Packet and APRS by WB5YYQ

Following the discussion in our last monthly meeting, here is a short summary of packet and APRS systems.

Packet

Packet Radio was first used by the University of Hawaii in 1970 to transfer data to its remote sites throughout the islands.

Packet Radio's strongest suits include networking and unattended operation.

Transmitted data is broken into 'packets' of data by a TNC or terminal node controller. Before sending these packets over the air, the TNC calculates each packet's checksum and makes sure the frequency is clear. On the receive end, a TNC checks packets for accuracy and requests retransmission of bad packets to ensure error-free communication.

Packet radio works best on frequencies that are relatively uncrowded. On busy frequencies or local area networks, it is possible for two stations to begin transmitting at once, garbling both packets (this is called a collision). Another common problem is the hidden transmitter, which happens when one of two stations that are out of range of each other but are both in contact with a third station within range of both. Collisions can easily occur at the third station since neither of the other two stations can hear each other and thus may transmit simultaneously.

Thousands of packet radio stations have formed a worldwide network, one that parallels and overlaps in some places the Internet. Services available on the packet network include global e-mail, callbook servers, "white pages" servers and gateways to & from the Internet. Other services, available in various locations, include libraries of program and text files, databases of equipment modifications, gateways to packet frequencies on HF and packet satellites. Most amateur networkers use VHF or UHF radios to access the packet network, but HF and satellites see a great deal of internode network traffic as well.

APRS

APRS is Automatic Position Reporting System; it uses the unconnected packet radio mode to graphically indicate the position of moving and stationary objects on maps displayed on a computer monitor. Unconnected packets are used to permit all stations to receive each transmitted APRS packet on a one-to-all basis rather than the one-to-one basis required by connected packets.

APRS was developed by Bob Bruninga, WB4APR in the 80's as a result of trying to use packet radio for real-time communications for public service events. Packet radio is not well suited for those real-time events, where information has a very short life time. To solve this problem, APRS avoids the complexity and limitations of trying to maintain a connected network. It uses unconnected frames to permit any number of stations to participate and exchange data. Just like voice users would on a single channel

voice net. Stations that have information to contribute simply transmit it, and all stations monitor and collect all data on frequency. Secondly, APRS recognizes that one of the greatest real-time needs at any special event or emergency is the knowledge of where stations and other key assets are located. APRS accomplishes the real-time display of operational traffic via a split screen and map displays.

APRS is used for tracking stations or objects in motion or in fixed positions. Weather-monitoring equipment can be interfaced to an APRS station to disseminate real-time weather information, such as wind speed, direction, temperature, barometric pressure, and rainfall are inserted into the station's periodic position report. The weather station shows up on all APRS maps as a large blue dot, with a white line showing wind speed and direction. Several automated APRS weather reporting stations, along with additional manual reporting stations, can form a real-time reporting network in support of SKYWARN activities.

Like standard packet radio transmissions, APRS data is relayed through digipeaters. Unlike standard packet radio, APRS stations use generic digipeater paths so that no prior knowledge of the network is needed. In addition, the Internet is an integral part of the system that is used for collecting and disseminating current APRS data in real time.

Virtually all VHF APRS activity occurs on 2 meters, specifically 144.39 MHz, which is recognized as the APRS operating channel in the US and Canada. On UHF, the frequency is 445.925 MHz.

Many groups and individuals that participate in public service and disaster communications find APRS a useful tool. Others find it interesting to view real-time weather reports from around their area.

This info comes from the 2002 ARRL Handbook.