

# DTH Technology

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**Abstract**—Studies about the information in a technical research paper will present the information related to DTH Technology. As the customer becomes more and more aware of the technology, hence the search of the new technology is the main motive of leading DTH. DTH stands for Direct -to -home television. DTH is defined as the reception of satellite signal in their home with the help of an individual dish. This paper describes the needs of demand continued development of DTH and explains some background on who is involved and what is currently happening in bringing DTH world.

## A. INTRODUCTION (DTH TECHNOLOGY)

Direct to home technology is the satellite television broadcasting process which is actually intended for home reception. This technology is originally referred to direct broadcast satellite (DBS) technology. This technology was developed for competing with the local cable TV distribution services by providing higher quality satellite signals with more number of channels. A DTH network consist of a broadcasting centre, satellite, encoders, multiplexers, modulators and DTH receivers (STB).

In short, DTH refers to the reception of satellite signals on a TV with a personal dish in an individual home, satellites that are used for this purpose is known as geostationary satellites. The satellites compress the signals digitally, encrypt them and then beamed them from high powered geostationary satellites. They are received by dishes that are given by the DTH providers to the DTH consumer.

Though DBS and DTH provide the same services to the consumers, there are some differences in the technical specifications, While DBS is used for transmitting signals from satellites at a particular frequency band (band differs in each country) and DTH is used for transmitting signals over a wide range of frequencies (normal frequencies including the KU and KA band). The satellite used for the transmission of the DTH signals is not part of any international planned frequency band. DBS has changed its plans over the past few years to include new countries and also modify their mode of transmission from analog to digital. But DTH is more famous for its services in both the analog and digital which includes both audio and video signals. The size of the dishes used for this service is also very small.

## B. WHAT IS DTH

DTH stands for Direct-To-Home television. DTH is defined as the reception of the satellite signal in their home with the help of an individual dish. DTH does away the need of the local cable operator and puts the broadcaster directly in touch with the consumer. Only cable operators

can receive satellite signals and then they distribute them to individual homes.

## C. WORKING OF DTH

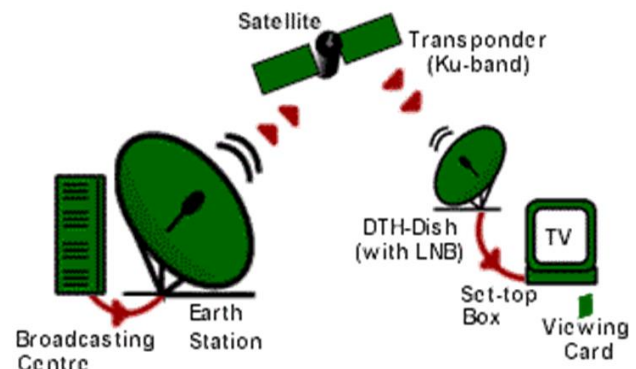


Fig. working of DTH

Early satellite TV viewers were explorers of sorts. They used their expensive S-Band and C-Band dishes to discover unique programming that wasn't necessarily intended for mass audiences. The dish and receiving equipment give viewers tools to pick up foreign stations, live feeds between different broadcast stations and a lot of other stuff transmitted using satellites. but nowadays, most of the satellite TV customers in developed television markets get their programming through a direct broadcast satellite (DBS) provider. The provider selects the programs and broadcasts them to subscribers as a set package. Basically, the provider's goal is to bring hundreds or thousands of channels to the customer's television in a form that approximates the competition from Cable TV. Unlike earlier programming, now the provider's broadcast is completely digital, which means it has a high picture and stereo sound quality.

Early satellite television was broadcast in C-band radio in the 3.4-GHz to 7-GHz frequency range. the Digital broadcast satellite transmits the programming in the Ku frequency range of 10 GHz to 14GHz.

There are five major components For a DTH network to be transmitted and received: the broadcasting center, encryption and transmission, the satellite dish and the receiver.

### a. The broadcast center

The broadcast center is the central hub of the DTH system. At the broadcast center or the Payout and Uplink location, the television provider receives signals from various programming sources, compresses I using digital compression, if necessary scrambles it and beams a broadcast signal to the satellite by the broadcast center. Turnaround channels usually have a distribution

center that beams their program to a geostationary satellite. The broadcast center uses large satellite dishes to pick up the analog and digital signals from several sources. The broadcast center converts all the programming into a high-quality, uncompressed digital stream. At this point, the stream contains an infinite quantity of data, about 270 Mbps per second for each channel. In order to transmit the signal from there, the broadcast center has to squeeze it. Otherwise, it would be very large for the satellite to handle. The providers use the MPEG-2 compressed video format, the same format used to store movies on DVDs. A provider can reduce the 270-Mbps stream to about 3 or 10 Mbps with MPEG-2 compression (depending on the type of programming). That crucial step has made DTH service a success. With digital compression, a typical satellite can transmit about 200 channels and without digital compression, it can transmit about only 30 channels. At the broadcast center, the high-quality digital stream of video goes through an MPEG-2 encoder, which converts the programming to the MPEG-2 video of the correct size and format for the satellite receiver in your house.

