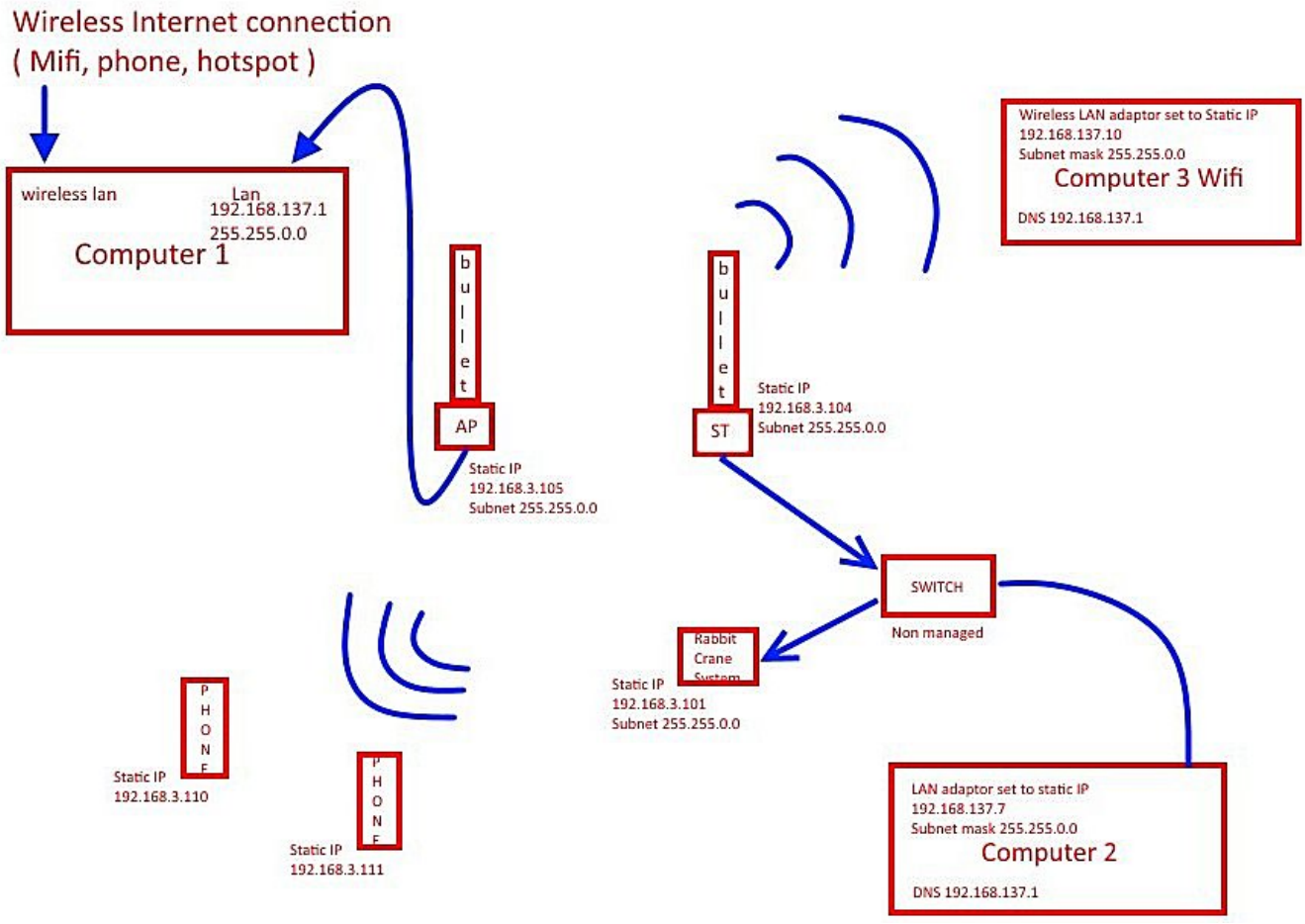
Sharing Internet Access Across Wireless Connections

By Bob Glover

With the expanded use of wireless connections in the dredging industry, we have been asked on many occasions if we can share Internet access across the wireless network. Currently we are using Ubiquiti Networks Bullet Titanium M2 Wireless stations, to build our networks in the field. This article assumes a basic knowledge of wireless communication along with basic networking. For more information regarding the setup and configuration of the Bullet stations, you can find it at this link: http://www.hypack.com/new/portals/1/pdf/sb/11_13/WIFI%20Crane%20Monitoring.pdf. (Please note that there are minor changes to the configuration of the bullet units in order to share the Internet connection that are not shown in the basic setup article at this link.)

For our testing purposes, we wanted to share Internet access from our main computer receiving the wireless Internet and pass this access across the bullet wireless link to the computer on the far end. We also configured a separate computer to wirelessly access the bullet's private network and share the same Internet connection. While we were at it, we added an Apple IPhone and Android phone to the network as well. Figure 1 is a rough map of our test network.

