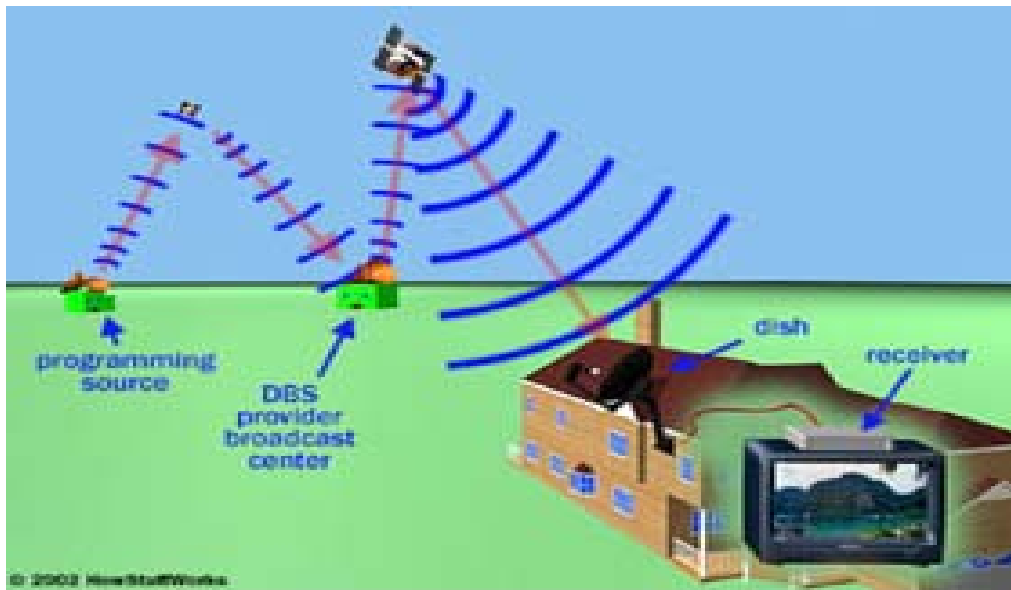


DIRECT TO HOME TELEVISION (DTH)

Today, most satellite TV customers in developed television markets get their programming through a direct broadcast satellite (DBS) provider, such as DISH TV or DTH platform. 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 the customer's television in a form that approximates the competition from Cable TV. Unlike earlier programming, the provider's broadcast is completely digital, which means it has high picture and stereo sound quality. Early satellite television was broadcast in C-band - radio in the 3.4-gigahertz (GHz) to 7-GHz frequency range. Digital broadcast satellite transmits programming in the Ku frequency range (10 GHz to 14 GHz). There are five major components involved in a direct to home (DTH) satellite system: the programming source, the broadcast center, the satellite, the satellite dish and the receiver.



THE COMPONENTS

Programming sources are simply the channels that provide programming for broadcast. The provider (the DTH platform) doesn't create original programming itself; it pays other companies (HBO, for example, or ESPN or STAR TV or Sahara etc.) for the right to broadcast their content via satellite. In this way, the provider is kind of like a broker between the viewer and the actual programming sources. (Cable television networks also work on the same principle.) The broadcast center is the central hub of the system. At the broadcast center or the Playout & Uplink location, the television provider receives signals from various programming sources, compresses using digital compression, if necessary scrambles it and beams a broadcast signal to the satellite being used by it. The satellites receive the signals from the broadcast station and rebroadcast them to the ground. 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 television. Lets look at each step in the process in greater detail.

THE PROGRAMMING

Satellite TV providers get programming from two major sources: International turnaround channels (such as HBO, ESPN and CNN, STAR TV, SET, B4U etc) and various local channels (SaBe TV, Sahara TV, Doordarshan, etc). Most of the turnaround channels also provide programming for cable television, so sometimes some of the DTH platforms will add in some special channels exclusive to itself to attract more subscriptions.

