Satellite Communication with the Merge on Television Communication

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Abstract **- In the context of a worldwide communications network, satellite communications systems are very important. Satellite communications links add capacity to existing communications capabilities and provide additional alternate routings for communications traffic. Satellite links, as one of several kinds of long-distance links, interconnect switching centers located strategically around the world. They are part of the defense communication systems (DCS) network. One important aspect of the satellite communications network is that it continues in operation under conditions that sometimes render other methods of communications inoperable. Because of this, satellites make a significant contribution to improved reliability of Navy communications .When satellite television first hit the market in the early 1990s, home dishes were expensive metal units that took up a huge chunk of yard space. In these early years, only the most die-hard TV fans would go through all the hassle and expense of putting in their own dish. Satellite TV was a lot harder to get than broadcast and CABLE AND TV. Today, you see compact satellite dishes perched on rooftops all over the United States. Drive through rural areas beyond the reach of the cable companies, and you'll find dishes on just about every house. The major satellite TV companies are luring in more consumers every day with movies, sporting events and news from around the world and the promise of movie-quality picture and sound. Satellite TV offers many solutions to broadcast and cable TV problems. Though satellite TV technology is still evolving, it has already become a popular choice for many TV viewers.**

Keywords: Merge on television communication, satellite communication, GPS, encoding.

I. INTRODUCTION

A satellite is basically any object that revolves around a planet in a circular or elliptical path. The moon is Earth's original, natural satellite, and there are many manmade (artificial) satellites, usually closer to Earth.

• The path a satellite follows is an orbit. In the orbit, the farthest point from Earth is the apogee, and the nearest point is the perigee.

• Artificial satellites generally are not mass-produced. Most satellites are custom built to perform their intended functions. Exceptions include the GPS satellites (with over 20 copies in orbit) and the Iridium satellites (with over 60 copies in orbit).

• Approximately 23,000 items of space junk-objects large enough to track with radar that were inadvertently placed in orbit or have outlived their usefulness -- are floating above Earth. The actual number varies depending on which agency is counting. Payloads that go into the wrong orbit, satellites with run-down batteries, and leftover rocket boosters all contribute to the count. This online catalogs of satellite has almost 26,000 entries!

Although anything that is in orbit around Earth is technically a satellite, the term "satellite" is typically used to describe a useful object placed in orbit purposely to perform some specific mission or task. We commonly hear about weather satellites, communication satellites and scientific satellite

II. HELPFUL HINTS

A.Types of Classification

• Weather satellites help meteorologists predict the weather or see what's happening at the moment. Typical weather satellites include the TIROS, COSMOS and GOES satellites.

• Communications satellites allow telephone and data conversations to be relayed through the satellite. Typical communications satellites include Telstar and Intelsat.

• Broadcast satellites broadcast television signals from one point to another (similar to communications satellites).

• Scientific satellites perform a variety of scientific missions. The Hubble Space telescope is the most famous scientific satellite, but there are many others looking at everything from sun spots to gamma rays.

• Navigational satellites help ships and planes navigate. The most famous are the GPS NAVSTAR satellites.

• Rescue satellites respond to radio distress signals .

• Earth observation satellites observe the planet for changes in everything from temperature to forestation to ice-sheet coverage. The most famous are the LANDSAT series.

B.Satellite Television – A Merge

Satellite television really becomes important in areas where it is not possible to install cable and the broadcast television reception is poor. Both systems use radio wave signals to transmit and the waves travel in straight lines. That means for broadcast television, which is transmitted and received via land-based antenna, that the natural curvature of the earth will eventually break the signals' line of sight. It also means that other land based signals and obstructions are likely to interfere with the TV signal and cause some distortion. Today, most satellite TV customers get their programming through a direct broadcast satellite (DBS) provider, such as DirecTV or DISH Network. The provider selects programs and broadcasts them to subscribers as a set package. Basically, the provider's goal is to bring dozens or

even hundreds of channels to your TV in a form that approximates the competition, cable TV.

Unlike earlier programming, the provider's broadcast is completely digital which means it has much better picture and sound quality. Early satellite television was broadcast in C-band radio -- radio in the 3.7-gigahertz (GHz) to 6.4-GHz frequency range. Digital broadcast satellite transmits programming in the Ku frequency range (11.7 GHz to 14.5 GHz).

C.The Components

There are five major components involved in a direct to home (DTH)

• Programming sources are simply the channels that provide programming for broadcast. The provider doesn't create original programming itself; it pays other companies (HBO, for example, or ESPN) for the right to broadcast their content via satellite. In this way, the provider is kind of like a broker between you and the actual programming sources. (Cable TV companies work on the same principle.)

• The broadcast center is the central hub of the system. At the broadcast center, the TV provider receives signals from various programming sources and beams a broadcast signal to satellites in geosynchronous orbit.

• The satellites receive the signals from the broadcast station and rebroadcast them to Earth.

• The viewer's dish picks up the signal from the satellite (or multiple satellites in the same part of the sky) and passes it on to the receiver in the viewer's house.

• The receiver processes the signal and passes it on to a standard TV.

III. ENCODING AND ENCRYPTION

Encoding works in conjunction with compression to analyze each video frame and eliminate redundant or irrelevant data and extrapolate information from other frames. This process reduces the overall size of the file. Each frame can be encoded in one of three ways:

• As an intraframe, which contains the complete image data for that frame? This method provides the least compression.

