Analysis of Microstrip Antenna element for Satelite Communication.

Gauri Shankar, Pooja Kumari & Manish Kumar*****
+2 Marwari H/S. Darbhanga, Department of computer science of engineering, Dr. A.P.J.K.Womens Institute of Technology, Darbhanga & Department of Physics R.N.College, Pandaul LNMU, Darbhanga***

Abstract

In this paper we amied at providing wireless data over long distances in a variety of ways, from point to point links to full mobile cellular type access. Broadband in data communications refer to Broadband Networks or Broadband internet and may have the same meaning as above, so that data transmission over a fiber optic cable would be referred to as broadband as compared to a telephone modem operating at 600 bits per second.

One of the great challenges of broadband is to provide service to potential customers in areas of low population density, such as to farmers and ranchers. In cities where the population density is high, it is easy for a service provider to recover equipment costs, but each rural customer may require expensive equipment to get connected. Department of communication has enhanced optical fibre networks across the country and also plans to lay new optical cables to unconnected areas with support from universal service obligation funds (USOF). Further, large scale WEB HOSTING SERVICES are to be provided.

Key words : Antenna element, Broadband Network, Service Obligation funds etc .

Introduction :-

This employs a satellite in geostationary orbit to relay data from the satellite company to each customer. Satellite Internet is usually among the most expensive ways of gaining broadband Internet access, but in rural areas it may only compete with cellular broadband. However, costs have been coming down in recent years to the point that it is becoming more competitive with other high-speed options. Satellite Internet also has a high latency problem caused by the signal having to travel 35,000 km (22,000 miles) out into space to the satellite and back to Earth again. The signal delay can be as much as 500 milliseconds to 900 milliseconds, which makes this service unsuitable for applications requiring real-time user input such as certain multiplayer Internet games and first-person shooters played over the connection [1-3]. Despite this, it is still possible for many games to still be played, but the scope is limited to real-time strategy or turn-based games. The functionality of live interactive access to a distant computer can also be subject to the problems caused by high latency. These problems are more than tolerable for just basic email access and web browsing and in most cases are barely noticeable.

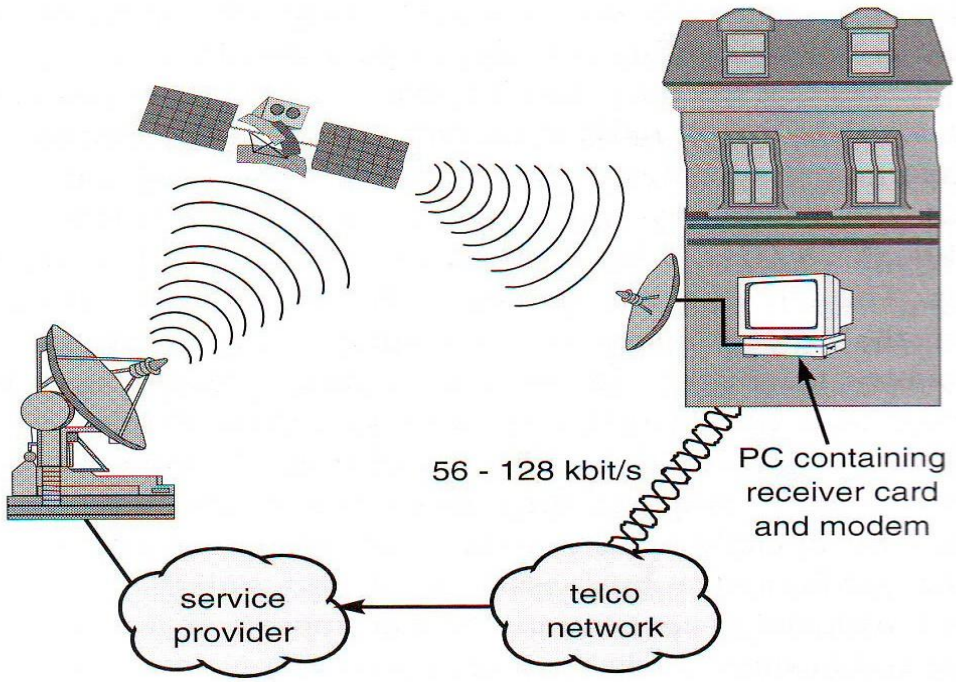


Figure Broadband access using satellite

The satellite is usually being used for two-way communications, the total distance increases to 140,000 km (88,000 miles), which takes a radio wave 466 ms to travel. Factoring in normal delays from other network sources gives a typical connection latency of 500-700 ms. This is far worse latency than even most dial-up modem users' experience, at typically only 150-200 ms total latency. Most satellite Internet providers also have a FAP (Fair Access Policy). Perhaps one of the largest cons against satellite Internet, these FAPs usually throttle a user's throughput to dial-up speeds after a certain "invisible wall" is hit (usually around 200 MB a day). This FAP usually lasts for 24 hours after the wall is hit, and a user's throughput is restored to whatever tier they paid for. This makes bandwidth-intensive activities nearly impossible to complete in a reasonable amount of time (examples include P2P and newsgroup binary downloading).