Turnaround channels usually have a distribution center that beams their programming to a geostationary satellite. The broadcast center uses large satellite dishes to pick up these analog and digital signals from several sources.

THE BROADCAST CENTER

The broadcast center converts all of this programming into a high-quality, uncompressed digital stream. At this point, the stream contains a vast quantity of data — about 270

megabits per second (Mbps) for each channel. In order to transmit the signal from there, the broadcast center has to compress it. Otherwise, it would be too big for the satellite to handle. The providers use the MPEG-2 compressed video format — the same format used to store movies on DVDs. With MPEG-2 compression, the provider can reduce the 270-Mbps stream to about 3 or 10 Mbps (depending on the type of programming). This is the crucial step that has made DTH service a success. With digital compression, a typical satellite can transmit about 200 channels. Without digital compression, it can transmit about 30 channels. At the broadcast center, the high-quality digital stream of video goes through an MPEG-2 encoder, which converts the programming to MPEG-2 video of the correct size and format for the satellite receiver in your house.

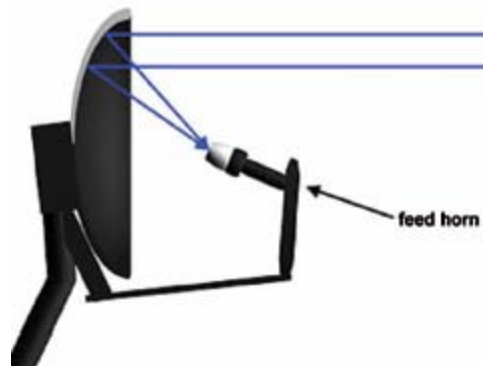
ENCRYPTION & TRANSMISION

After the video is compressed, the provider needs to encrypt it in order to keep people from accessing it for free. Encryption scrambles 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 one of its satellites. The satellite picks up the signal, amplifies it and beams it back to Earth, where viewers can pick it up.

THE DISH

A satellite dish is just a special kind of antenna designed to focus on a specific broadcast source. The standard dish consists of a parabolic (bowl-shaped) surface and a central feed horn. To transmit a signal, a controller sends it through the horn, and the dish focuses the signal into a relatively narrow beam. The dish on the receiving end can't transmit information; it can only receive it. The receiving dish works in the exact opposite way of the transmitter. When a beam hits the curved dish, the parabola 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 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 the dish receives a clear signal. In some systems, the dish needs to pick up signals from two or more satellites at the same time. The satellites may be close enough together that a regular dish with a single horn can pick up signals from both. This compromises quality somewhat, because the dish isn't aimed directly at one or more of the satellites. A new dish design uses two or more horns to pick up 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 a different horn.

The central element in the feed horn is the low noise blockdown converter, or LNB. The LNB amplifies the signal bouncing off the dish and filters out the noise (signals not carrying programming). The LNB passes the amplified, filtered signal to the satellite receiver inside the viewer's house.

THE RECEIVER

The end component in the entire satellite TV system is the receiver. The receiver has four essential jobs: It de-scrambles the encrypted signal. In order to unlock the signal, the receiver needs the proper decoder chip for that programming package. The provider can communicate with the chip, via the satellite signal, to make necessary adjustments to its decoding programs. The provider may occasionally send signals that disrupt illegal de-scramblers, as an electronic counter measure (ECM) against illegal users.

It takes the digital MPEG-2 signal and converts it into an analog format that a standard television can recognize. Since the receiver spits out only one channel at a time, you can't tape one program and watch another. You also can't watch two different programs on two TVs hooked up to the same receiver. In order to do these things, which are standard on conventional cable, you need to buy an additional receiver. Some receivers have a number of other features as well. They pick up a programming schedule signal from the provider and present this information in an onscreen programming guide. Many receivers have parental lock-out options, and some have built-in Digital Video Recorders (DVRs), which let you 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 (the ability to easily split signals between different TVs and VCRs, for example), 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 TV war is really heating up. Just about anything could happen in the next 10 years as all of these television providers battle it out.