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Fundamental Circuit Design to Strategic Mass Developments in Telecommunications Engineering

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Introduction

The work in telecommunications engineering ranges from fundamental circuit design to strategic mass developments and it is based on electrical and computer engineering. The design and supervision of the installation of telecommunications equipment and facilities, such as sophisticated electronic switching systems and conventional telephone service facilities, optical fibre cabling, IP networks and microwave transmission systems, are the responsibilities of a telecommunications engineer. There is also overlap between broadcast engineering and telecommunications engineering [1].

Description

Electronic, civil and systems engineering

Electronic, civil and systems engineering are all intertwined in the diverse field of telecommunications engineering. Ultimately, high-speed data transmission services are the responsibility of telecom engineers. When designing the infrastructure of the telecom network, they make use of a variety of equipment and transport media; twisted-pair, coaxial and optical fibres are the three types of media that are currently utilized by wired telecommunications the most [2]. Wireless telephony services, radio and satellite communications, the internet, Wi-Fi and broadband technologies, among other wireless modes of communication and information transfer, are also provided by telecommunications engineers as solutions. Media transmission frameworks are for the most part planned by telecom engineers who sprang from mechanical upgrades in the message business in the late nineteenth hundred years and the radio and the phone ventures in the mid twentieth hundred years [3]. Television, radio and other devices that facilitate communication, like the telephone, are commonplace in many parts of the world today. Computer networks, the Public Switched Telephone Network (PSTN), radio networks and television networks are just a few of the many networks that link these devices together. One of many examples of telecommunication is computer communication over the Internet. Telecommunication is important to the global economy; the telecommunication industry makes just fewer than 3% of the world's gross domestic product, according to estimates [4]. On September 2, 1837, Samuel Morse independently developed a version of the electrical telegraph that he tried unsuccessfully to demonstrate. Soon after, Alfred Vail joined him and created the register, a telegraph terminal with a logging device for writing messages to paper tape. On January 6, 1838, this was successfully demonstrated over three miles and on May 24, 1844, it was finally demonstrated over forty miles or 64 kilometres, between Washington, DC, and Baltimore. By 1851, telegraph lines in the United States covered more than 20,000 miles (32,000 kilometres). On July 27, 1866, the first successful transatlantic telegraph cable was completed, enabling transatlantic communication for the first time. The international use of the telegraph has sometimes been dubbed the Victorian internet [5]. The first commercial telephone services were established in the cities of New Haven and London in 1878 and 1879 on both sides of the Atlantic. Earlier transatlantic cables that were constructed in 1857 and 1858 only functioned for a few days or weeks before they broke down. The master patent for the telephone, which was required for such services in both countries, belonged to Alexander Graham Bell. By the middle of the 1880's, there were telephone exchanges in every major city in the United States and inter-city lines. Despite this, customers were unable to communicate *via* voice across the Atlantic until January 7, 1927, when a radio connection was established. However, until TAT-1, which provided 36 telephone circuits on September 25, 1956, there was no cable connection. In 1880, Bell and co-inventor Charles Sumner Tainter made the first wireless telephone call in the world using modulated light beams projected by photo phones [6]. When they were first implemented in military and fibre-optic communications, the scientific principles of their invention would not be used for several decades. The first complete, commercially successful wireless telegraphy system based on airborne electromagnetic waves (radio transmission) was developed by Italian inventor Guglielmo Marconi over several years beginning in 1894. He would go on to establish wireless communication between Britain and Newfoundland in December 1901, earning him the Nobel Prize in physics in 1909, which he shared with Karl Braun. In 1900, Reginald Fessenden was able to wirelessly transmit a human voice. Scottish inventor John Logie Baird demonstrated the transmission of moving silhouette images in public at the

London department store Selfridges on March 25, 1925. Baird was successful in obtaining moving pictures with halftone shades in October 1925, which were, according to most accounts, the first true television pictures. This resulted in a public demonstration of the improved device on January 26, 1926, once more at Selfridges. The mechanical television was the name given to Baird's first devices, which used the Nipkow disk. Beginning on September 30, 1929, it served as the foundation for the British broadcasting corporation's semi-experimental broadcasts. In 1958, Project SCORE was the first U.S. satellite that used a tape recorder to store and forward voice messages. Dwight D. Eisenhower, the president of the United States, used it to send a Christmas greeting to the entire world. An Echo satellite was launched by NASA in 1960; for radio communications, the 100 foot (30 meter) aluminized PET film balloon served as a passive reflector. Philco's Courier 1B, which was also launched in 1960, was the first active repeater satellite in the world. Today, satellites are utilized in numerous applications, including GPS, television, internet and telephone use [7].

Public switched telephone network

The first commercially available active direct relay satellite was Telstar. It was launched by NASA from Cape Canaveral on July 10, 1962, the first privately sponsored space launch and belonged to AT and T as part of a multi-national agreement to develop satellite communications between AT and T, Bell Telephone Laboratories, NASA, the British general post office and the French national PTT (post office). Relay 1 was launched on December 13, 1962 and it became the first satellite to broadcast across the Pacific on November 22, 1963. Intercontinental long distance telephony was the first and historically speaking, most significant use of communication satellites. Calls from land line telephones are routed through the fixed public switched telephone network to an earth station, where they are sent *via* a geostationary satellite in Earth orbit to a receiving satellite dish.

Conclusion

In the latter part of the 20th century, improvements in fibre-optic submarine communications cables led to a slight decline in the use of satellites for fixed telephony. However, satellites continue to only serve isolated islands like Ascension Island, Saint Helena, Diego Garcia and Easter Island, for which there are no submarine cables in operation. Antarctica, as well as large portions of Australia, South America, Africa, Northern Canada, China, Russia and Greenland is among the countries and continents where landline telecommunications are scarce or absent.

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