FIGURE 1. *Test Network Schematic*



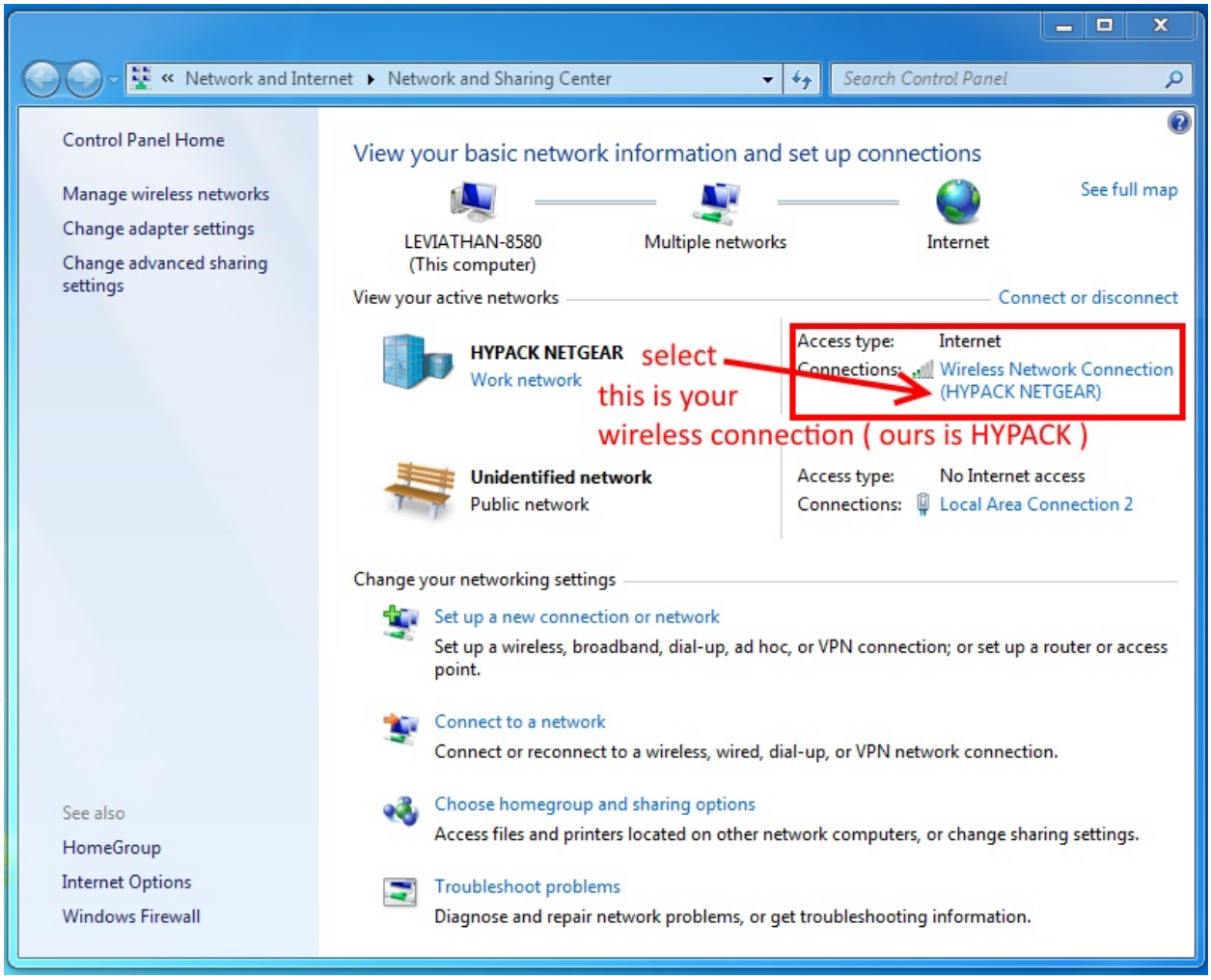
STEP 1. SHARING THE INTERNET ACCESS BETWEEN THE WIRELESS LAN ADAPTER AND THE HARDWIRED LAN

The main computer must be able to gain access to the Internet. Access can be from a wireless router, Wi-Fi hot spot or even a smart phone. (Most dredges currently use a Wi-Fi hot spot to access the Internet.)

Once this wireless connection is established, share it across to the LAN adapter, which in this case is linked to our Bullet Access Point.

