4. Alternative Communication Systems... during disasters

FOCUS

In Monsoon-2004, severe flood situations in the States of Assam and Bihar caused major devastation. Many district head quarters got totally cut-off from the State head quarter and neighboring districts due to submerged telephone exchanges or damaged cables and disrupted roads and railways communication. In the worst affected districts the need for relief and rescue operation could not be communicated to the State head quarters. Realizing this, State Government requested National Disaster Management Division of the Government of India to immediately send the emergency coordination kits containing satellite phones to establish communication links among the severely affected districts and state headquarters.

From the above case study, we see that during any major disaster or emergency situation, the communication links are totally disrupted. Therefore, it is crucially important to have completely functional communication links among Government authorities at various levels to provide adequate assistance to the affected population. This chapter tries to explain various basic telecommunication facilities, need for alternative communication systems during the large-scale natural disaster/emergency situations, and modes of emergency communication systems including satellite based communication systems.

Can you think of today's world without the telecommunication links?

Quite difficult, right? The telecommunication links have become a vital part of our daily life. Most popular means of communication is the public wired telephone, which is known as *Public Switched Telephone Network (PSTN)* line. This is the prime network connecting all Government and Private offices, police stations, fire stations, hospitals and majority of homes and business places by transmitting and receiving voice, fax and data. The usage of Wireless phones such as mobile (cellular) phones have also become widespread in recent times.

Why does telecommunication network get disrupted or jammed in event of a major natural disaster or emergency situation?

Unfortunately at the time of major natural disasters such as earthquake, cyclone, flood and landslide, the regular telecommunication infrastructure of public wired and wireless (mobile) telephones get severely damaged and become non-functional. This mainly happens because of the *damaged cables* and *cellular transmission towers* or *disrupted power supply* to operate the telephone exchanges and cellular transmission towers. The wireless radio communication network of Police and Civil authorities also gets affected due to damaged transmission towers. During this emergency situation, the communication traffic goes beyond its capacity which leads to congestion of the network or in worst case, complete failure of network.

Do You Know...

Generally, a perfectly working PSTN system is designed so that no more than 5% of the phones connected to it can be talking at the same time. During a crisis, there may be too much traffic for it to handle as *'Everyone wants to speak to everyone'*, and hence the network gets jammed.

Do we really need to have alternative communication systems, in case the normal communication lines fail?

Yes, we do. At the time of any major disaster or emergency situation, it is extremely necessary to have the communication links operational among Government authorities at various levels and the people/ volunteers working in the disaster affected areas to help the affected population.

It becomes imperative to ensure that the critical needs of search and rescue operations, relief and response measures are communicated among the authorities of State Government, local administration, voluntary organizations and the affected population. This situation calls for reliable alternate communication links, which ensures the rapid movement of the right resources to the right place at the right time. It may also happen that some severely affected areas get completely disconnected from other parts of the world. In such situations, the urgent needs of the disaster-affected population are not known or communicated to the responsible Government authorities, voluntary organizations and unaffected populations in the vicinity. This may lead to severe losses in terms of human lives, livestock and property.

The prime communication networks of Government of India.

NIC: National Informatics Centre (NIC) is a premiere Science & Technology organization of the Government of India in this field. It functions through a nationwide information and communication technology (ICT) network called NICNET.

BSNL: The Department of Telephone Operations, Government of India became a corporation on October 1, 2000 and was christened Bharat Sanchar Nigam Limited (BSNL). Today, BSNL is a leading telecommunication company and the largest public sector undertaking of India. It has a network of over 45 million lines covering 5000 towns with over 35 million telephone connections. Its responsibilities include improvement of the quality of telecom services, expansion of telecom network, introduction of new telecom services in all villages and instilling confidence among its customers.

Modes for Emergency Communication

RADIO COMMUNICATIONS

In the scenario where normal telephone and mobile phone network is disrupted or such services have never existed in the disaster affected area, we need to find out other reliable means of communicating urgent messages from the site to shorter and longer distances. The first obvious choice is to establish a wireless radio communication network limited to the area of operations. Any wireless communication link is based on the Radio waves either using the terrestrial or satellite systems.

A radio wave is an electromagnetic wave propagated by an antenna. Radio waves have different frequencies, and by tuning a radio receiver to a specific frequency you can pick up a specific signal. Hand held wireless sets (walky talky) are considered to be more suitable for local communication in case of such emergencies.

Amateur (Ham) Radio

In the event of major disasters/emergencies, it has been experienced that Amateur Radios have worked successfully when no other communications worked.