#### b. Encryption & transmission

After the video is compressed, the provider needs to encrypt it in order to keep people from obtaining it for free. Encryption disarranges the digital data in such a way, that it can only be decrypted (converted back into usable data), if the receiver has the correct decoding satellite receiver with decryption algorithm and security keys. Once the signal is compressed and encrypted, the broadcast center beams it directly to its satellites. The satellite picks up the signal, amplifies it and beams it back to Earth, where the consumer can pick it up.

#### c. The satellite dish

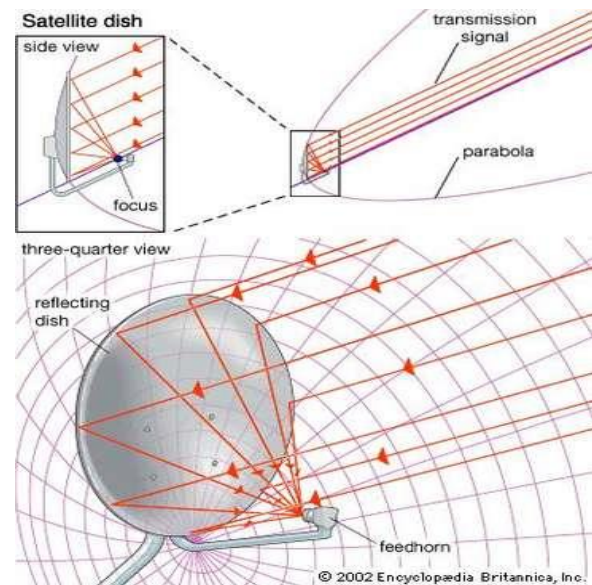
A satellite dish is a special kind of antenna, that is designed to focus on a specific broadcast source. The standard dish consists of a bowl-shaped (parabolic) surface and a central feed horn. A controller sends the signal through the horn to transmit it, and the dish focuses the signal into a relatively narrow beam.

The dish on the receiving end can't transmit the information, it can only receive it. The receiving dish works in the exact opposite way of the transmitting end. When a beam hits the curved dish, the bowl-shape reflects the radio signal inward onto a particular point, just like a concave mirror focuses light onto a particular point.

The curved dish focuses the incoming radio waves onto the feed horn. In this case, the point is the dish's feed horn, which passes the signal onto the receiving equipment. In an ideal setup, there aren't any major obstacles between the satellite and the dish, so that the dish receives a clear signal.

In some systems, the dish needs to pick up the signals from two or more satellites at the same time. The satellites may be close enough together that the regular dish with a single horn can pick up signals from both satellites. This compromises quality somewhat, because the dish is not aimed directly at one or more of the satellites. A new dish design uses two or more horns to pick up the different

satellite signals. As the beams from different satellites hit the curved dish, they reflect at different angles so that one beam hits one of the horns and another beam hits another horn. The central element in the feed horn is the low noise block down converter (LNB).



The LNB amplifies the signal bouncing off the dish and filters out the noise from the signal (signals not carrying programming). The LNB passes the amplified, filtered signal to the satellite receiver inside the consumer's house.

#### d. The receiver

The end component in the entire satellite DTH system is the receiver. The receiver has four essential jobs:

It de-scrambles or decodes the encrypted signal. In order to unlock the signal, it needs the proper decoder chip for that programming package. The provider can communicate with the chip, via the satellite signal, to make required adjustments to its decoding programs. The provider may occasionally send signals that distort illegal de-scramblers, as an electronic countermeasure (ECM) against illegal users.

It takes the digital MPEG-2 signal and converts it into an analog format that a standard television can recognize easily. Since the receiver spits out only one channel at a time, you can't tape one program and watch another program. You also can't watch two different programs on two TVs hooked up with the same receiver. In order to do these things, which are standard conventional cable, you need to buy an additional receiver for that.

Some receivers have other features as well. They pick up a programming schedule signal from the provider and present the information in an onscreen programming guide. Many receivers have parental lock-out options, and some have built-in Digital Video Recorders (DVRs), which allow you to pause live television or record it on a hard drive. While digital broadcast satellite service is still lacking some of the basic features of conventional cable (for example -the ability to easily split signals between different TVs and VCRs) but its high-quality picture, varied programming

selection, and extended service areas make it a good alternative for some. With the rise of digital cable, which also has improved picture quality and extended channel selection, the Television war is really heating up.