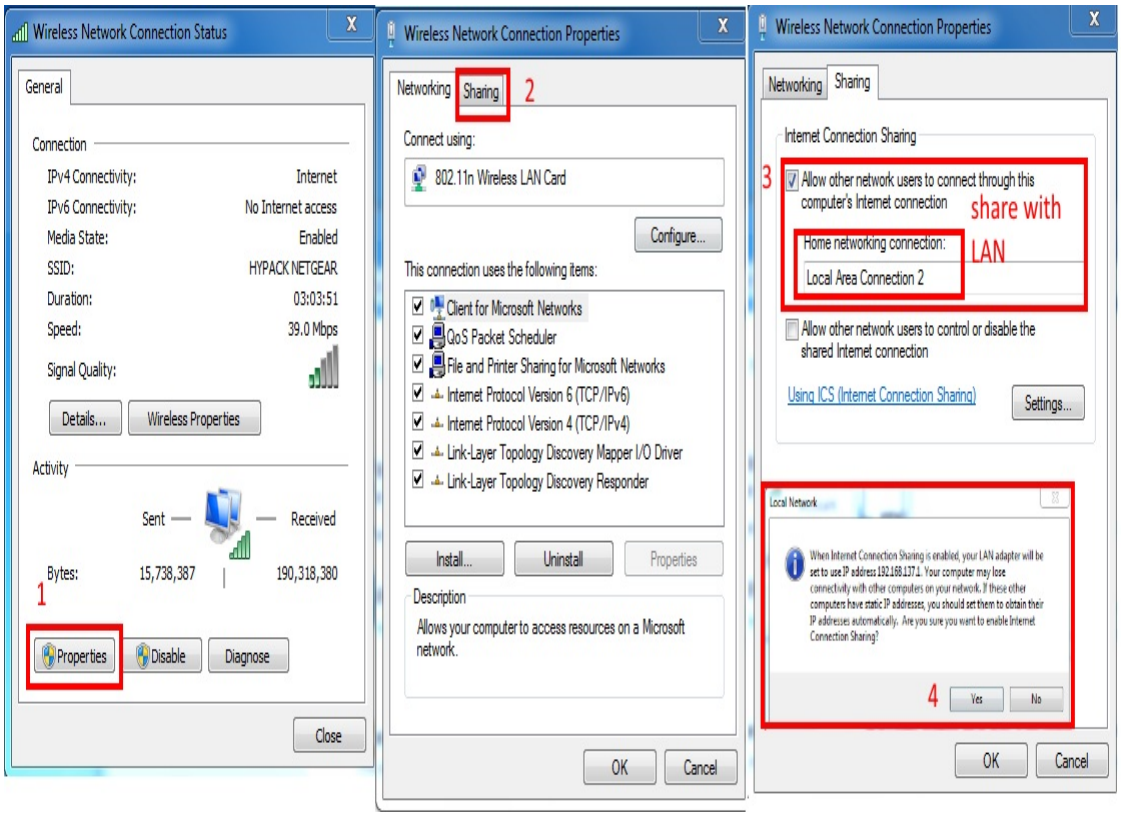
To share the wireless LAN, we configured it as in Figure 2.

FIGURE 2. *Sharing the Wireless LAN*



1. **Open the Network and Sharing Center from the Windows® Control Panel and select the Wireless adapter.** (Our SSID in the office is HYPACK NETGEAR.) This is simply a wireless router connected to our testing computer.
2. **Set the Wireless LAN to share its Internet access.** Depending on the number of LAN adapters the computer has, you might have more than one choice of adapters with which to share. Our testing computer has two Local area LAN adapters.

FIGURE 3. *Sharing the Internet Access from the Wireless LAN*



We decided to share the Internet access with Local Area Connection 2. Once the connection is shared, a dialog opens which alerts you that the IP Address of 192.168.137.1 will be set as static on the Local Area Connection. This is fine as we will configure the remaining computers to use this same IP range.

Now that the Internet access is being shared between the wireless and wired LAN adapters, we can move on to the Bullet configuration to establish communications between both units. This will feed the Internet access across our wireless link to the far end computer.

BULLET CONFIGURATION

The Bullet wireless units must be configured separately. (Here we assume basic understanding of how this is accomplished.) We have setup up the Bullet AP as shown in Figure 4.

NOTE: The Channel Spectrum Width has been scaled back to 20MHz. This allows Smart Phones to better access the network.

