s current longitude / latitude to the server.
- The server will use several different APIs to resolve the following fields: Nearest City, Elevation, County, Route, Route Suffix, Postmile Prefix, Postmile, Alignment and Milepost.

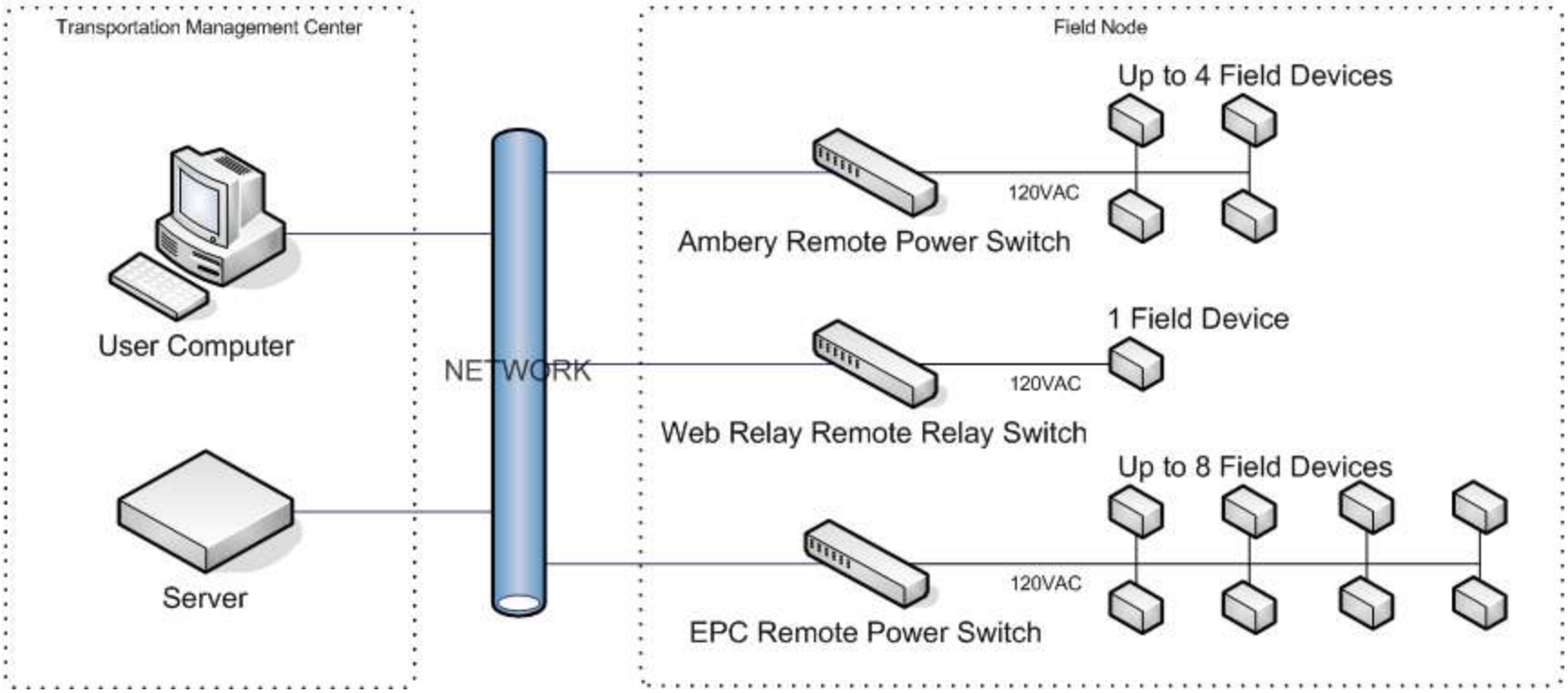


Remote Switch Interface

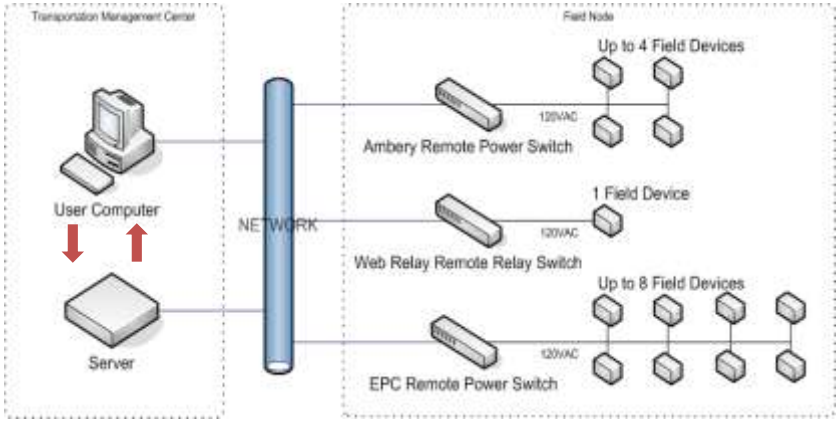
- Here is the same information using the Google Map Street View API.
- Sure enough, the EMS field device is near where the marker indicates.
- Disclaimer – While the Google Maps API is a good tool to find the general longitude / latitude of a field device, it is not intended to be the definitive geospatial locater tool.

