

Ham radio amateurs could warn of disasters

By Sunil C. Perera

Local scientists propose that development of an effective amateur radio voice communication network to be used during disaster situations.

T. D. N. Perera of the Department of Architecture, University of Moratuwa said every established landline and electromagnetic forms of communication come to a standstill during a disaster.

"This is a result of damage to landlines, switching centers, cell sites and power supplies, said Perera.

However Sri Lanka has a number of Amateur Radio operators who have independent operation, portability and requirement of low power. These radio operators are useful, when the country faces a disaster communicate with the public and create awareness on various matters, Perera said.

The Amateur Radio Service is for individuals who are interested in the technical side of radio and are able to provide emergency communication in disasters, all for the general benefit of the public. It is called "amateur" because it is strictly non-commercial; no business may be transmitted on amateur frequencies. The Amateur Radio Service is a voluntary disciplined communication service guided by five traditional objectives.

- To provide emergency or public service communications when normal communications are disrupted or inadequate;
- To advance the state of the art;
- To improve individual skills in radio operation;
- To provide a reserve pod of qualified radio operators and technicians;



- To promote international goodwill.

Amateur radio communications are carried out using modern, state-of-the-art systems consisting of many modes of operation. In addition to voice capabilities provided by hand-held, mobile, and fixed/portable base stations, digital data communications may be established over any existing radio circuit using "pocket radio" equipment to provide printed "hard copy" error-free, high speed point-to-point communications. A growing number of amateurs have equipment to generate, transmit and receive color television signals; such equipment aboard aircrafts or mobile units is being used to send "real-time" pictures back to central control points in

times of disaster, hazardous chemical spills, or fires.

Just three days after the calamitous tsunami, Radio Society of Sri Lanka (RSSL) President, 4S7VK, declared that "uncomplicated short wave" radio had saved lives.

"Ham radio played an important part and will continue to do so," he said in an e-mail relayed to ARRL. He said Sri Lanka's prime minister had no contact with the outside world until Amateur Radio operators stepped in. "Our control center was inside the prime minister's official house in his operational room," he recounted. "This will show how they valued our services." Amateur radio operators are also experienced in improvising antennas and power sources and most equipment can be powered

by an automobile battery. Annual "Field Days" are held in many countries to practice these emergency improvisational skills. Amateur radio operators can use hundreds of frequencies and can quickly establish networks tying disparate agencies together to enhance interoperability.

Recent examples include the 2001 attacks on the World Trade Center the 2003 North America blackout, the 2004 Indian Ocean earthquake and Hurricane Katrina, where amateur radio was used to coordinate disaster relief activities when other systems failed.

Licensed amateurs often take portable equipment with them when traveling. A portable station can be anything from a small QRP (Low Power) radio and antenna, to a top-of-the-line rig, space dependent. On long-distance expeditions, such equipment allows them to report progress, arrivals and sometimes exchanging safety messages along the way.

Scientist Perera has completed a research on this matter and published through Sri Lanka association, for the Advancement Science - Annual research booklet.

According to the research a reliable disaster communications system must be capable of providing means for effective and efficient communication with any two locations in the country at any given time without a break with at least four communication channels.

TDD is the standard operational mode used in

amateur radio transmissions. 2m and 40m bands are the main amateur radio bands used in inland communication.

The research said Sri Lanka could use this system to issue public warnings and other communications. Twenty four hour communication is possible on 2m up to about 22 km distance.

Long distance inland communication is being done using repeaters. Two repeaters installed in Yatiyantota and Nuwaraeliya cover about 65% of the total land area of the country.

Local communications on 40m band is highly susceptible to variations in ionosphere. It is impossible to rely on this band throughout the year. Resources available for 2m band are also not sufficient due to inability to allocate more than a single channel at a time and impossibility to sufficiently cover the total land area of the country.

It was understood from analysis done that the present system failed to provide reliable communications during disasters. Results confirmed that 2m band is the most suitable band to perform reliable transmissions irrespective of the time of the day and season. Since only a single channel is available, AM, SSB and NBFM modes cannot be used to handle necessary density of traffic. Since TDMA needs centralized processing at repeater site, its usage is non-relevant. CDMA is unusable due to the availability of only a narrow bandwidth of 50 kHz. Usage of CDMA with narrow digital channels is the only possibility. It is necessary to limit bit rate to 5kHz, the research revealed.