FIGURE 4. *Bullet AP Configuration*

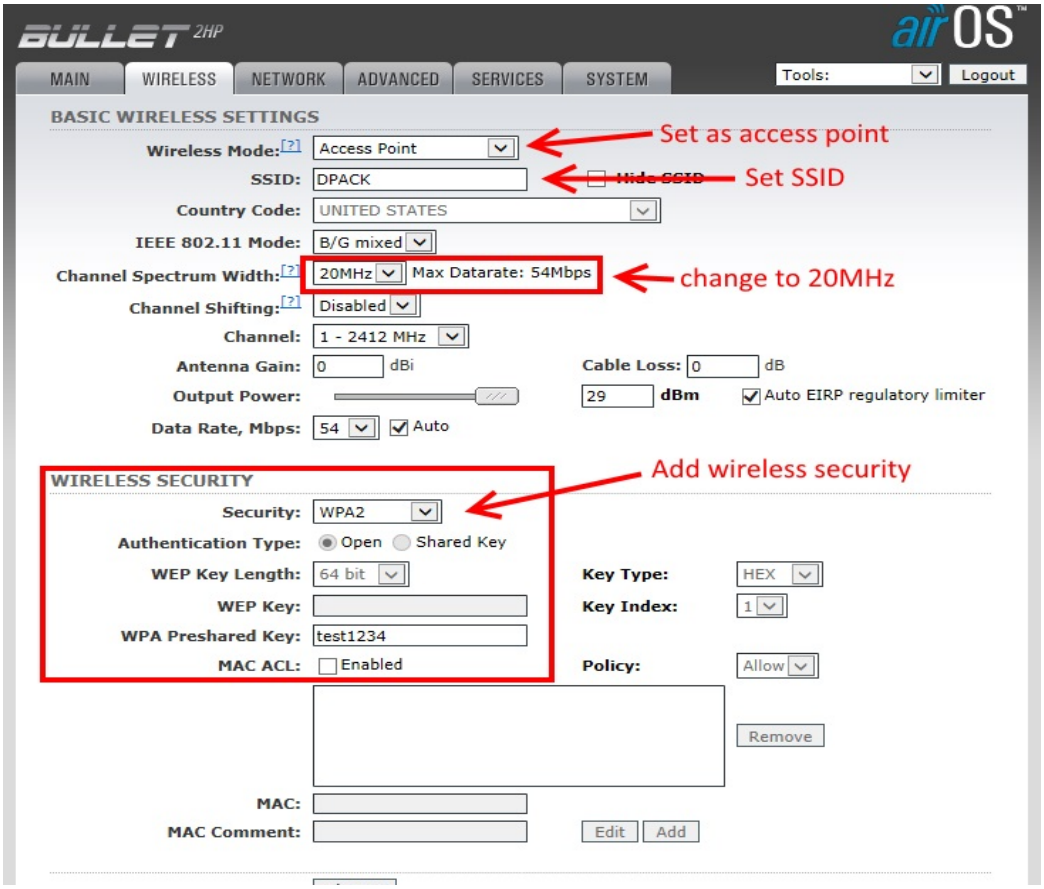
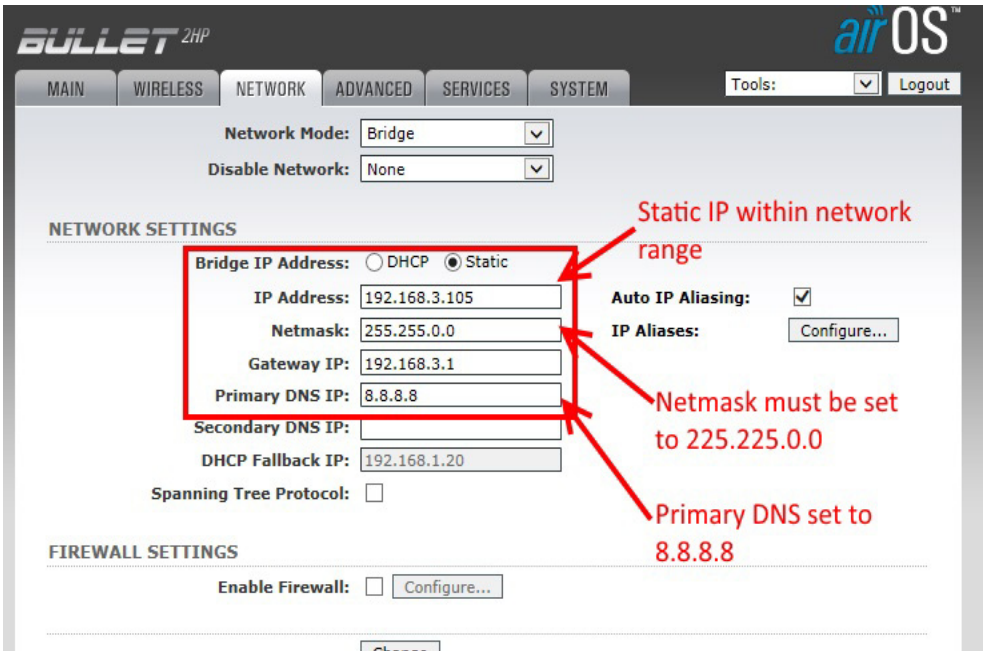
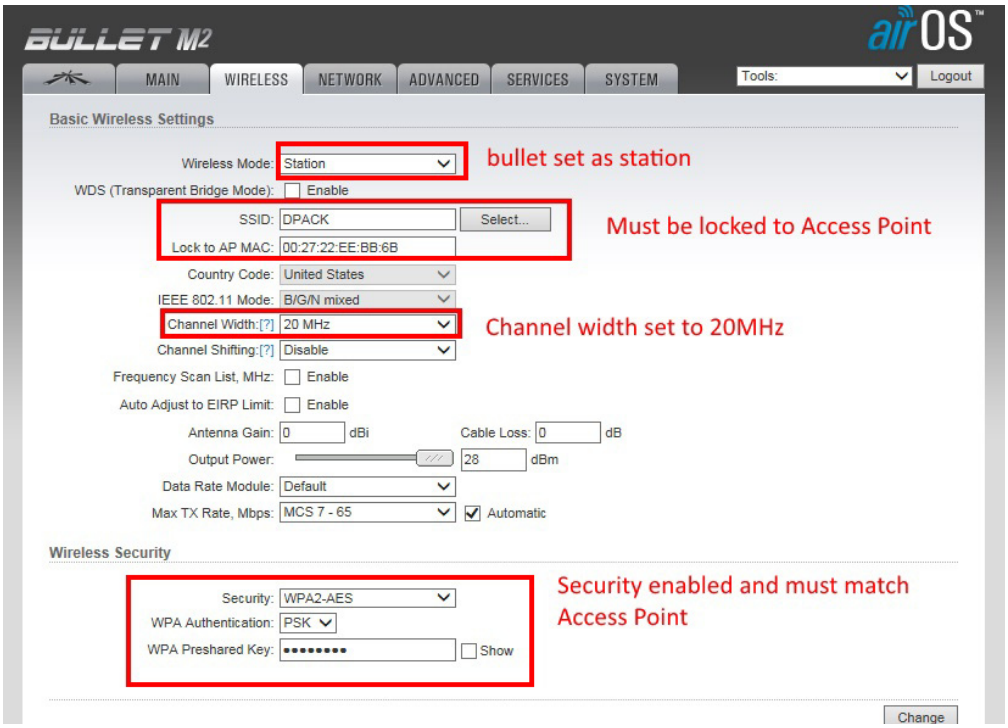


