

A review of the implementation of HDTV technology over SDTV technology

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Abstract— Standard Definition television (SDTV) Standard-Definition Television is a kind of television system that provides lower resolution than HDTV and higher resolution than analog TV does. The word 'SDTV' is generally used at the digital television broadcasting system that has a similar or little bit higher state of resolution to the 'analog television system'. Digital broadcasting system uses digital signals when they receive sound and movie. It is compared to analog TV that uses analog signals. High Definition television (HDTV) High-definition television (HDTV) provides a resolution that is substantially higher than that of standard-definition television.

I. INTRODUCTION

Digital television

Digital television is a new way of broadcasting television signals. It is different from today's way of doing it, known as 'analog.' In analog broadcasting the signal is in the form of a continuous wave form whereas a digital signal is in the form of discrete bits of information.

Digital television is better than analog for several reasons.

□□ Firstly, it provides clearer, sharper pictures. There is none of the interference and ghosting that people get today, especially if they live in builtup areas or hilly terrain.

□□ Secondly, it offers a wide screen format, such as we are used to seeing at the movies.

□□ Thirdly, digital television is very flexible. One moment you can be watching television; the next moment surfing the Internet; and next doing some home shopping. And it offers different types of television viewing – sometimes

widescreen movie quality pictures, other times multiple camera angles (of the Grand Prix, for example) which you choose between.

□□ And fourthly, with digital television, you can fit many more television channels into a given amount of 'radiofrequency spectrum'.

The change to digital television will also enable viewers to receive datacasting and enhanced television services which may include subtitles, captioning, further information on programming and a choice of viewing angles.

benefits with digital television

Digital television is a far more efficient and flexible transmission system than the current analog system. It allows broadcasters to offer viewers a range of new and different services. Digital television features can include:

- Much improved reception capability, including the elimination of ghosting and other transmission errors
- A 16 x 9 aspect ratio, or screen shape. This is also known as widescreen.

It is similar to the aspect ratio that is widely used in the cinema.

• Standard Definition television (SDTV)

• High Definition television (HDTV)

• High quality audio

• Electronic Program Guides (EPGs). A basic EPG can be used by viewers to navigate between channels, identify the currently screening program and the next program ('now and next') on each channel. More

sophisticated EPGs can be used to set reminders for program viewing, provide a short synopsis of the content of programs, identify programming in advance for several days, search for programs by genre, and provide access to some enhancements

- Multichannel programs
- Radio programs
- Program enhancements on separate channels to the primary program, eg, additional camera angles on a sports match, statistics about a player, or additional information about a segment in a lifestyle or magazine program
- Broadcasters will be allowed to broadcast more than one channel when certain events, such as sporting matches, extend beyond time due to circumstances beyond the broadcasters' control, and overlap a regularly scheduled news program. This will allow viewers the option of continuing to watch the end of the event or the news bulletin

• Over time, interactive television services and datacasting services, including selected Internet services, home shopping, computer games, etc will be provided by broadcasters and datacasters

Equipment required to receive digital television

- A fully integrated Digital Television or,
- A set-top box decoder to convert the digital signal back to analog form for existing analog televisions.

Viewers will be able to access most of the enhanced features of the digital signal, including clearer pictures and improved reception in built-up areas. The set-top box, however, will not cause an analog television to display a high definition picture. With the addition of a set-top box, an analog television will either display the images in the current 4:3 aspect ratio (width relative to height) or in a widescreen 16:9 ratio with the addition of black bands above and below the image.

Integrated Digital television receiver (IDTV)

This is a television set which contains all the components necessary to receive and display digital transmissions. Integrated digital television receivers will generally be distinguished by wide screens, high level audio capability and high resolution displays. They will not require a set top box.

Standard Definition television (SDTV)

Standard-Definition Television is a kind of television system that provides lower resolution than HDTV and higher resolution than analog TV does. The word 'SDTV' is generally used at the digital television broadcasting system that has a similar or little bit higher state of resolution to the 'analog television system'.

Digital broadcasting system uses digital signals when they receive sound and movie. It is compared to analog TV that uses analog signals.