Advantages

1. True global broadband Internet access availability

2. Mobile connection to the Internet (with some providers)

Disadvantages

- Very high latency compared to other broadband services, especially 2-way satellite service
- Unreliable: drop-outs are common during travel, inclement weather, and during sunspot activity

- The narrow-beam highly directional antenna must be accurately pointed to the satellite orbiting overhead
- The Fair Access Policy limits heavy usage
- VPN use is discouraged, problematic, and/or restricted with satellite broadband, although available at a price
- One-way satellite service requires the use of a modem or other data uplink connection
- VoIP is not supported.
- Satellite dishes are huge. Although most of them employ plastic to reduce weight, they are typically between 80 and 120 cm (30 to 48 inches) in diameter.

A MICROSTRIP ANTENNA ELEMENT FOR SATEL - LITE COMMUNICATION:-

Antenna is an essential part of communication equipment. Here how microstrip antenna's can be used for satellite communication in different orbits are discussed at length in different modes of operations [4-6]. Microstrip antennas also known as printed antennas, the most common of which is the microstrip patch antenna or simply patch antenna.

PATCH ANTENNA CHARACTERISTICS:-

A patch antenna is a narrow band, wide beam antenna fabricated by etching the antenna element pattern in metal trace bonded to an insulated dielectric substratey such as printed circuit board with a continuous metal layer bonded to the opposite side of the substrate which forms a ground plane[7-10]. The shape of a microstrip antenna may be as per needs of the communicating systems-i.e. circular, square, rectangular, optical etc. Patch antennas with a metal patch are designed elemenating dielectric substrate has wider bandwidth such microstrip antennas are mounted on the exterior of aircraft or spacecraft or in.

ADVANTAGES OF MICROSTRIP ANTENNAS :-

(1) These are usually employed at UHF and higher frequencies because the size of the antenna is directly tied to the wavelength of resonant frequency.
(2) Patch arrays can provide much higher gains than a single patch.
(3) Matching and phase adjustment can be performed with printed microstrip feed structures in the same operations that form the radation patches.
(4) Microstrip antennas/patches create high gain arrays in a low profile antenna hence are much popularly used in airplanes and military applications.
(5) An array of Patch antennas is an easy way to make a phased array of antennas with dynamic beam forming ability.

Exploration of planetary systems using microstrip antennas:-

An exploration of planetary system (planetary system is a set of gravitationally bound non-steller objects in orbits around a star or star system) can be an important application of microstrip antenna systems. As now the planetary

configuration is very well understand in this infinite universe system, solar planetary system can be explored to understand and analyze it to enhance the

(6) Finally, an advantage inherent to pitch antennas is the ability to have polarization diversity patch antennas can easily be designed to have

(a) Vertical
(b) horizontal
(c) Right handed circular polarization
(d) Left handed circular polarization

using multiple feed points. Thus patch antennas have unique properties and can be used in many types of communication links with varied requirements present knowledge. A system of microstrip antennas can be developed in such a way that they form a mini system proportional to their interplanetary distances. Thus planets and dwarf planets of the solar system - Mercury, Venus, Earth, Mars, Jupiter, Saturn Uranus, Neptune etc. can be independently studied by creating inter communication system through microstrip antennas. Thus let us call one patch antenna as tp, one can while the communication between .

SOLAR SYSTEM:-

Solar system consists of 'Sun' and its planetary system of eight planets, their moons and other non stellar objects. The major part of the system's mass is in the Sun, further most of the remaining mass in contained in the planet Jupiter. Then there are four inner small planets -

(1) Mercury
(2) Venus
(3) Earth and
(4) Mars

are also called the terrestrial planets and are composed of rocks and metals.