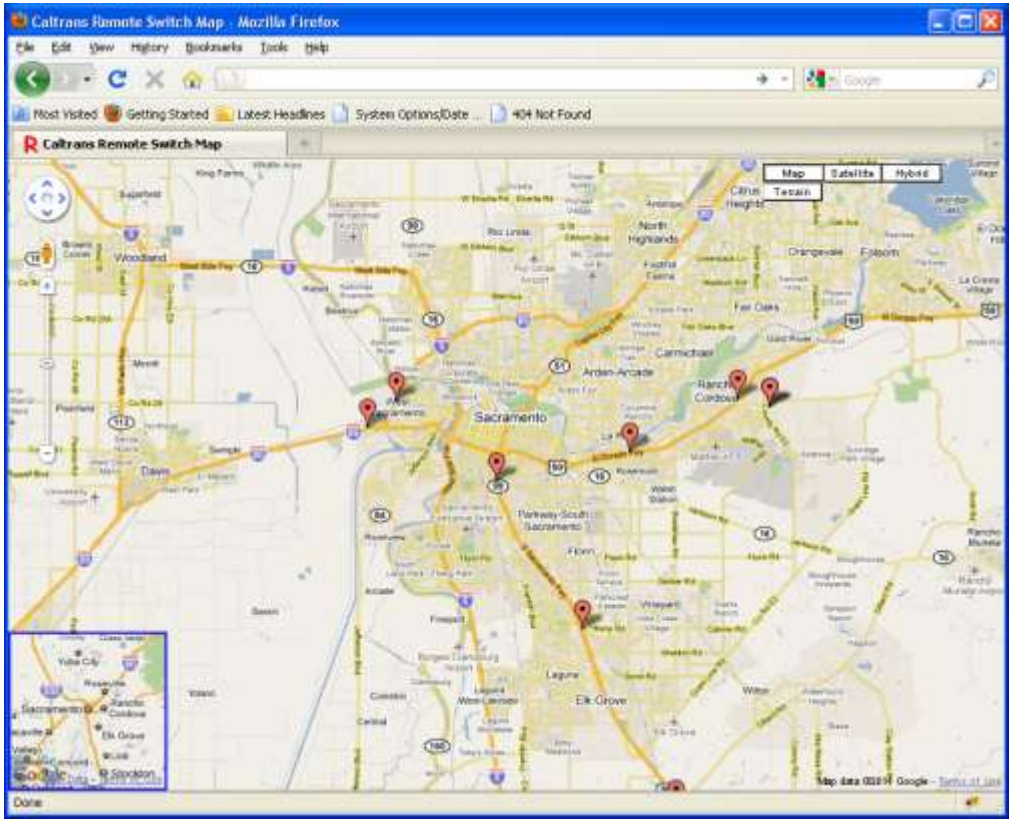


Remote Switch Interface



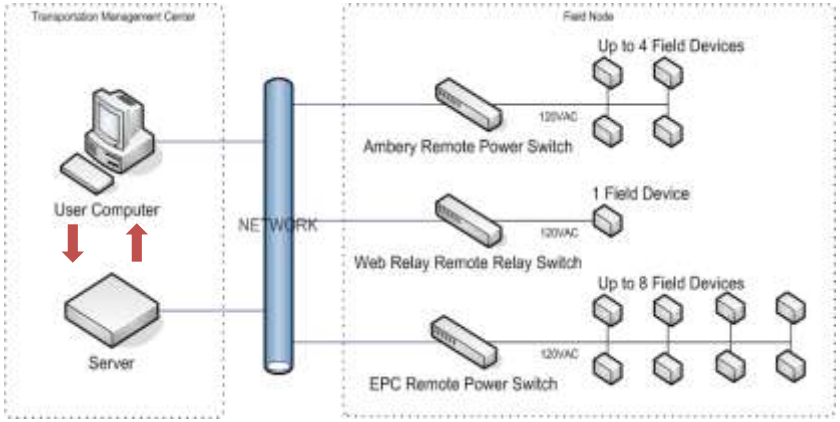
Remote Switch Interface

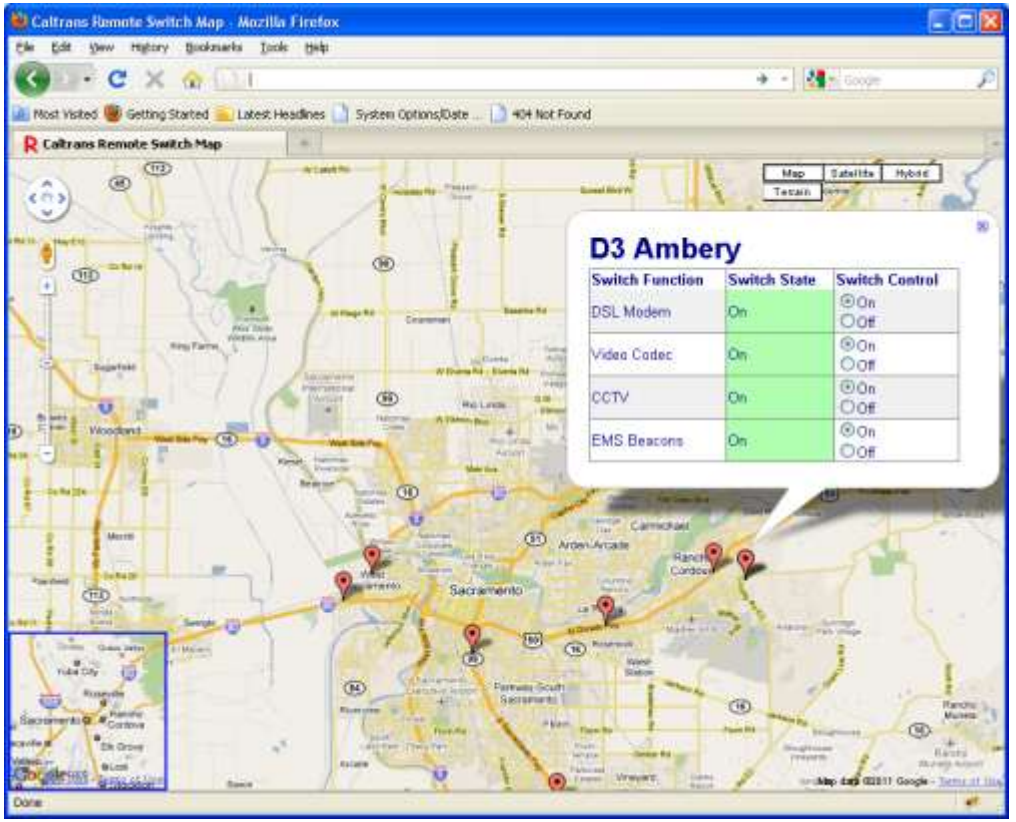




- Operator uses web-browser to call up map application.
- Server sends web page and data set to web-browser.
- Google Maps API supplies mapping facility.
- Operator can pan and zoom to area on map needed.