FIGURE 5. *Configuring the Network Settings*



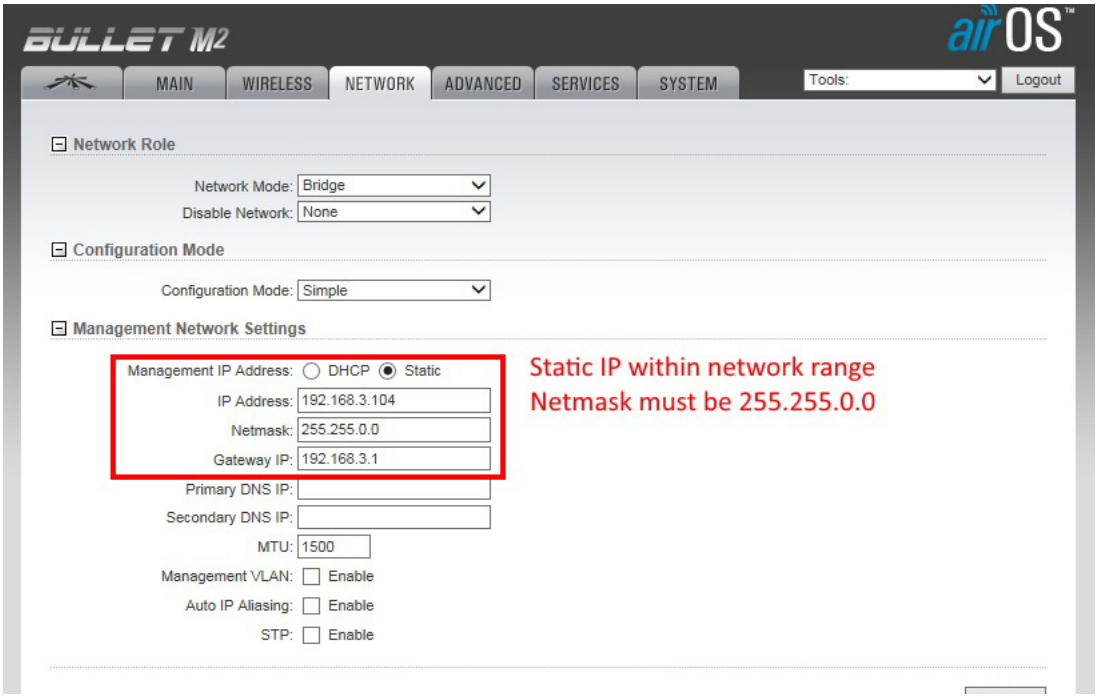
The Bullet set as the Station, is configured as shown in Figure 6. The Station has been locked to the MAC Address of the AP, establishing the wireless link between them.