It is a television system that uses a resolution that is not considered to be either high-definition television (HDTV 720p, 1080i, and 1080p) or enhanced-definition television (EDTV 480p). The two common SDTV signal types are 576i, with 576 interlaced lines of resolution, derived from the European-developed PAL and SECAM systems; and 480i based on the American National Television System Committee NTSC system.

According to a ATSC standard, SDTV broadcasts in three ways. First, at ratio of length and width 16:9 and resolution 704x480. Second, at ratio 4:3 and resolution 704x480. Lastly, at ratio 4:3 and resolution 640x480. The first one has best quality, second one is next, and the last one is the worst. The Screen's frame can be 24, 30, 60 per second. These are similar level with DVD.

SDTV has a similar state of resolution compared to analog TV. But SDTV is more vivid than analog TV because it has less noise. And it has better sound. The point that SDTV uses a digital broadcasting system makes SDTV have many

accompanying functions. For example, multitasking, electronic program guide, and so on. These functions are impossible at analog TV. Compared to HDTV, it has lower resolution. But in fact, HDTV programs are not spread widely yet, and the cheaper price of SDTV makes consumers to use SDTV.

High Definition television (HDTV)

High-definition television (HDTV) provides a resolution that is substantially higher than that of standard-definition television.

HDTV broadcast systems are identified with three major parameters:

□□**Frame size** in pixels is defined as number of horizontal pixels × number of vertical pixels, for example 1280 × 720 or 1920 × 1080. Often the number of horizontal pixels is implied from context and is omitted, as in the case of 720p and 1080p.

□□**Scanning system** is identified with the letter p for progressive scanning or i for interlaced scanning.

□□**Frame rate** is identified as number of video frames per second. For interlaced systems an alternative form of specifying number of fields per second is often used.

If all three parameters are used, they are specified in the following form: [frame size][scanning system][frame or field rate] or [frame size]/[frame or field rate][scanning system]. Often, frame size or frame rate can be dropped if its value is implied from context. In this case the remaining numeric parameter is specified first, followed by the scanning system.

For example, 1920×1080p25 identifies progressive scanning format with 25

frames per second, each frame being 1,920 pixels wide and 1,080 pixels high.

The 1080i25 or 1080i50 notation identifies interlaced scanning format with 25

frames (50 fields) per second, each frame being 1,920 pixels wide and 1,080 pixels high.

At a minimum, HDTV has twice the linear resolution of standard-definition television (SDTV), thus showing greater detail than either analog television or

regular DVD. The technical standards for broadcasting HDTV also handle the 16:9 aspect ratio images. A very high resolution source may require more bandwidth than available in order to be transmitted without loss of fidelity. The lossy compression that is used in all digital HDTV storage and transmission systems will distort the received picture, when compared to the uncompressed source.

The Differences Between Standard & HDTV

TV display standards are constantly evolving. One of the most dramatic changes

in the evolution of picture quality in home TV sets was the move from a standard

picture to high-definition. People who watch HDTV programs or media on an HD

television set will enjoy increased picture and audio quality.

Clarity of Image

□□One of the primary differences between an HDTV set and a standard

television set is how many lines are displayed on the set. More lines

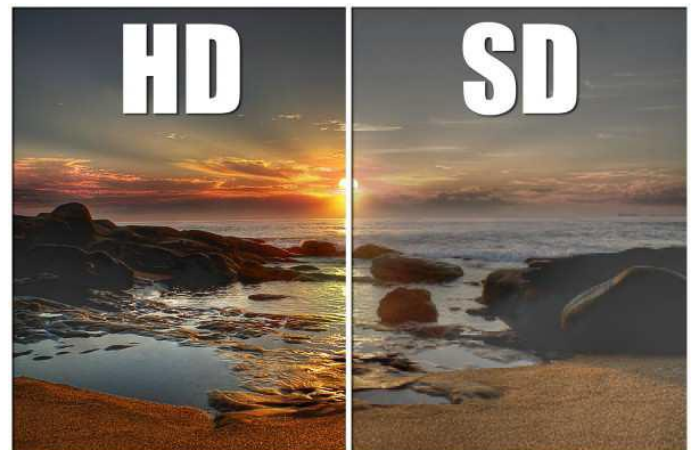
results in a sharper image with increased definition. A regular North

American television set can display 486 lines on the screen. HDTVs

typically deliver either 720 or 1080 lines, depending on the quality of the

set. The best image displayed on an HDTV in 2011 is indicated as 1080p,

which means that the set displays 1080 lines on the screen.