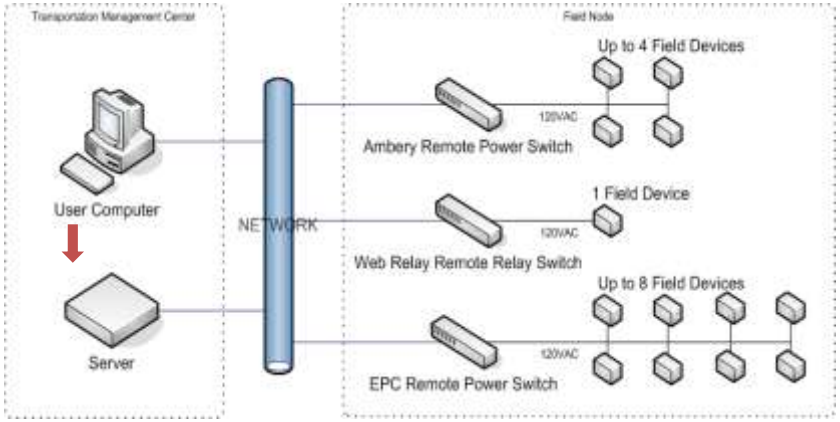
Remote Switch Interface

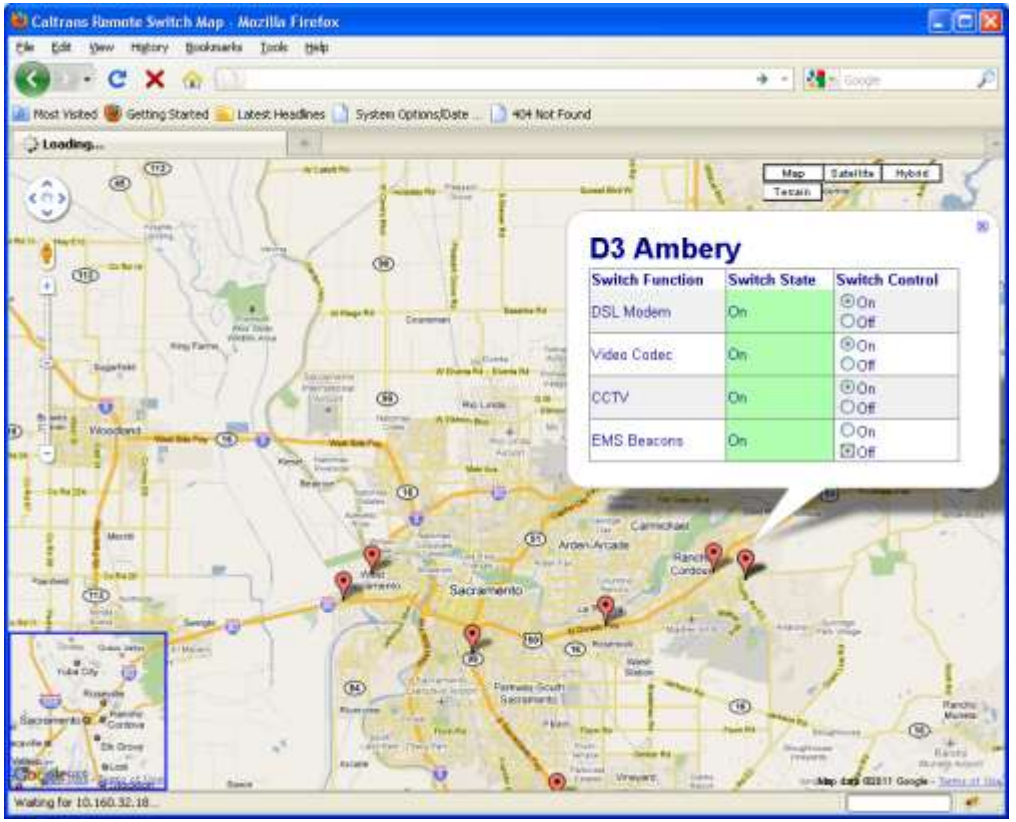




- Operator selects marker which represents field location, which sends request to server.
- Server sends web page with current information related to field location to web-browser.

