Not Your Grandpa's Ham Radio!

Broadband Hamnet

- Broadband Hamnet (BBHN) repurposes commercial WiFi equipment to operate only in the ham bands to create robust, wireless, IP-based networks suitable for emergency communications or remote monitoring and control.

- Commercial WiFi equipment is restricted through FCC Part 15 regulations, limiting power and range and precluding the user from modifying type-accepted products.

- ***Licensed hams are allowed to legally modify Part 15 equipment*** for operation within the amateur bands. Hams can add external antennas, low noise preamplifiers and high power amplifiers within the framework of Part 97 regulations – including running peak output power of 1500 Watts! (Kind of overkill for WiFi, but you get the idea.)

- BBHN uses software that is freely available to licensed hams. Hardware from Linksys and Ubiquiti in the 2.4 GHz, 5.7 GHz and the 900 MHz ham bands is used. Not all hardware is compatible.

- The result is a system which creates an ad-hoc, meshed network, supporting IP traffic, e.g., voice, video and data. A recent addition, *Hamchat*, provides keyboard-to-keyboard communications over the network. The *Hamchat* server is hosted by one of the WiFi routers and is accessed through a Web browser.

- A meshed wireless network affords greater reliability by providing alternative route paths in the event of a failure.

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- Our in-booth meshed network uses four Linksys WRT54GS routers, two Ubiquiti M2 Bullets and one Ubiquiti M2 Rocket.
- With a suitable antenna, the Bullets can achieve distances of 60 km/37.2 mi.
- There are several IP cameras, VoIP modules using standard POTS telephones and a management console.
- In order to minimize interference to and from our system in the Expo Hall, antennas are made with attenuators and TEE connectors, providing a copper rather than an *aether* path. It also allows us to use low power levels in the routers and reduces the possibility of external signals causing interference to our system. This is a common testing technique.
- BBHN uses the Optimized Link State Routing protocol. OLSR is designed to support mobile ad-hoc meshed networking. Unlike OSPF and IS-IS protocols, OLSR does not use flooding to determine the best path. *Hello* and *Topology Control* messages are used to discover and disseminate topology information used by the individual nodes to compute the best path. See *Wikipedia* for more details!
- BBHN can employ Internet gateways as well as tunnel through the Internet to allow multiple networks to be joined over great distances.
- Reference: **broadband-hamnet.org** is a great place to start.

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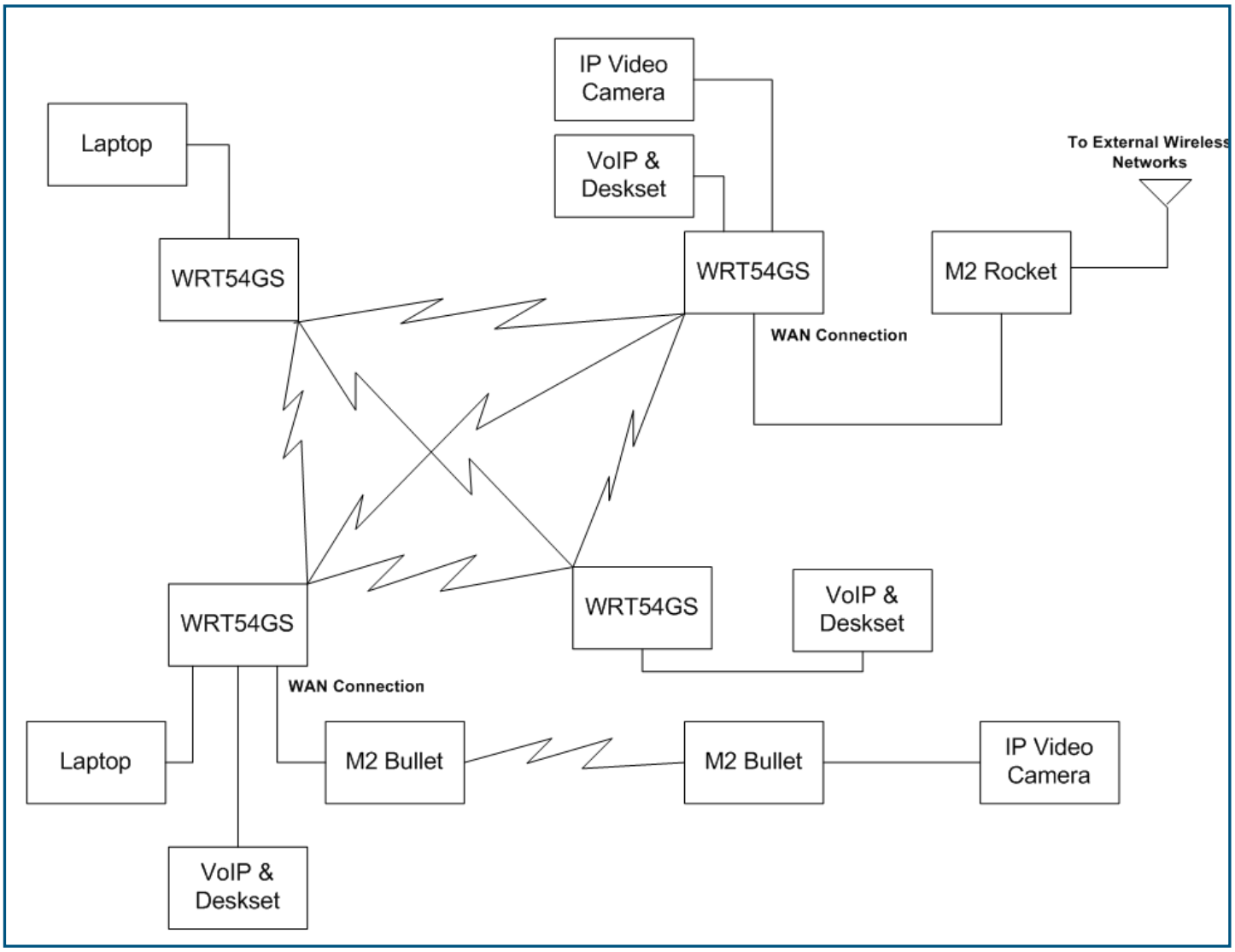
Broadband Hamnet Demo



This demonstration depicts a possible configuration for an emergency network deployment during a disaster. Remote cameras can provide video back to a command center. Critical information can be transferred through the network between computers. Keyboard-to-keyboard communications can relay critical information. Full-duplex telephony – "The next best thing to being there …"

Bell System advertisement from 1965. Remember rotary dials?