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VSAT Review

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Abstract

The aim of this paper is to study, analyze VSAT components and architecture and investigate frequency bands and applications of VSAT and to discuss orbits type for VSAT. Also to introduce some previous studies that considers VSAT using descriptive analysis.

***Keywords**: VSAT, ka band, GEO, EHF.*

1. Introduction

In the early days of satellite systems, antennas were large, expensive and more complicated. The reason behind this was not because of the disadvantages Palace in these stations, but because of the satellite itself. This old type of satellite was suffering from a weak transmission capacity as well as high noise impact on their receptors [1], receiving stations need large and complex installation to broadcast their signals to cover the area of the moon. After that these satellites have evolved gradually and became the highest-capacity Send narrow beam broadcast and became more receptors for sensing the next signal. Also the ground stations were evaluated and turned into small sizes but also more sensitive , its less expensive and less complex and has become more wide spread and Advance[2].

So the VSAT (Very Small Aperture Terminal) As is clear from the name given to the small volume of earth stations, but it is a communication system used to connect different networks via satellite, is one of the services provided to users who are interested in independent communications network linking a number of geographically sites such as institutions and government departments to link its parts with each other both within the State or outside, on land or at sea [3].

The objectives of this paper are to study the concept, components, architecture and frequency bands and previous studies about satellite and VSAT.

2. Architecture

The VSAT system consists of a satellite transponder, central hub or a master earth station, and remote VSATs. the ground station used for reception and transmission or terminal .this terminal be installed in scattered locations and related ground station centralized (Hub) or other spread via satellite by using antennas with a diameter small plants (mostly diameters ranging between 60 cm to 3.8 meters) [4].

Satellites used in this system are on orbit GEO This orbit is parallel to the equator, there are at an altitude of 35 786 km, the speed of these satellites up to 3.06 kilometers a second, the same Earth's rotation speed of any The duration of the cycle of one of the moon is 23 hours and 56 minutes and 4 seconds and so the moon is fixed for the earth station[5].

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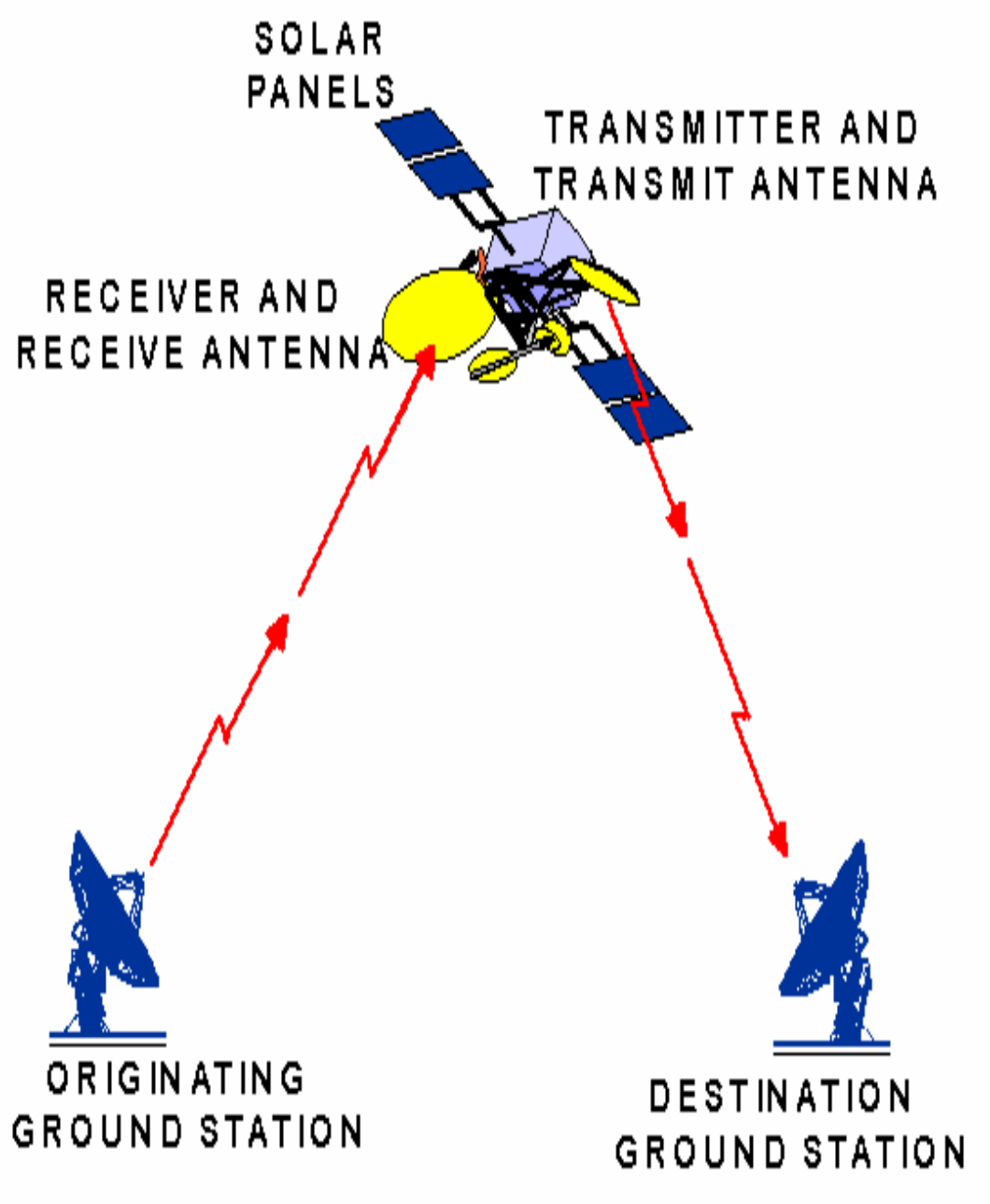