FIGURE 6. *Setting the Bullet as the Station*



The Network settings for the Station should be configured as shown in Figure 7.

FIGURE 7. *Network Settings for the Station*



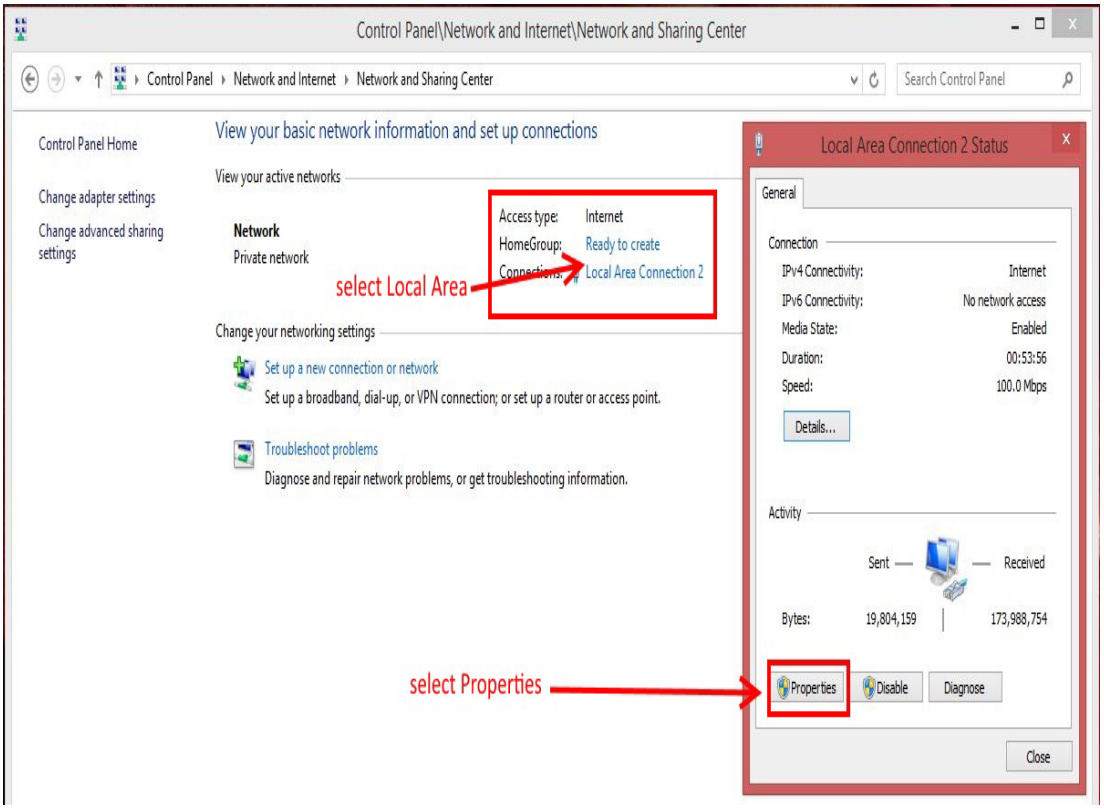
ADDING THE FAR END COMPUTER TO THE NETWORK

With the Bullet link established, the far end computer can be configured onto the network.

Once completed, the far end computer, which previously had no Internet access, will share in the Internet connection. This can be extremely useful for receiving Internet-based GPS corrections, where this was not possible before.