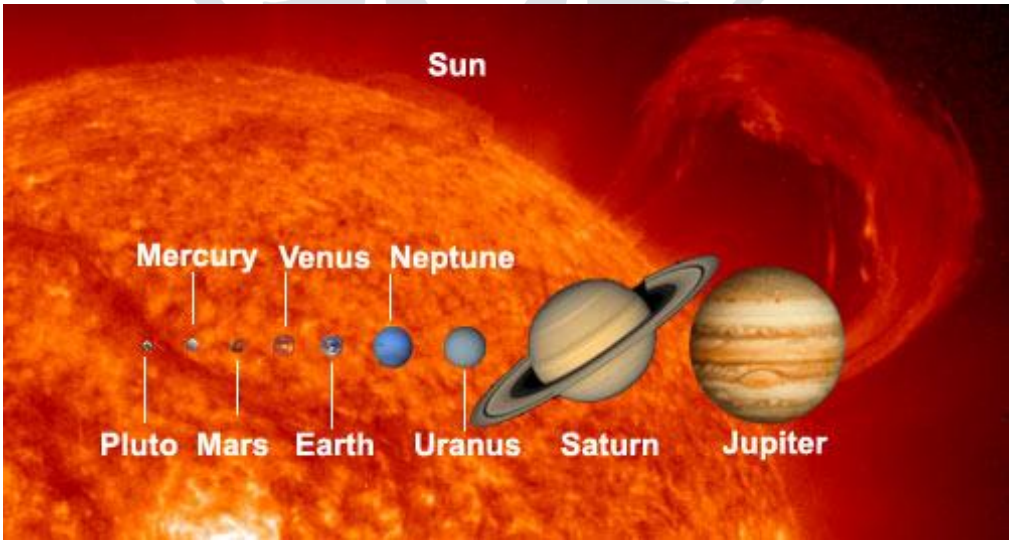
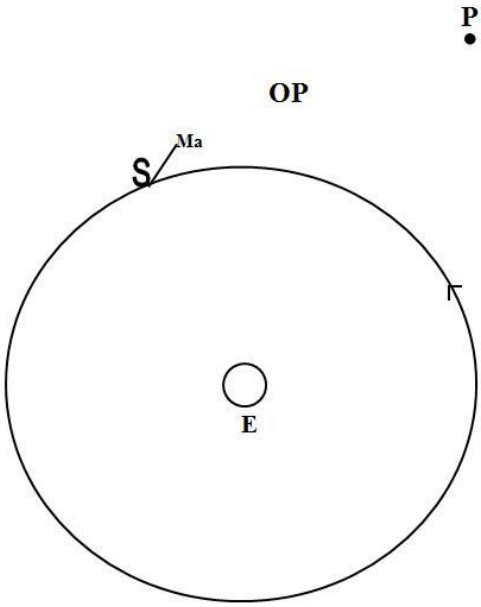


Figure Solar System

The four outer planets are called gas giants are more massive then the terrestrial planets. The largest Jupiter and Saturn are composed of mainly hydrogen and helium while the two outer most Uranus and Neptune are composed of largely with substances with high melting points compared to

hydrogen and helium. All planets have circular orbits that lie within a nearly flat disc called the ecliptic plane. To add further the solar system also contain a number of regions populated by small objects -asteroid belt Kuiper belt etc. etc. further a large number of dwarf planets and small bodies are also orbiting with their natural satellites communication between the planet of the solar system and the earth station can be established



Figure

through microstrip/patch antenna with proper inclination/predetermined inclination. Thus the communicate between earth status and the planet chosen is a function of the signals received through the satellite system which is already equipped with microstrip antenna say, Signal S is a function of signals

$S= \int (ms_{antenna})$ recieved through ms antenna

If number of planets are being studied simultaneously, receiving signals, S_m, S_j , S_m , S_u etc. with microstrip antennas located in proportion to the interplanetary distances as a geostationary satellite antenna then signals S received from different planet locations can be described as

$$S= \int \left(S_{mer} + S_{venus} + S_{mars} + S_{jup} + S_{sat} + ... \right)$$

Where,

S= signal strenghts recd by microstrip antennas deviced for the purpose of space exploration in general and planetary exploration in genera.

S_{mer} =Signal received by Microstrip antenna meant to received signals from mercury.

S_{venus} = Signal received by microstrip antenna meant to receive signals from the planet venus.

S_{mer} = Signal recd by mu antenna meant for planet mercury of communication.

S_{jup} = Signal received by microstrip antenna meant for the planet Jupiter for communication and studies.

S_{sat} = Signals received by microstrip antenna meant for the planet Saturn for communication and studies.

and so on and so forth. Thus, we see that microstrip antenna arrays can be used with a great advantage for communication and studies of these planetary stystems by choosing and designing systems dependent upon the interplanetary distances and system analyze pay loads (pre determined and prefabricated).

CONCLUSIONS :-

Broadband in data communications refer to Broadband Networks or Broadband internet and may have the same meaning as above, so that data transmission over a fiber optic cable would be referred to as broadband as compared to a telephone modem operating at 600 bits per second.

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Exploration of planetary systems using microstrip antennas has been described.

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