Amateur radio, also known as 'Ham radio', does not refer to special kind of radio but to a special set of rules which apply to certain frequencies as defined by the International Telecommunications Union (ITU) and regulated in India by Wireless Planning and Coordination Wing, Ministry of Communications. The laid down rules allow these frequencies to be used only for research, education and personal purpose. The word Amateur implies the use of radio communications for non-commercial purposes. Amateur Radio operation does not use the ground based infrastructure, and has limited power requirements which can be easily met by batteries and generators and thus work successfully in emergencies.

Amateur radio is getting popular in India as a creative hobby and there are around 15,000 licensed Amateur Radio Operators (Hams) in India. Amateur Radio is an unbeatable way of learning about radio communications, and not only will you learn much, but you would also be able to help at the time of emergency. Licensed Amateur Radio Operators are known as Amateurs or Hams. Most Governments expect their Amateurs to provide emergency communication support in case of an emergency and Amateurs always come forward to provide their services voluntarily for establishing crucial

communications among the emergency response managers. Such Amateur volunteers provided commendable services during the Orissa super cyclone in 1999 and Gujarat earthquake in 2001.

In efforts to popularize the Amateur Radio in the country and develop a trained force of licensed Amateurs, Department of Information Technology has initiated a nation wide programme to establish Amateur Radio Stations at various places and provide the necessary training for interested Amateur Station Operators.

HAM operator helps families connect with tsunami victims

New Delhi, December 28 .The Tribune

An amateur radio enthusiast based in the Capital has succeeded where most government agencies have failed. Sandeep Baruah, a licensed HAM operator who works in a government organisation by day and pursues his hobby from home at night, has managed to establish communication links with Port Blair, the capital of Andaman and Nicobar Islands, and has helped relay messages between the people stranded on the island and their families back home.

SATELLITE BASED COMMUNICATIONS SYSTEMS

Satellite based Communication systems mean communication systems intended for users on the Earth but which have some equipment in space, i.e. a satellite. Different satellites carry out different jobs, such as taking weather pictures or finding accurate positions on earth in terms of latitudes and longitudes. Communications satellites are essentially radio relay stations in space and are sometimes referred to as COMSATs. The other words you may hear are SATCOMS for satellite communications in general and SATPHONE for a satellite phone terminal.

The most important feature of a communications satellite is the transponder - a radio that receives a conversation at one frequency and then amplifies it and re-transmits it back to Earth on another frequency.

When deadly floods struck central and southern Texas-USA in mid-October 1998, amateur radio operators from four states volunteered their time. A volunteer is shown helping with communications at a Red Cross office.

A Ham operator is on the radio, reporting a new flare up during the forest fires that broke out in several counties in Florida-USA during June and July of 1998.

YOU CAN ALSO BECOME AN AMATEUR AT THIS AGE BY PASSING THE AMATEUR STATION OPERATORS LICENSE (ASOL) EXAMINATION TAKEN BY WPC WING, MINISTRY OF COMMUNICATION, GOVT. OF INDIA

A young operator enjoys making friends over the radio. Amateur radio is a fascinating hobby for people of all ages and all walks of life irrespective of educational qualifications and status.

A satellite normally contains hundreds or thousands of transponders. Data, television, image and some telephone transmissions are routinely received and re-broadcasted by these transponders of communication satellites.

Present operational Indian space systems include Indian National Satellite (INSAT) for tele-communication, television broadcasting, meteorology

and disaster warning and Indian Remote Sensing Satellite (IRS) for resources monitoring and management.

This mode of communication is most reliable as the radio relay stations, Communications satellites, are in space and not at all vulnerable to any natural disasters on the earth, while global communications links can be established with very small, portable and easy to install satellite antennas.

Most widely used means of satellite communications in disaster management is 'satellite phone'. For these phones the satellite works as a telephone exchange. These phones provide very reliable voice and data communication and are very handy and can be to transported to any location.

INMARSAT Satellite Phone

Government of India is equipping the Disaster/Emergency managers in multi-hazard prone Districts/States with portable Satellite phones so that proper communication among the administrations at local and State level can be maintained in case the main communication lines fail.

Radio communications and setellite based communication system are highly reliable and widely used. All India Radio, Doordarshan and Press Trust of India also play a key role in collecting and disseminating information.

Reference for further reading:

- http://home.nic.in
- www.isro.org
- http://www.dotindia.com/wpcc/spectrum-home.htm
- www.itu.int
- www.howstuffworks.com

1. Why should the alternative communications systems be installed?
2. Name two prime communication networks of Government of India and explain their functions.
3. How is Amateur (Ham) radio different from the common radio communication?
4. What makes the Satellite based communication systems more reliable in case of large-scale natural/manmade emergencies?