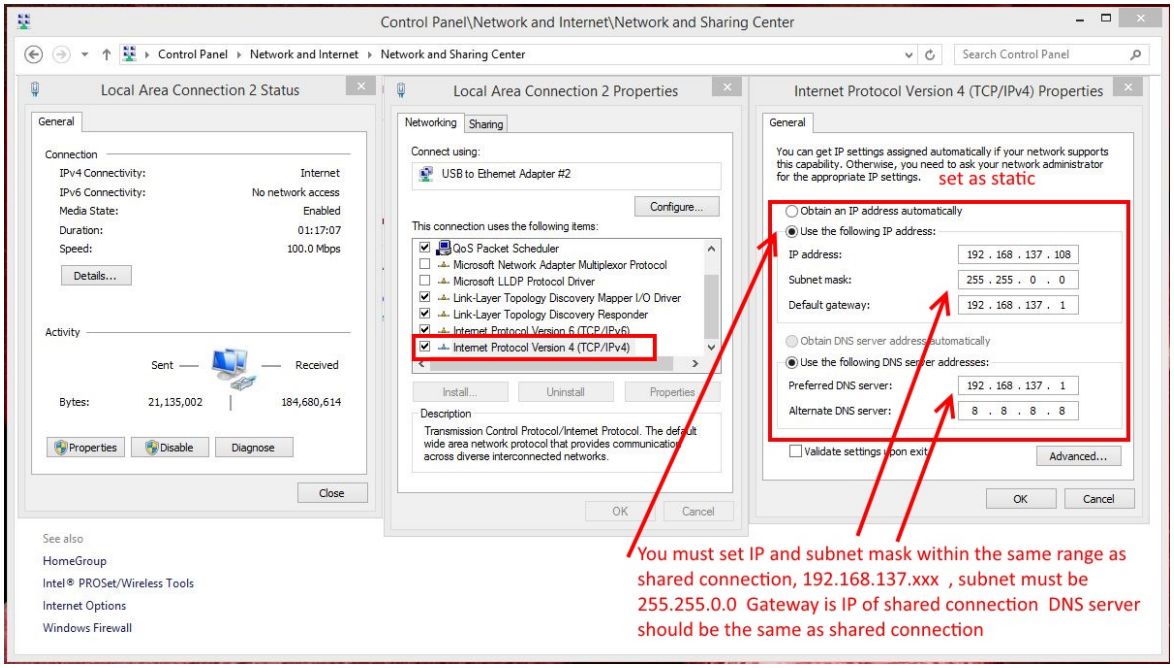
For our testing, the Station-end of our bullet is connected to a router within the HYPACK® Crane System and our far-end computer is also connected to the crane system. This only adds another piece to our network puzzle. The Bullet, acting as the station, could just as easily have been connected directly to our far-end computer, and the network configuration shown in Figure 8 would still apply.

FIGURE 8. *Connecting the Crane System with to the Network through the Bullet*



Select the Local Area Connection and then display the properties.

FIGURE 9. *Properties of the Crane System Connection*



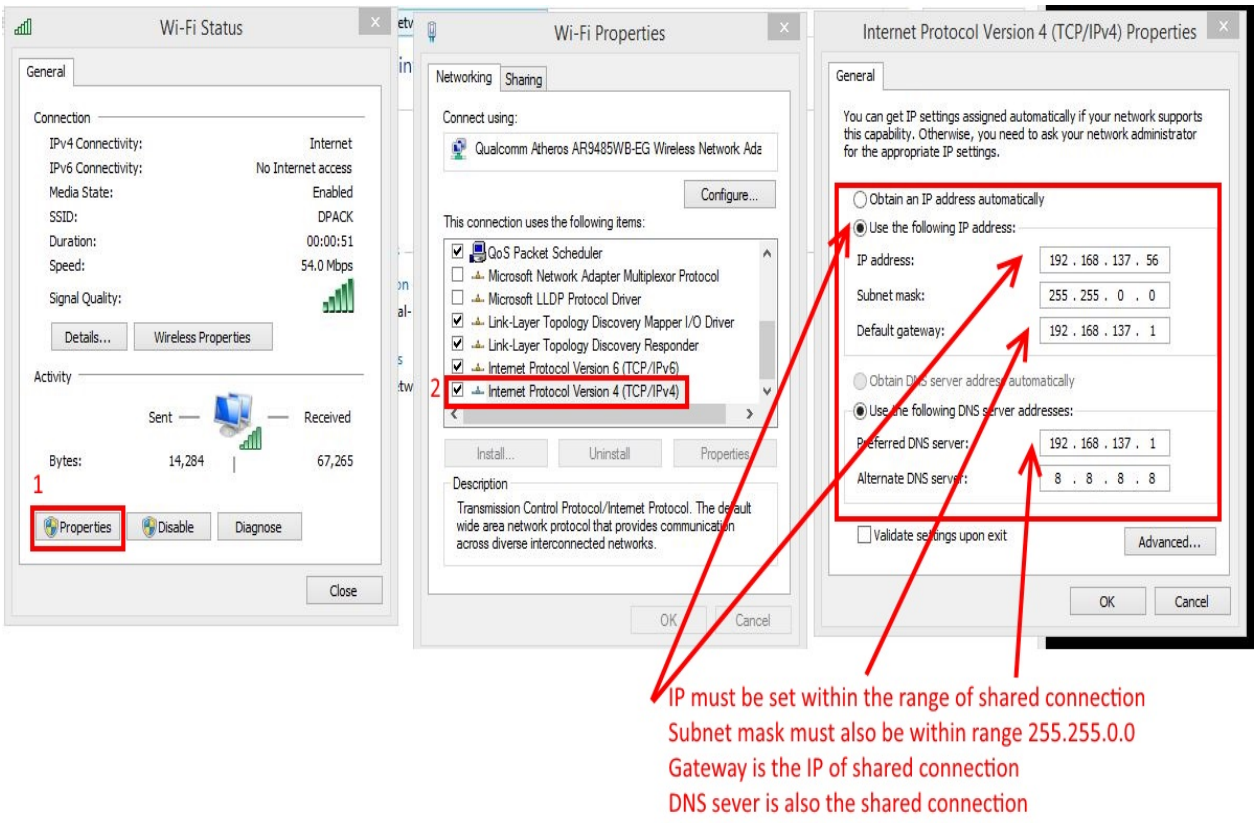
Select the TCPIPv4 protocol and set a static IP. It would be possible to access the Internet at this stage without setting a static IP; however, without changing the Subnet mask, we would not have access to anything on the local network—the only access would be to the Internet.