Color

□□The overall quality of an image on a TV screen is not just related to the number of lines that fit on the set. On top of that, the quality of the color has a large impact on how good the image subjectively looks. On an HDTV, more colors are displayed than on standard TVs. This results in brighter, richer and more complex colors than you see on an older TV. A larger dynamic range on an HDTV also allows for brighter and darker colors.

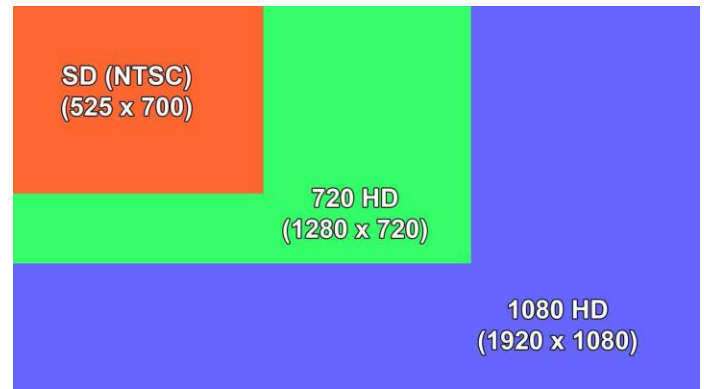
Audio

□□Audio quality is also improved when you have HDTV instead of regular TV. When a HD signal is delivered to your television, it is delivered with a 5.1 Dolby Digital audio signal. This is the same type of audio used in movie theaters. This creates a clear, defined, rich sound-scape, better than what is achieved through the old stereo signal sent to standard televisions. The difference becomes especially noticeable when your HDTV is hooked up to a surround-sound system.

Aspect Ratio

□□Another large difference between these two types of television is something called "aspect ratio." Basically, this just means the relation of the width of the TV to its height. Standard televisions are viewed in a 4:3 display. HDTVs are often called "widescreen" because of the wider 16:9 ratio. This format is much closer to the one used in movie theaters, and it allows the eye to take in more of the image.

Variation in Resolution



MERITS AND DEMERITS

Merits of SDTV:

- SDTV is more vivid than analog TV because it has less noise.
- It has better sound.
- SDTV have many accompanying functions. For example, multitasking, electronic program guide, and so on. These functions are impossible at analog TV.

Demerits of SDTV:

- Compared to HDTV, it has lower resolution.

Merits of HDTV:

- HDTV has twice the linear resolution of standard-definition television (SDTV), thus showing greater detail than either analog television or regular DVD.
- Effective image resolution is increased.

Demerits of HDTV:

- A very high resolution source may require more bandwidth than available in order to be transmitted without loss of fidelity.
- The lossy compression that is used in all digital HDTV storage and transmission systems will distort the received picture, when compared to the uncompressed source.

Implementation of HDTV

The HDTV production chain typically begins with a high-definition camera, or a project shot on film then converted to a digital format. However other means are possible. Much of Tim Burton's recent stop-motion feature, *The Corpse Bride* was shot with a Canon digital still camera, and then transferred to digital video for

editing. Many commercials, cartoons, and full-length features have been created solely with 2D and/or 3D animation software.

RESOLUTION: As mentioned the TV screen is made of lines. More the Number of lines, better the detail. The conventional TV has 625 lines. When the HDTV was introduced it had 1250 (HD-MAC) lines which provided sufficiently high resolution as compared to film. Presently (and when I say *presently* it means the DIGITAL era when the things change while you write about them), there are various standards. Among them the most talked about are with 780 lines and 1080 lines. We can not go in detail as it would add so many complicated technical terms. It can be summarized that on the front of resolution too the TV is becoming a match for the films.

CONTRAST: This is tricky to discuss. Just visit a high tech shop and look At the latest Plasma after reducing the colours to zero. Compare it with your old black and white photographs. You can get your answer.

FLICKER: It can be safely said that this problem has been almost Completely tackled with. In modern display devices whether plasma or LCD, flicker is virtually absent.

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