By John Champa,* K8OCL

HSMM

Communicating Voice, Video, and Data with Amateur Radio

S.H.A.R.K.s and Tsunamis

This column is on the easy use of Amateur High Speed Multimedia (HSMM) radio in an emergency. HSMM radio is packet radio, but thousands of times faster. It is so fast that we can use simultaneous voice, data, text, and video modes. What a godsend this can be for hams working in a disaster area, such as the world is now facing in the aftermath of the tsunamis in Asia.

Walt DuBose, K5YFW, the ARRL's HSMM Working Group Assistant Chairman, reported the following on January 4:

> The Texas Baptist Men are deploying four or five water-purification units and three feeding units. They will likely want our Command, Control, and Communications unit next (that's my crew and me), but we will need State Department appointments to do our work and use ham frequencies. There is already talk of needing 802.11b links between communications centers and the various distribution points, using an AP *(access point—ed.)* that is high up on a mountain.

The accompanying sidebar contains their recommended packing list.

HSMM Radio—The Future

There are a number of significant reasons why HSMM radio is the wave of the future for many Emergency Communications (EmComm) situations such as those encountered by RACES, ARES, and other radio amateurs responding to disaster locations. These reasons include:

1. The amount of digital radio traffic on our 2.4-GHz band, presently the most common band used by hams for HSMM radio, is increasing. Operating under low-power, unlicensed Part 15 limitations cannot overcome this noise.

2. Higher power is sometimes needed for longer range, higher reliability, and high data-speed links (i.e., improved signal margins), so operating under Part 97 makes sense.

3. EmComm organizations increasingly need high-speed radio networks that can get vast amounts of data out of a disaster area and into an area where ADSL, cable modem, satellite, or other broadband Internet access is available.

4. The equipment needed by hams is readily available, highly economical, and easily adaptable, commercial off-the-shelf (COTS) gear of the IEEE 802.11b variety.

With HSMM radio, all that would be

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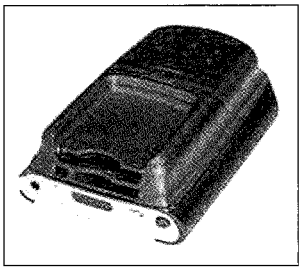
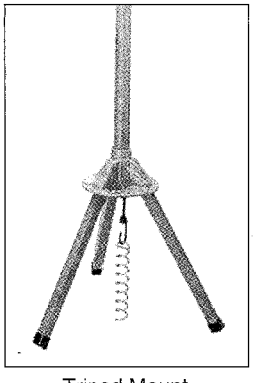
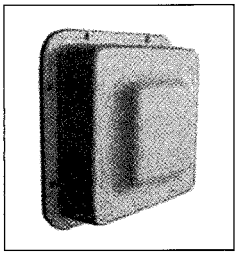
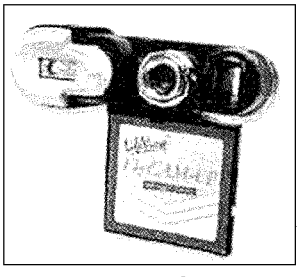
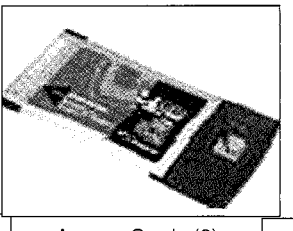
S.H.A.R.K. Components