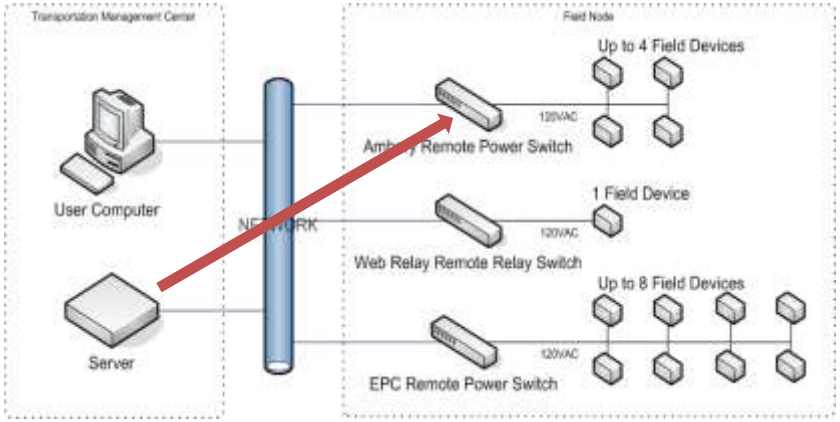
Remote Switch Interface

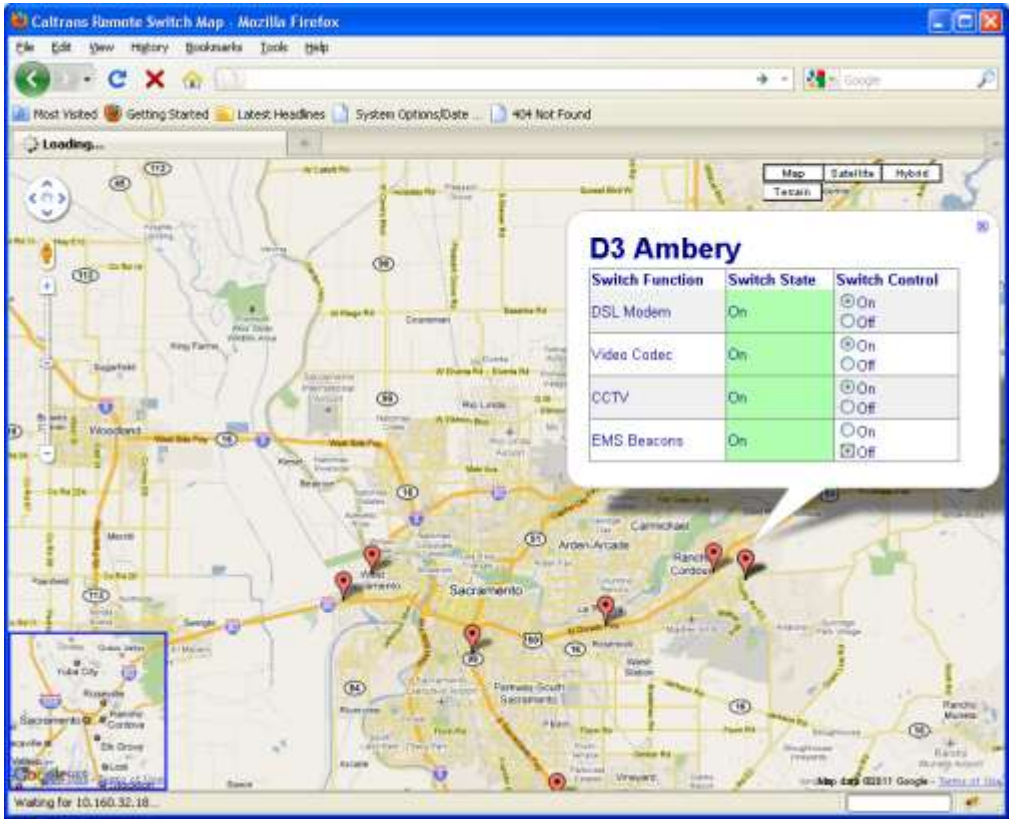




- Operator can remotely switch on or off any of the switches listed in the map bubble.
- When operator makes a selection, application automatically sends a request to the server.