Figure 1: Basic Components of satellite

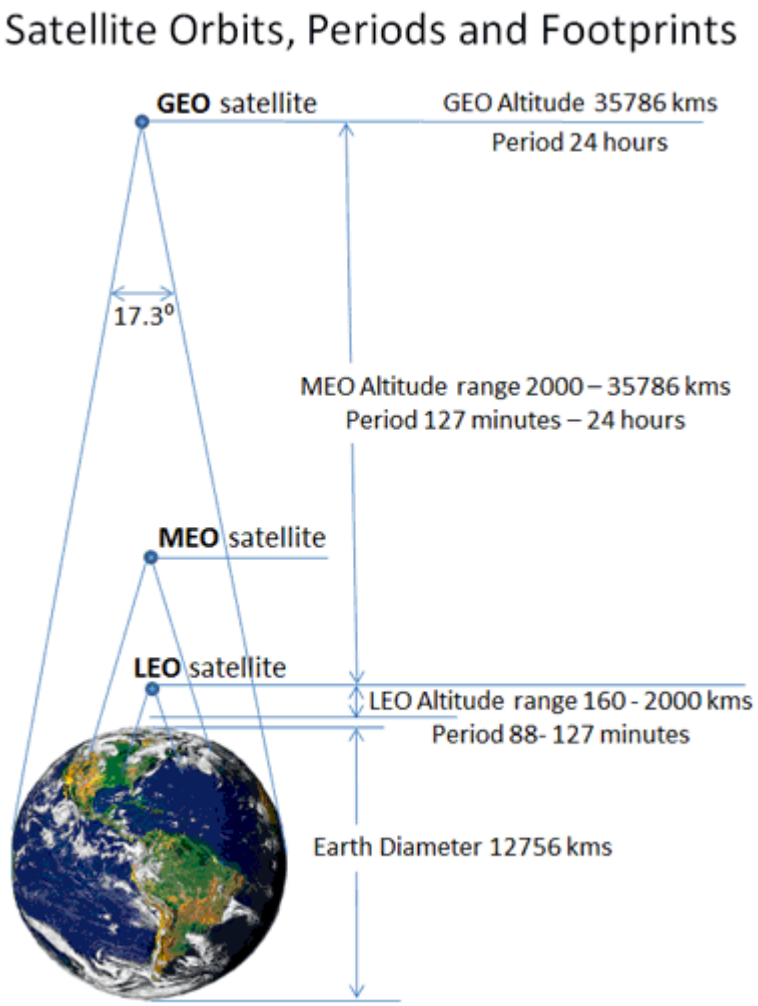

Figure 2: Satellite, Orbit, Periods and Footprints

3. VSAT Services

This system is used in voice services between local telephone networks and other networks , as well as transfer service between the same networks as the company is doing some portable telecommunications companies to connect to their To connect the parts of company that cannot be connected by wire or wimax [6].Also of the most important uses of this system is connected to the Internet where service is available starting at different speeds to 32 , 64, 128 kilobits per second and up to 2 Megabit or more .there are different frequency bands using in satellite services such as:

3.1 Ku band

Is the band of electromagnetic spectrum between 12-18 GHz in the range of frequencies .ku band is used in satellite communications, the ku band is designed specially for satellite communications that means there is no competition or signal interference from other communication systems also ku band used for specific

applications such as international space satellite and NASA tracking data relay satellite.

3.2 C band

The c band is the band between (3.7 - 4.2 Ghz) for downlinks and (5.9 - 6.4Ghz) for uplinks that means a wider coverage area. One of the disadvantages of C-band satellite service is that it shares the same frequency as terrestrial microwave radio systems. That makes interference between the vsat and other radio systems.

3.3 Ka-Band

Is the frequency band between (26.5-40 ghz) is an very high frequency need a great RF equipment used commonly for high definition satellite tv, and also used for terrestrial vsat services .ka band should be inexpensive if we compared with ku band because its plentiful and need once implementation. In my opinion the ka band is the best one because it delivers a high quality satellite signal and that what we actually need for commutations. Because all the delay, attenuation, interference and bit error rate are reduced[7].