In our testing, I wanted to have access to the crane system as well as the Internet. Using just the configuration discussed above, we now have Internet access between two computers using the Bullet AP and Station to provide the wireless link.

NETWORKING A SECOND COMPUTER TO THE BULLETS

Once we were able to establish communication and Internet access between the computers, we decided to add in a second computer connected only to the wireless network between the two Bullets. This will function much like any computer that connects to a wireless network; however the correct IP and subnet mask must be assigned in order to access hardware located on the local network. Once connected to the Bullet network using the correct WPA key, the computer will be assigned an IP Address via the main computer. This would be fine *for Internet access only;* we need to configure a static IP for local network connections. We configured our second computer as shown in Figure 10.

FIGURE 10. Configuring the Second Computer



This second computer is configured very closely to our far end computer, with the exception of a different static IP.

NOTE: The subnet mask and default gateway remain the same as the host shared computer's static IP, the host will also be used as the DNS server.

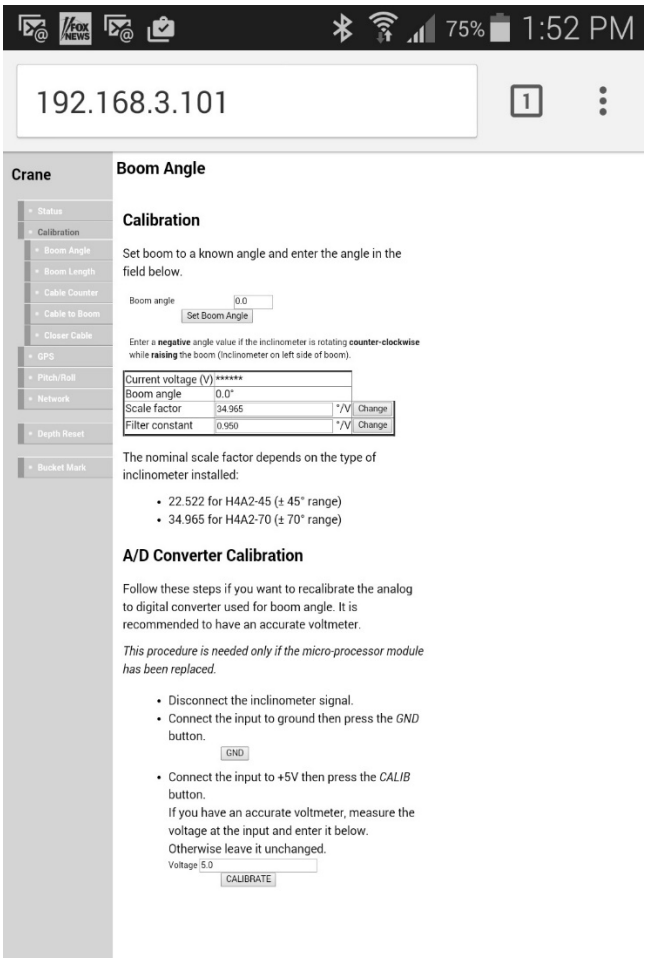
NETWORKING WITH A SMART PHONE

Since things had been going well, we decided to see if we could access the network, and share Internet with a Smart Phone as well as our two computers.

Again, we accessed the wireless network established using the Bullet AP and Station. This too is much like accessing a wireless router with your smart phone; you must know the WPA key and also set your phone to a static IP within the same range as the network.

Here, I wanted to access to the Web interface of the HYPACK® Crane System from my phone to eliminate having to climb up into the cab to work on the computer during calibrations. This method should work with any device capable of accessing a network via Wi-Fi.

FIGURE 11. *Configuring a Smart Phone to Access the Web Interface of the Crane System*



With all devices running on the network sharing the single Internet connection, I didn't notice much of a reduction in bandwidth; however, I was not streaming video or broadcasting remote content to other computers. If bandwidth became an issue, I would imagine that the speed would suffer.

The purpose of this test was to determine whether sharing the Internet connection to the far end computer was feasible to provide for GPS corrections when Internet access wasn't accessible by other means. So far, *after limited testing*, it appears to be a success. Should you have any questions regarding this article please feel free to contact me, I can be reached at Bob@HYPACK.com