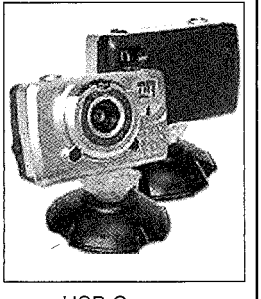

PDA & Extended Battery

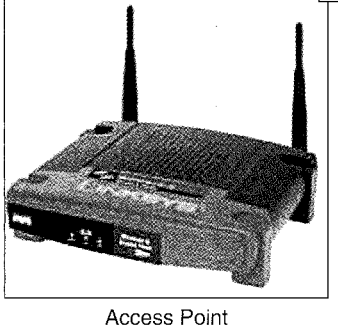

Tripod Mount

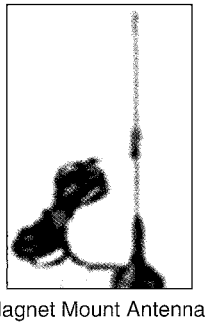

Antenna

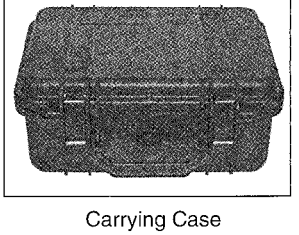

PDA Video Camera

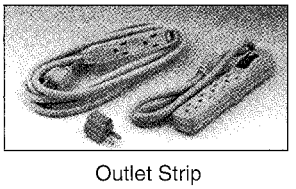

Access Cards (2)

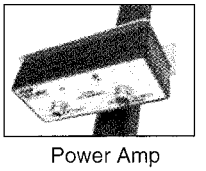

USB Camera

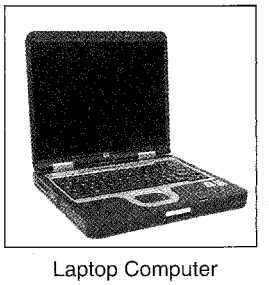

Access Point


Magnet Mount Antenna


Carrying Case


Outlet Strip

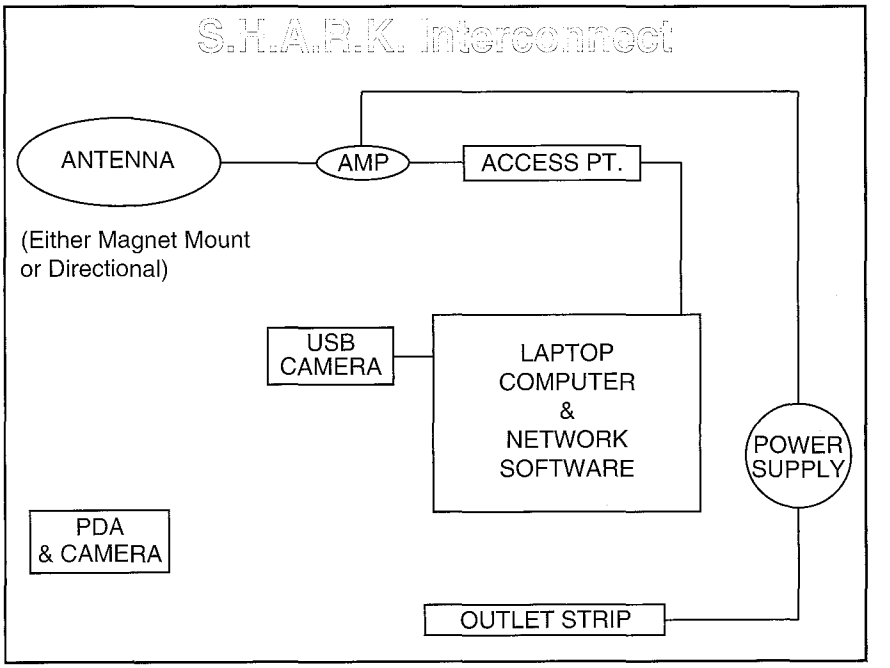

Power Amp


Laptop Computer

- Standard kit for deployment in emergency
- Easily field adaptable
- Video/file transfer operation
- Kit includes documentation, forms, etc.
- Includes PDA to allow handheld roaming
- Includes both omni & directional antenna

needed for such emergency communications in the field is a laptop computer with a headset for simultaneous voice and data modes. A digital camera can also be attached for simultaneous Amateur Digital Video (ADV) modes.