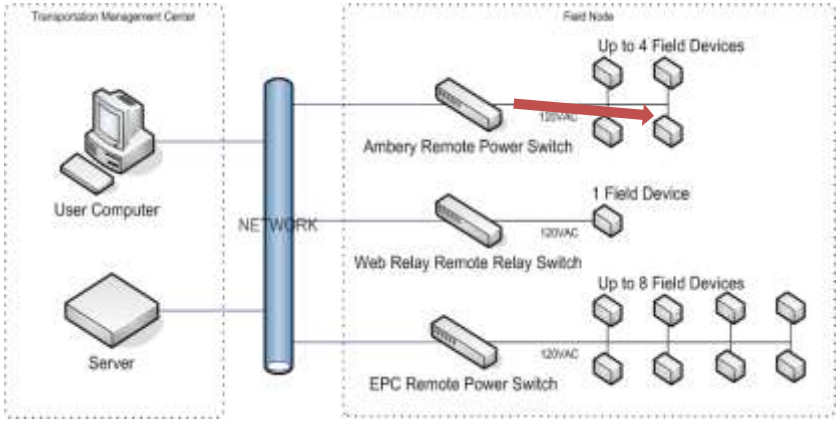
Remote Switch Interface

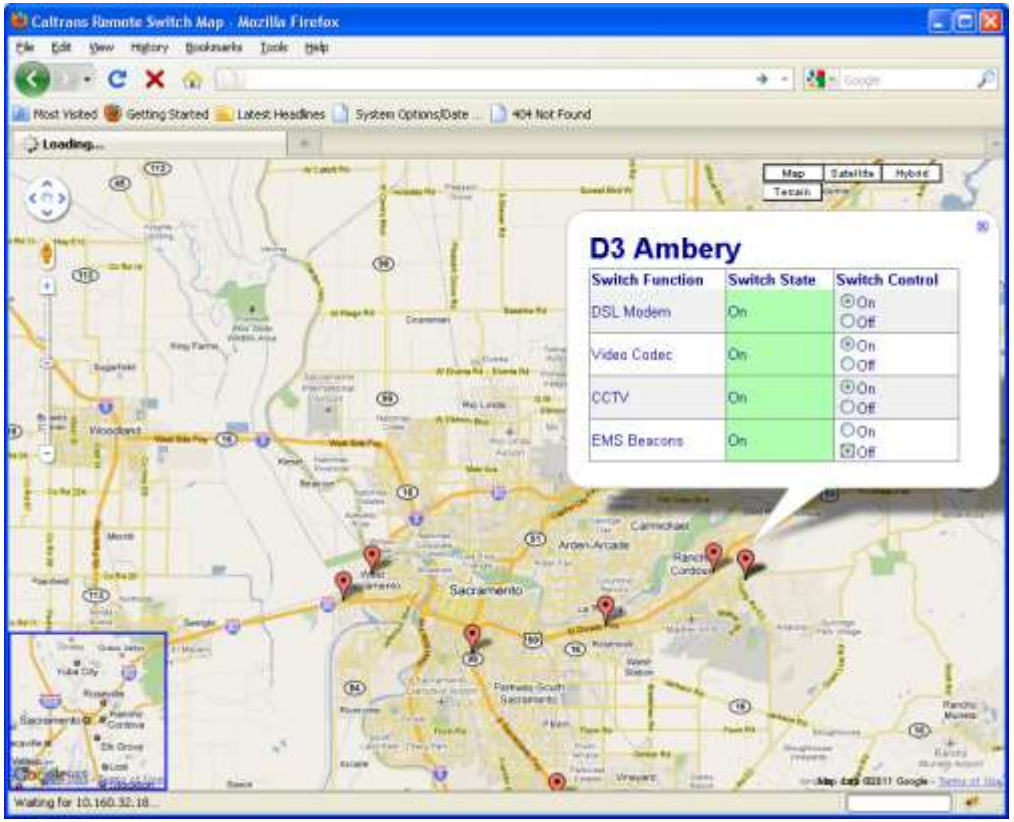




- Server determines correct device API .
- Server sends the device a request to perform the operator's action.

