Radio

Radio is a transmission or reception of electromagnetic radiation in the radio frequency range. The term is commonly applied also to the equipment used, especially to the radio receiver.

## Development of Radio Technology

Radio is based on the studies of James Clerk Maxwell, who developed the mathematical theory of electromagnetic waves, and Heinrich Hertz, who devised an apparatus for generating and detecting them. Guglielmo Marconi, recognizing the possibility of using these waves for a wireless communication system, gave a demonstration (1895) of the wireless telegraph, using Hertz's spark coil as a transmitter and Edouard Branly's coherer (a radio detector in which the conductance between two conductors is improved by the passage of a high-frequency current) as the first radio receiver. The effective operating distance of this system increased as the equipment was improved, and in 1901, Marconi succeeded in sending the letter across the Atlantic Ocean using Morse code. In 1904, Sir John A. Fleming developed the first vacuum electron tube, which was able to detect radio waves electronically. Two years later, Lee de Forest invented the audion, a type of triode, or three-element tube, which not only detected radio waves but also amplified them.

Radio telephony - the transmission of music and speech - also began in 1906 with the work of Reginald Fessiden and Ernst F. W. Alexanderson, but it was not until Edwin H. Armstrong patented (1913) the circuit for the regenerative receiver that long-range radio reception became practicable. The major developments in radio initially were for ship-to-shore communications. Following the establishment (1920) of station KDKA at Pittsburgh [Pennsylvania](http://en.wikipedia.org/wiki/Pittsburgh,_Pennsylvania), the first commercial broadcasting station in the United States, technical improvements in the industry increased, as did radio's popularity. In 1926 the first broadcasting network was formed, ushering in the golden age of radio. Generally credited with creating the first modern broadband FM system, Armstrong built and operated the first FM radio station, KE2XCC, in 1938. The least expensive form of entertainment during the Great Depression, the radio receiver became a standard household fixture, particularly in the United States. Subsequent research gave rise to countless technical improvements and to such applications as radio facsimile, radar and television. The latter changed radio programming drastically, and the 1940s and 50s witnessed the migration of the most popular comedy and drama shows from radio to television. Radio programming became mostly music and news and. to a lesser extent, talk shows. The turn of the century saw a potential rebirth for radio as mobile digital radio entered the market with a satellite-based subscription service in Europe (1998) and in the United States (2000). Two years later, a land-based digital radio subscription service was inaugurated in the United States.

Radios that combine transmitters and receivers are now widely used for communications. Police and military forces and various businesses commonly use such radios to maintain contact with dispersed individuals or groups. Citizens band (CB) radios, two-way radios operating at frequencies near 27 megahertz, most typically used in vehicles for communication while travelling, became popular in the 1970s. Cellular telephones, despite the name, are another popular form of radio used for communication.

The prime purpose of radio is to convey information from one place to another through the intervening media (i.e., air, space, no conducting materials) without wires. Besides being used for transmitting sound and television signals, radio is used for the transmission of data in coded form. In the form of radar it is used also for sending out signals and picking up their reflections from objects in their path. Long-range radio signals enable astronauts to communicate with the earth from the moon and carry information from space probes as they travel to distant planets. For navigation of ships and aircraft the radio range, radio compass (or direction finder), and radio time signals are widely used. Radio signals sent from global positioning satellites can also be used by special receivers for a precise indication of position. Digital radio, both satellite and terrestrial provides improved audio clarity and volume. Various remote-control devices, including rocket and artificial satellite operation systems and automatic valves in pipelines, are activated by radio signals. The development of the transistor and other microelectronic devices led to the development of portable transmitters and receivers. Cellular and cordless telephones are actually radio transceivers. Many telephone calls routinely are relayed by radio rather than by wires; some are sent via radio to relay satellites. Some celestial bodies and interstellar gases emit relatively strong radio waves that are observed with radio telescopes composed of very sensitive receivers and large directional antennas.

~ 4238

**Comments:**

**a spark coil** - катушка зажигания

**to usher in** - вводить

**drastically** - решительно

**to witness**- свидетельствовать, удостоверять

**dispersed** – разбросанный

**a probe** - зонд

**to relay** – передавать, транслировать

**a celestial body** – небесное тело

**interstellar** – межзвездный

## Uses of Radio

There are a number of uses of radio.

AM broadcast radio sends music and voice in the MF radio spectrum. AM radio uses amplitude modulation, in which louder sounds at the microphone causes wider fluctuations in the transmitter power while the transmitter frequency remains unchanged. Transmissions are affected by static because lightning and other sources of radio add their radio waves to the ones from the transmitter.