The laptop must be equipped with a special wireless local area network card (PC card) *with* an external antenna jack. Connect the PC card via a short strain-relief cable (a.k.a. pigtail) to some good coaxial cable (e.g., LMR-400) to a short Yagi antenna (typically 18 inches of antenna boom length) or a small mast-mounted dish antenna. That's all there is to it!



Oklahoma Baptist Hams Emergency List

Make a plan for sleeping in the open in an insect-infested area. Here is a list of possibilities items to include in your plan.

- Personal tent (pop-up, fully enclosed, zippered door)
- Inflatable mattress (that, of course, would fit in the tent)
- Sleeping bag
- Pillow
- Sheets
- Mosquito netting
- Insect repellant
- Clothing suitable for the climate
- TBM uniforms (caps, blue shirts, jackets, and so on)
- Boots
- Plenty of socks and underwear
- Long, sturdy pants
- Over-the-counter medications
- Any prescribed medications (at least a four-week supply)
- Melatonin (a natural sleep aid that will help shake off jet lag)
- Imodium
- Laxative
- Perhaps an antibiotic (your doctor may prescribe an overseas travel kit that includes this item)
- Maximum-size luggage (We need as much space for carrying the items needed for water purification as you can provide us.)
- Personal hygiene items
  - Soap
  - Toothpaste and toothbrush
  - Shaving kit
  - Manicure set
  - Brush or comb
  - Bath towels
  - Wash cloth
  - Shampoo
- Your *Bible*
- Items Not to Take!

  Anything you are not willing to leave behind and cell phone

Next point the antenna to the HSMM radio repeater at the Emergency Operating Center. Ranges from several miles to 20 miles and more over open water are readily possible. Date rates can be as high as 11 million bits per second (Mbps). The actual throughput is less, because the system is operating in half-duplex mode. This is *radio,* not your local cable modem, so the radios must stop transmitting between packet clusters to listen from time to time.

The S.H.A.R.K.

Here is where the S.H.A.R.K. comes in. S.H.A.R.K. stands for Standard HSMM Amateur Radio Kit. It is the brainchild of Jim Kvochick, WB8AZP (wb8azp@arrl.net), and Brandon Field, KC8YHE, and others in the wonderful and very friendly Livingston (Michigan County) Amateur Radio Klub (LARK).

Both Jim and Brandon are associated with the ARRL's HSMM Working Group (http://www.arrl.org/hsmm/). If you have any questions about high-speed digital or multimedia operation, the HSMM Working Group can help you get started in this exciting part of amateur radio. You can subscribe to the ARRL IEEE 802.11b Mail List at Texas A & M University. To subscribe, go to: <http://listserv.tamu.edu/archives/arrl-80211b.html> and select "Join" or *leave the list* (or *change settings*), or send an e-mail to <listserv@listserv.tamu.edu> and in the body put subscribe arrl-80211b [first name last name], or subscribe arrl-80211b [first name last name-callsign].

This list has been established to facilitate discussions of the various aspects of the HSMM and IEEE 802.11b/g with members of the ARRL HSMM WG and other interested parties. The IEEE 802.11b used by hams employs commercial 802.11b hardware, and additional legal amateur radio hardware such as RF amplifiers and high-gain directional antennas, which are appropriate for Part 97 service. All participants are welcomed to the list.

The photos and diagrams with this column are fairly self-explanatory, but what Jim and Brandon have created is a portable HSMM radio field station in a weatherproof transport container. It is available for immediate deployment, and in the hands of a qualified ham it can provide a high-speed Internet connection for simultaneous digital voice, data, and video within minutes of arriving at the scene of a disaster.

Jim and Brandon have shown us one way in which the mission of supplying emergency communications can be accomplished. Generally speaking, hams have the skills to deploy such HSMM radio systems. What they need is the knowledge base for operating these radio systems, and it can be fairly easily acquired by participating in the list and/or interacting with other participants on the list. ■