Optical Communication

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Science and technology is the mile stone of human progress. Indeed, science and technology has uplifted human beings from stone age to the age of computer.

Communication is the transfer of information from one place to another. Many kinds of communication system have been invented over the years. One of the earliest known optical transmission links was the use of fire signal by the Greeks in the eighth century B.C. for sending alarms, cells for help or announcements of certain events.

The invention of the telegraphy by Samuel F.B. Morse in 1838 opened the door of electrical communications. The radio and microwaves were used to carry information over copper wires and coaxial cables. The advancement of electrical communication system lead to the birth of radio, television, radar and microwaves links.

In 1870 John Tyndall, a British physicist demonstrated that light can be guided along a curved Stream of water. Dr. Narindar Kapani, Emperical collage of science and technology, first guided the light in bent fibers of glass in 1954. The crazy idea in optical communication was explored by prof. Chorles Kuen Kao in 1966 and gave birth to glass fiber. He was rewarded Nobel prize in 2009 for huge achievements concerning the transmission of light in fibers for optical communication.

The optical fiber is a transparent conduit as thin as human hair, made of glass or clear plastic, design to guide light waves along its length. It is a dielectric wave guide, works on the principle of total internal reflection. The optical fiber carries datas over long distance with high fidelity at low cost. Unlike copper cables, glass fiber is not sensitive to lighting and unlike radio communication, it is not affected by bad whether. The fibers can operate in hostile environment.

There are three coaxial regions in optical fiber. The inner most region is the light guiding region known as core. It is surrounded by coaxial middle region kwon as cladding. The outer most region is called the sheath. The refractive index

Optical communication system is basically identical to other types of communication mode. The difference is that the carrier frequency is optical frequency which is several times higher than those used in radio and microwave system. The optical communication involves the sending of information by modulation of light.

The modern era of optical communication is originated with the invention of laser in 1958. The innovative idea of optical fiber communication come in 1996, experimental reality in 1976 and major transmission technology is developed in 1986. The first optical cable was laid out on the bottom of Atlantic Ocean between the united state and Europe 1988. Today more than one billion kilometer of optical glass fiber have been laid in the ground and in the ocean. The compact wave of optical fiber is the foundation of world-wide web.

We are facing great demand of high band width and differentiated data services. The transmission capacity in a single fiber has increased from megabits per see to gigabits per see to terabits per see. But the speed at which data moving out from core to the user depends on the bend width of transmitting medium and data carrying capacity . The fastest internet system carries the data at the rate of terabits. It would take just 48 seconds to downloading entire contents of the library of congress.

The semi conductor lasers and light emitting diodes are used almost all of the telephone and data communication around the world. Now a days, infrared light with the wave length of 1.55 um is

used for long distance communication where the losses are lowest.

Optical communication systems are becoming more and more popular. The worldwide communication network has truly shrunk the work and brought human beings closer together. Narinder Kapani ploughed the field, Charles Kao painted the seed, Bob Maurer watered it and Johan Mac Chesney grew its roots.

Optical communication is still in growing stage. Various groups of researcher are involving in this field. The developments are evolving in rapid pace; hopping to next generation network.

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