#### D. ADVANTAGES OF DTH TECHNOLOGY

- The main advantage is that this technology is beneficial to everyone equally. As the process is wireless, this system can be used in all remote areas.
- High-quality video and audio which are cost effective due to the absence of mediators.
- Almost 4000 channels can be viewed along with 2000 radio channels in DTH. Thus, the world's entire information including news and entertainment is available to you at home in high-quality.
- As there are no mediators, a complaint can be directly expressed to the provider by the viewer.
- With a single DTH service, you will be able to use digital quality audio, video and high-speed broadband.

#### E. RECENT DEVELOPMENTS

With the advent of HDTV many changes took place in DTH world, to understand it we should learn about the HDTV.

##### a. HDTV

HDTV Stands for "High Definition Television". HDTV is a high-quality video standard developed to replace older video formats like SDTV (standard definition television). While HDTV's video quality is one of the most noticeable improvements over standard definition television. HDTV includes the other important improvements as well. First of all, the HDTV signal is a digital signal. Instead of an analog signal, used by traditional NTSC broadcasts, HDTV is always digital signal. This eliminates analog interference caused by magnetic fields and electrical currents. Secondly, HDTV uses a different aspect ratio than SDTV, While previous broadcasts used a 4:3 ratio (4 units wide for every 3 units tall) but HDTV uses a ratio of 16:9. This wider aspect ratio more closely emulates how humans see the world, to making the image appear more realistic. The HDTV ratio is also better for watching widescreen movies, which are recorded in widescreen.

True to its name, high definition television offers a much higher resolution than SDTV. While a typical analog broadcast in the U.S. contains a maximum number of 525 horizontal lines of resolution, an HDTV signal supports up to 1080. The three formats used by HDTV are 1080i (interlaced), 720p and 1080p (progressive). HDTV's higher resolution produces images that are much finer and contain more color and more detail than previous formats. HDTV also provides a higher

Quality digital audio signal than SDTV and supports up to six audio channels compared to the two channels allowed previously in HDTV.

To watch HDTV, you need an HDTV compatible TV and a means of receiving an HDTV signal. HDTVs come in both 4:3 and 16:9 formats (for backward compatibility). Some HDTVs include HDTV tuners for receiving over-the-air broadcasts, but others HDTVs require the receiver to be bought separately. Fortunately, most satellite and cable TV companies offer HDTV-compatible boxes with their digital service plans.

##### b. Pause/Record/Rewind live tv

This makes the DTH more interesting, One of the biggest benefits of the Advanced HDPVR is that you can pause, record and rewind live TV. It really makes the most of your viewing experience, You can choose to record it at any time and if you have been watching from the beginning, the complete program will be added to the PVR list.

Live program recording when you turn on your TV, your Advanced HDPVR will start recording your current channel or current show. The recording will be saved to a special temporary part of the disk, allowing you to rewind or pause it. You just have to buy a set top box with storage capacity which is a bit expensive.

##### c. 3D TV

3D television or 3D TV is television that conveys depth perception to the viewer by employing techniques such as stereoscopic display, multi-view display, 2D-plus-depth, or any other form of 3D display. Most modern 3D TV sets use an active shutter 3D system or a polarized 3D system, and some are autostereoscopic without the need of glasses.

##### d. Internet through DTH

Satellite Internet is very popular in the US and some parts of Europe in country / hilly areas where setting up lines is time-consuming and expensive. It could be a boon for India if it is implemented properly.

##### e. Advent of 4K TV

Technically speaking, 4K has a very specific display resolution of 4096 x 2160. This is the resolution of all 4K recordings, though many people use 4K to refer to any display resolution that has roughly 4000 horizontal pixels and Ultra HD TVs have a resolution faintly lower than that - 3840 x 2160. That is exactly four times higher than the full HD resolution of 1920 x 1080.

#### F. CONCLUSION

This paper described the needs that demand continued development of DTH and explain some background on who is involved and what is currently happening in bringing DTH world. DTH has made the hopes of the people of urban areas to come true. DTH provide the wide thinking of rural people which helps to develop the culture of society DTH connects to every part of the country and provides desire information communication, education, and entertainment to next level with just one click of a button.

## G. REFERENCES

- [1]. Pattan, Bruno, Satellite Systems: Principles and Technologies. Berlin: Springer Science & Business Media.
- [2]. "Performance Indicators Reports". Telecom Regulatory Authority of India.
- [3]. "What is DTH?". [www.rediff.com](http://www.rediff.com).
- [4]. Gupta, Surajeet Das, "10 years of DTH in India.
- [5]. Prasar Bharati DTH moving to pay mode?
- [6]. Big TV launched in August 2008. BIG TV crosses 10 lakhs Subscriber Mark Within The 90 Days of Launch.
- [7]. Discovery launches India's first high definition channel. [www.afaqs.com](http://www.afaqs.com).