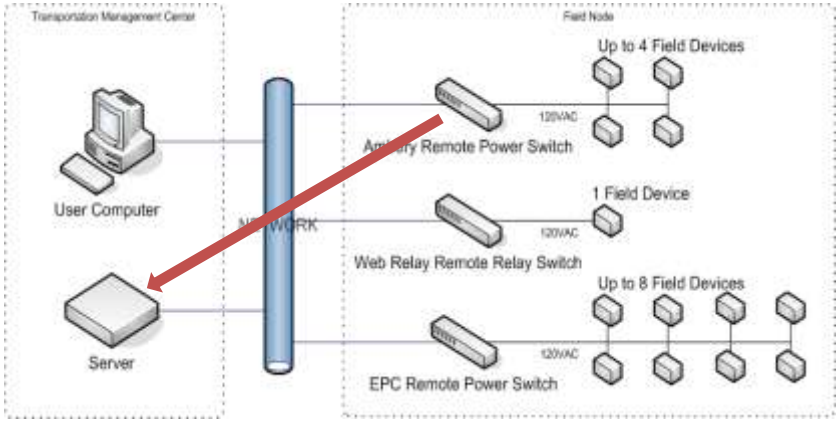
Remote Switch Interface

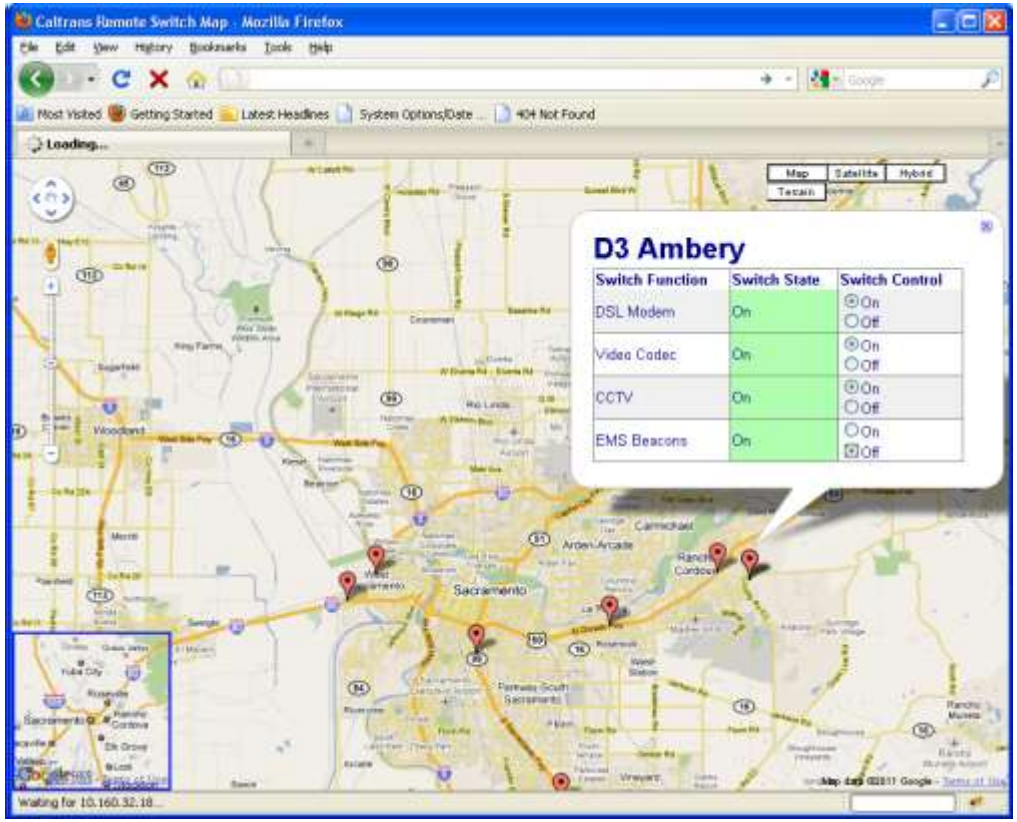




- Remote switch device interprets command received and performs operation.
- Field device either turns on or off.