4. Pervious study

In [8] the best throughput for the ka frequency band and the optimization using of available spectrum to deliver high speed internet access and the large range of data services such as VOICE OVER INTERNET PROTOCOL, digital signature, video conference were simulated to use and enjoy the effective high throughput and hold off less of ka place beam satellite systems we most use effective and very intelligent and liable ground segment technologies. A new type of getaway structure producing fully redundant radio frequency, intermediate frequency and time distribution slots for high availability. at the monetary side the procedure costs plainly decreased from this paper we achieved that the ka frequency band is the choice solution of the bandwidth and speed problems for the satellite.

In [9] the writer attempted to describe the regulation of satellite in the national and global information infrastructure and the use of the electromagnetic range for data transmission and reception will be employed by larger telecommunication companies using all the bandwidth also the natural problems such as rain attenuation, antenna wetting, depolarization due to rain and ice, cloud attenuation etc. still influence significantly high frequency distribution. Also the congestion problem makes the regulation organizations facing difficulties to manage the frequency bands also to give capacity and the best problem they face you should do the frequency recycling all of that result a reduction of money can be retch to billions of dollars per year. Marketing communications satellites with wide-coverage, wide-bandwidth, and low-noise Communication systems with high effective isotropic rays power such as multi-level Gaussian frequency-shift keying (MGFSK) transponder and Gen*Star multiple-beam Antenna (MBA) system should be executed in order to cutting-edge

As the authors in [10] discusses the analysis of the communication service quality between huge and satellite. The main goal of studies to develop algorithm to assess the communication quality of service between vast and satellite. the way of work the algorithm use is to lower the hold off ratio between transmitter and receiver also to reduce the ratio of the bit error rate that can be occur ensuing of the attenuation and interference of the transmission transmitted. the researcher used a kind of programing language called MATLAB the used version of MATLAB is 7. 9. zero (R2009b). he used MATLAB to implement and analyzed the data that he calculated. after data analyzation your data the result of research show we most use completion algorithm to increase the vast quality of service also to reduce the delay also to reduce any sort of noise can be occur also to lower the interference.

In [11] the creator is talking about a hot research topic which is basically high regularity bands (the band between the range of 30-300 GHZ) for broadband tranny over satellite networks. we can increase bandwidth availableness By increase the throughput means of suitable radio source management and

transport protocols, able to support very high data-rates in long range aerospace scenarios. We still face the old problem about the rain atmosphere on the real transmitting signal the implementation in the model is established on theoretical and statistical analysis and extinctions the bigger frequency but the damping mostly occurs at lower frequency's.

In [12] there is modelling and simulation of VSAT data messaging network operating in India at Karnataka with extended C-band. VSATs in Karnataka of KPTCL use VSATS six. 875-6.9465GHz uplinks and 4. 650- 4. 7215 GHz downlinks. These types of frequencies are dedicated to fixed services. The performance of the device is analyzed by the error probability called BER (Bit Error Rate) and results are produced from Earth station to hub and hub to Earth station using satellite tv Transponder as the mass media of communication channel. The Link budgets are developed for a single do follow satellite link.

In [13] the goal of this thesis is to maximize the priority of packet arrived at downlink. the rain fade payment problem, for downlink indication in the Ka-band satellite television by dynamic resource was studied increasing power on the satellite provides rainfall compensation attenuation. The problem formulated mathematically in structure of knapsack problem (kp) and the mathematical formulation demonstrated through simulation in Opnet.

This kind of paper [14] talks about The Satellite television communication as a part of telecommunication systems which carrying large amount of data (internet, e-mail). Very small aperture terminal (VSAT) is generally used for these purposes. This paper aims to provide the framework of VSAT technology in the growing context of satellite marketing and sales communications in conditions of network configuration, services, economics and operational aspects. This newspaper presents the modeling and a simulation aspect of communication hindrances of VSAT which is often used in several types of network topology and also is made up of the numerical and mathematical results simulated by MATLAB.

In [15] talks addresses three country case studies on the status of VSAT commissioned by the IDRC through the GVF as part of CATIA component 1a on low cost satellite access in Africa. The country circumstance studies were conducted in Nigeria, Algeria and Tanzania. The report analyses VSAT from two angles: first of all, from a policy and regulatory perspective and subsequently, from an economical and use perspective. In the first instance, the record finds that Algeria, Nigeria and Tanzania are on different points of the ICT development curve. This is significant explanatory factor for the various.

5. Conclusion

Satellites have become most famous telecommunication technologies because it can reach the largest number of users easily and without noisy losses. The Rapid development in the field of communications and applications using satellite led to the development satellites dramatically. In this paper we studied the evolution of satellite and constraints that faces this development, also the techniques that have been used in this development. VSAT is one of satellite development faces and we talked about VSAT Carefully Inside of Components, Architecture and Orbits. Number of papers discussed at this paper and summarized.

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