• As a predicted frame, which contains just enough information to tell the satellite receiver how to display the frame based on the most recently displayed intraframe or predicted frame. A predicted frame contains only data that explains how the picture has changed from the previous frame.

• As a bidirectional frame, which displays information from the surrounding intraframe or predicted frames? Using data from the closest surrounding frames, the receiver interpolates the position and color of each pixel.

This process occasionally produces artifacts -- glitches in the video image. One artifact is macro blocking, in which the fluid picture temporarily dissolves into blocks. Macro blocking is often mistakenly called pixilation, a technically incorrect term which has been accepted as slang for this annoying artifact. Graphic artists and video editors use "pixilation" more accurately to refer to the distortion of an image. There really are pixels on your TV screen, but they're too small for your human eye to perceive them individually -- they're tiny squares of video data that make up the image you see.

IV. ADVANTAGES OF SATELLITE COMMUNICATION

Satellite links are unaffected by the propagation variations that interfere with hf radio. They are also free from the high attenuation of wire or cable facilities and are capable of spanning long distances. The numerous repeater stations required for line-of-sight or tropo scatter links are no longer needed. They furnish the reliability and flexibility of service that is needed to support a military operation.

A.Capacity:

The present military communications satellite system is capable of communications between backpack, airborne, and shipboard terminals. The system is capable of handling thousands of communications channels.

B.Reliability:

Communications satellite frequencies are not dependent upon reflection or refraction and are affected only slightly by atmospheric phenomena. The reliability of satellite communications systems is limited only by the equipment reliability and the skill of operating and maintenance personnel.

C.Vulnerability:

Destruction of an orbiting vehicle by an enemy is possible. However, destruction of a single communications satellite would be quite difficult and expensive. The cost would be excessive compared to the tactical advantage gained. It would be particularly difficult to destroy an entire multiple-satellite system such as the twenty-six random-orbit satellite system currently in use. The earth terminals offer a more attractive target for physical destruction. These can be protected by the same measures that are taken to protect other vital installations. A high degree of freedom from jamming damage is provided by the highly directional antennas at the earth terminals. The wide bandwidth system that can accommodate sophisticated anti-jam modulation techniques also lessens vulnerability

D.Flexibility

Most operational military satellite earth terminals are housed in transportable vans. These can be loaded into cargo planes and flown to remote areas. With trained crews these terminals can be put into operation in a matter of hours. Worldwide communications can be established quickly to remote areas nearly anywhere in the free world.

V. PROBLEMS AND SOLUTION

Conceptually, satellite TV is a lot like broadcast TV. It's a wireless system for delivering television programming directly to a viewer's house. Both broadcast television and satellite stations transmit programming via a radio signal. Broadcast stations use a powerful antenna to transmit radio waves to the surrounding area. Viewers can pick up the signal with a much smaller antenna. The main limitation of broadcast TV is range. The radio signals used to broadcast television shoot out from the broadcast antenna in a straight line. In order to receive these signals, you have to be

in the direct line of sight of the antenna. Small obstacles like trees or small buildings aren't a problem; but a big obstacle, such as the Earth, will reflect these radio waves. If the Earth were perfectly flat, you could pick up broadcast TV thousands of miles from the source. But because the planet is curved, it eventually breaks the signal's line of sight. The other problem with broadcast TV is that the signal is often distorted, even in the viewing area. To get a perfectly clear signal like you find on cable, you have to be pretty close to the broadcast antenna without too many obstacles in the way. satellite TV solves the problems of range and distortion by transmitting broadcast signals from satellites orbiting the Earth. Since satellites are high in the sky, there are a lot more customers in the line of sight. Satellite TV systems transmit and receive radio signals using specialized antennas called satellite dishes.

Fig.1 model of satellite antenna

VI. ITS FUTURE USE

In the future SATELLITE TV will open up so many possibilities that it is hard to imagine what our lives will be like in 30, or even just 20 years from now. To give an idea of how fast things are going. 50 years ago, there was nothing in space that was made by humans. Now there are even satellite graveyards (specific orbits where obsolete satellites are "parked"). The possibilities of satellite TV technology are growing faster every year. What took 10 years to develop 30 years ago is now done in 2 years; Satellite TV is one of the driving forces for satellite technologies because the need to please million of subscribers is much stronger than the need to please the relative limited needs of communications for commercial purposes. The future of satellite TV is so bright, that a supernova would pale in comparison.

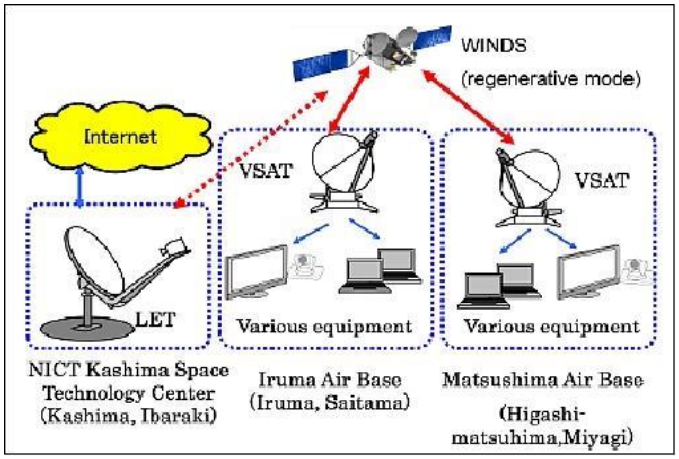

Fig.2 example of satellite communication

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