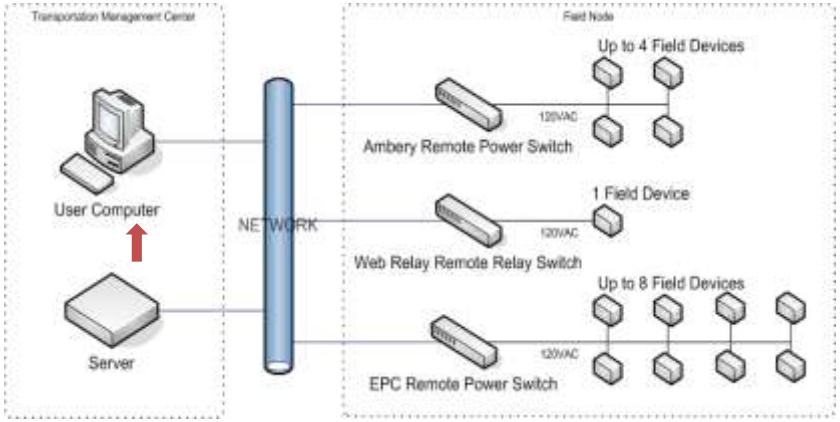
Remote Switch Interface

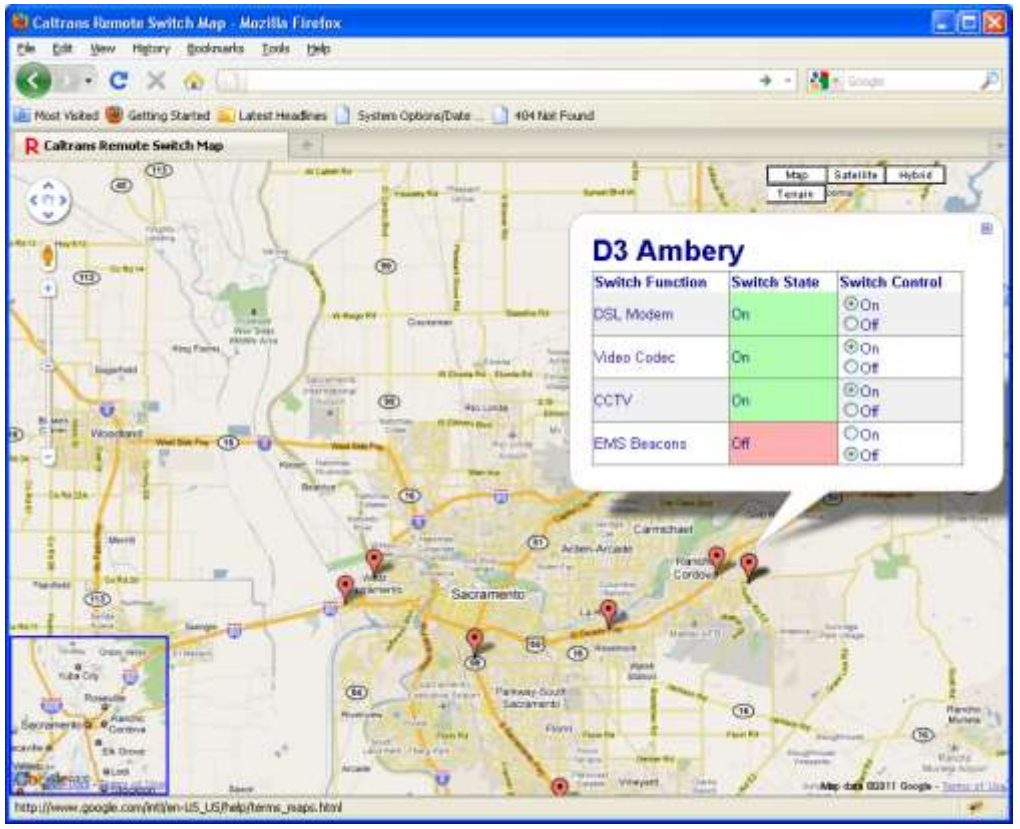




- Remote switch device sends a confirmation back to the server, acknowledging that the request has been performed.
- Server updates status logs with current state of remote switch and also logs time and date.

Remote Switch Interface





- Server sends updated information back to map bubble.
- Map bubble updates itself.
- Operator views current state of remote switch.
- Operator can close map bubble and move on to next objective.

Remote Switch Interface