FM broadcast radio sends music and voice, with higher fidelity than AM radio. In frequency modulation louder sounds at the microphone cause the transmitter frequency to fluctuate farther, the transmitter power stays constant. FM is transmitted in the VHF radio spectrum. FM requires more radio frequency space than AM and there are more frequencies available at higher frequencies, so there can be more stations, each sending more information. Another effect is that shorter VHF radio waves act more like light, travelling in straight lines; hence the reception range is generally limited to about 50-100 miles. During unusual upper atmospheric conditions, FM signals are occasionally reflected back towards the Earth by the ionosphere, resulting in Long distance FM reception. FM receivers are subject to the capture effect, which causes the radio to only receive the strongest signal when multiple signals appear on the same frequency. FM receivers are relatively immune to lightning and spark interference.

FM Subcarrier services are secondary signals transmitted "piggyback" along with the main program. Special receivers are required to utilize these services. Analog channels may contain alternative programming, such as reading services for the blind, background music or stereo sound signals. In some extremely crowded metropolitan areas, the subchannel program might be an alternate foreign language radio program for various ethnic groups. Subcarriers can also transmit digital data, such as station identification, the current song's name, web addresses, or stock quotes. In some countries, FM radios automatically retune themselves to the same channel in a different district by using sub-bands.

Aviation voice radios use VHF AM. AM is used so that multiple stations on the same channel can be received. (Use of FM would result in stronger stations blocking out reception of weaker stations due to FM's capture effect). Aircraft fly high enough that their transmitters can be received hundreds of miles (kilometers) away, even though they are using VHF. Marine voice radios can use AM in the shortwave the HF radio spectrum for very long ranges or narrowband FM in the VHF spectrum for much shorter ranges.

Government, police, fire and commercial voice services use narrowband FM on special frequencies. Fidelity is sacrificed to use a smaller range of radio frequencies, usually five kilohertz of deviation (5 thousand cycles per second), rather than the 75 used by FM broadcasts and 25 used by TV sound.

Civil and military HF voice services use shortwave radio to contact ships at sea, aircraft and isolated settlements. Most use SSB, which uses less bandwidth than AM. SSB sounds like ducks quacking on an AM radio. Viewed as a graph of frequency versus power, an AM signal shows power where the frequencies of the voice add and subtract with the main radio frequency. SSB cuts the bandwidth in half by suppressing the carrier and (usually) lower sideband. This also makes the transmitter about three times more powerful, because it doesn't need to transmit the unused carrier and sideband. ~ 2974

**Comments:**

**AM** - amplitude modulation- амплитудная модуляция

**FM** - frequency modulation - частотная модуляция

**MF -** Medium Frequency (0.300 MHz to 3 MHz) - средняя частота

**immune** – невосприимчивый

**piggyback** – дополнительный

**stock quotes** – котировки на фондовом рынке

**versus** – в сравнении с

**to sacrifice**- приносить жертву, жертвовать

**VHF** - Very High Frequency (30 MHz to 300 MHz) – очень высокая частота

**HF** - High Frequency (3 MHz to 30 MHz) – высокая частота

**SSB** - single sideband – одна боковая частота

**a bandwidth -** полоса (частот); полоса пропускания (в системах связи - разность между максимальной и минимальной частотой в заданном диапазоне)

## Generation and Control of Radio-Frequency Power

The radio-frequency power required by a transmitter is practically always obtained from a vacuum-tube oscillator. Vacuum-tube oscillator is capable of converting direct current1 power into alternating-current2 energy of any desirable frequency up to 300,000,000 cycles or higher. Over the range of frequencies used in long-distance radio communication, i.e., 12 to 30,000 kilocycles, the power that can be obtained from vacuum-tube oscillators is in the order of tens to hundreds of kilowatts, the efficiency with which the direct-current power is transformed into alternating-current energy being in the neighborhood of 50 per cent or higher.

A number of other methods of obtaining radio-frequency energy have been used at one time or another during the history of radio. Among those are the high frequency alternator, the frequency multiplier, and the oscillatory spark discharge. The high frequency alternator is a special high-speed inductor-type alternator with many poles. Such alternators are capable of generating several hundreds of kilowatts with reasonable efficiency when operating at frequencies of 50,000 cycles of less. The frequency multiplier utilizes a moderately high frequency alternator from which the desirable radio frequency is obtained by the use of magnetic-type harmonic generators. In this way it is possible with an alternator giving a frequency of 5000 cycles to produce considerable quantities of power at frequencies of from 20,000 to 40,000 cycles. This type of arrangement at one time had a very prominent place in radio but now, has practically disappeared.

