Role of Communication Satellites in Socio-Economic Development

It is difficult to go through a day without using a communications satellite at least once. Do you know when you used a communications satellite today? Did you watch T.V.? Did you make a long distance phone call, use a cellular phone, a fax machine, a pager, or even listen to the radio? Well, if you did, you probably used a communications satellite, either directly or indirectly.

The world today has become increasingly dependent on information and communication technologies (ICT) and with it comes the need for societies and communities to stay connected and be integrated into the global information super highway. Communication Satellites today have become an integral part of global information infrastructure, connecting people across the world and serving communications needs of individuals, businesses and governments.

Advances in Satellite technology and design have further enhanced the scope and reach of communication satellites. The latest generation of high powered communication satellites allows the use of smaller antennas thereby reducing the cost of ground equipment on one hand and increasing the data throughput on the other. Higher functionality, at lower cost, is contributing to the growth of satellite based networks around the world.

Some typical applications of communication satellites

Internet Access · Broadband Data Communications · Rural Telephony · Public Switched Telephone Network Infrastructure Extension · News Distribution · Distance Learning · Telemedicine · Disaster Recovery · Multicast Services · Land Mobile Communications · Government Closed User Groups · Intergovernmental & Corporate Applications · National & Multinational Networks and Aeronautical & Maritime Links

Communication satellites are not only playing an important role in facilitating business and commerce the world over, but are also important agents for socio-economic development. Some of the ways in which communication satellites are helping governments improve the socio-economic conditions of their people are explained below.

The Digital Divide

World Bank studies in many countries have demonstrated that access to telecommunications has catalyzed local economic and social development. The studies show that a country's GDP, and equitable per capita distribution, is directly related to investment in telecommunications infrastructure.

Connecting people living in rural remote areas of a country with a terrestrial infrastructure of copper, fiber, and microwave is not always possible and may also not be economically feasible. Communication Satellite remains the best if not the only means to access such remote and dispersed population that is deprived of ICT infrastructure because of commercial and geographic constraints. During the last decade over half-a-million very small aperture satellite terminals - VSAT terminals - have been deployed in more than 120 countries. These provide highly reliable telecommunications services, low deployment and operating costs, and sufficient flexibility to enable cost-effective solutions for everything from stripped-down rural voice services to fully loaded multimedia services.

Such access, together with universal access policies, promotes socio-economic development, offers greater educational opportunities, provides better health services, stimulates private sector business and investment, increases employment and spurs growth of foreign earnings.

The information economy is being shaped by two continuing developments: the improvement of technologies and the increasing awareness and knowledge corresponding to those technologies. The term digital divide signifies the disparity between the rural and urban communities, whereby the rural communities have far lesser access to the same quality of information, knowledge, and education resources that is more readily available to urban communities because of a lack of required communication infrastructure. The digital divide imposes a virtual, yet real barrier to the advancement of individuals and the society in remote rural parts of the world.

In addition to spanning geographically separated populations, the digital divide also spans culturally separated populations. While the densely populated and well-developed urban communities keep up with the newly available technologies, the rural and remote regions miss-out on the vast opportunities provided by broadband access.

Communication satellites fill this infrastructure gap, and provide telecom operators and governments cost effective ways to extend essential telecom services to farthest corners of a country. GSM backhaul solutions via satellite enable operators to bypass the need for terrestrial infrastructure, to extend cellular coverage and create network backbone extension for their terrestrial telecom networks.

Improving healthcare service delivery

Developing countries around the world face chronic shortage of medical professionals and the situation is more acute in rural parts of such countries which often lack communication infrastructure. The limited number of medical professionals and medical services in remote rural areas creates discrepancy in the quality of healthcare available to people living in such areas as compared to that available in cities. In particular, rural communities have a lower per capita availability of medical professionals, poor access to diagnostic facilities, and greater incidence of infant and maternal mortality. Some of the key concerns regarding access to medical care in rural and remote regions are the delay in receiving diagnosis and treatment, lost productivity due to greater travel time and cost, and poor access to emergency medical care. Furthermore, medical professionals living in remote regions have difficulty in pursuing continuing medical education due to the distance from teaching centers.

Today, Communication Satellites are being employed the world over to offer Tele-Medicine services in rural communities to improve access to medical care, enhance the quality of medical care, provide earlier diagnosis and treatment, and improve the healthcare delivery. By enabling physicians to consult their peers, have access to specialists, and continue their education, Tele-Medicine could also increase the number of physicians located in rural areas.

SUPARCO has been the pioneer of telemedicine in Pakistan, and established first ever VSAT based telemedicine network between JPMC Karachi and Shikarpur in Sindh using existing in-orbit satellite PAKSAT-1. This not only enabled the people of Shikarpur to access specialist medical services of JPMC at their door steps, but also demonstrated the viability and effectiveness of the concept. As a result federal government has initiated a pilot project replicating this model in 12 rural remote areas of Punjab and Sindh. India has approximately 100,000 rural telemedicine centers spread across the country connected with over 400 major hospitals through their national communication satellites.

Providing access to quality education

Today's school students need very different skill sets for the employment environment of the Twenty-first century. They require new attitudes toward learning and new ways of learning. This requires access to computers, telephones, and other broadband services. In comparison with their

urban counterparts, rural residents are at a disadvantage with regards to educational opportunities. Many rural communities share the problems of fewer economic resources available to finance their educational systems, availability of teachers, and access to latest available educational tools.

Satellite based Tele-Education networks are being used to address the gaps in educational infrastructure of rural communities across the world. This is helping to increase the diversity and access to educational programs, providing opportunities for adult community education and in-service teacher training. Some programmes are using VSAT based distance learning tools employing digitized learning materials to offer higher education through a network of tele-education centers spread across the rural and remote parts of the country connected to big urban educational institutes and universities. This allows provision of high quality education available in the cities to people living in remote areas at a place, pace, and time suited to students' needs.

Countries all over the world have implemented extensive VSAT based distance learning programmes to ensure equitable learning opportunities for their rural population.

China's Central Agriculture Broadcast and Television School (CABTS) was chosen by the Chinese Ministry of Agriculture to run the National Farmers' Science and Technology Training Center and has established the China Distance Education Network using VSAT technology. CABTS is using a VSAT network to provide interactive distance-learning applications in its municipal schools. The need for such a network was emphasised by the outbreak of the SARS epidemic. The epidemic highlighted the need to deliver health education quickly to farmers throughout China's vast regions in order to prevent the spread of the deadly disease.

Extending the reach of government services

Governments, the world over, are embracing Information and Communication Technologies through e-governance to ensure greater transparency, improved service delivery and wider reach. From online access to government forms, municipal services and complaints registrations etc. to development planning, community awareness and emergency services, the extent and scope of programmes being undertaken by government organizations reflects tremendous impact and outreach of such programmes. However, rural communities lacking the required ICT infrastructure to support such programmes often get left behind. Here again Communication satellites come to the rescue, with VSAT based community tele-centers where rural communities can access a host of online government services.

One of the biggest and most successful programmes was executed by Brazil using hub based VSAT network. The programme called GESAC provides satellite Internet service to 3,100 remote schools and 100 other sites, including village communication centres. Such a large scale nation wide deployment of project was completed in a short span of six months using Communication Satellites with its hub located in Belo Horizonte; and over 3,200 remote rural sites across the country.