The oscillatory spark discharge was the earliest and for many years the only method known for the generating of radio-frequency power. In this type of transmitter a condenser is charged to a high potential, which then breaks down a spark gap, permitting an oscillatory discharge through an inductance, this process being repeated about one thousand times each second. The spark transmitter thus radiates a series of wave trains, each of which being a damped sinusoidal oscillation. This method is capable of generating large quantities of radio-frequency energy with good efficiency but is in disfavor because of the radiated waves being not simple sine waves but rather waves of a number of frequencies superimposedon each other. The result of excessive interference with radio signals being transmitted on slightly different frequencies.

Modulation.

The transmission of information by radio waves requires that some means be provided to control the radio waves by the desired intelligence. In radio telegraphy this control is obtained by turning the transmitter on and off in accordance with the dots and dashes of the telegraph code. In the radio telephony the transmission is effected by varying the amplitude of the radio-frequency wave in accordance with the pressure of the sound wave being transmitted. Thus the sound wave would be transmitted from a radio-telephone station by causing the amplitude of the radiated wave to vary. In the transmission of pictures by radio a similar method is employed, in which the amplitude of the wave radiated at any time is made proportional to the light intensity of the part of the picture that is being transmitted at that instant.

When the amplitude of the alternating - current wave is varied from time to time, the wave is said to be modulated. Thus the wave radiated from a radio-telephone station is modulated by the voice or sound wave, while during the transmission of a picture the modulation is in conformity with the light intensitiesof different portion of the picture, and in the case of radio-telegraphy the modulation is by the telegraph code. Except in the case of telegraphy, the modulation of the radio-frequency wave is usually performed by means of vacuum tubes that control the amplitude of the generated of radiated high-frequency energy in accordance with the intelligence to be transmitted. ~ 3338

**Comments:**

**a direct current (DC)** – 1) постоянный ток 2) прямой (однонаправленный) ток

**an alternating current (AC)** – переменный ток, электрический ток, меняющий своё направление с частотой 50 Гц - в России и 60 Гц - в США.

**an alternator** – генератор переменного тока, синхронный генератор

**a spark discharge** – искровой разряд

**a magnetic type harmonic generator** – генератор гармоник магнитного типа, генератор гармонических колебаний магнитного типа

**a spark gap** – искровой промежуток, искровой разрядник

**a wave train** – цуг волн, последовательность волн

**a damped sinusoidal oscillation** – убывающее синусоидальное колебание

**a sine wave** – гармоническая волна, синусоидальная волна

**to be in disfavor** – быть в немилости

**superimposed waves** – наложившиеся волны

**a conformity** – соответствие, сходство

**light intensities** – значения силы света

## Transmission and Reception of Radio Waves

For the propagation and interception of radio waves, a transmitter and receiver are employed. A radio wave acts as a carrier of information-bearing signals; the information may be encoded directly on the wave by periodically interrupting its transmission (as in dot-and-dash telegraphy) or impressed on it by a process called modulation. The actual information in a modulated signal is contained in its sidebands, or frequencies added to the carrier wave, rather than in the carrier wave itself. The two most common types of modulation used in radio are amplitude modulation (AM) and frequency modulation (FM). Frequency modulation minimizes noise and provides greater fidelity than amplitude modulation, which is the older method of broadcasting. Both AM and FM is analogue transmission systems, that is, they process sounds into continuously varying patterns of electrical signals which resemble sound waves. Digital radio uses a transmission system in which the signals propagate as discrete voltage pulses, that is, as patterns of numbers; before transmission, an analogue audio signal is converted into a digital signal, which may be transmitted in the AM or FM frequency range. A digital radio broadcast offers compact-disc-quality reception and reproduction on the FM band and FM-quality reception and reproduction on the AM band.

In its most common form, radio is used for the transmission of sounds (voice and music) and pictures (television). The sounds and images are converted into electrical signals by a microphone (sounds) or video camera (images), amplified, and used to modulate a carrier wave that has been generated by an oscillator circuit in a transmitter. The modulated carrier is also amplified, and then applied to an antenna that converts the electrical signals to electromagnetic waves for radiation into space. Such waves radiate at the speed of light and are transmitted not only by line of sight but also by deflection from the ionosphere.

Receiving antennas intercept part of this radiation, change it back to the form of electrical signals, and feed it to a receiver. The most efficient and most common circuit for radio-frequency selection and amplification used in radio receivers is the superheterodyne. In that system, incoming signals are mixed with a signal from a local oscillator to produce IFs that are equal to the arithmetical sum and difference of the incoming and local frequencies. One of those frequencies is applied to an amplifier. Because the IF amplifier operates at a single frequency, namely the intermediate frequency, it can be built for optimum selectivity and gain. The tuning control on a radio receiver adjusts the local oscillator frequency. If the incoming signals are above the threshold of sensitivity of the receiver and if the receiver is tuned to the frequency of the signal, it will amplify the signal and feed it to circuits that demodulate it, i.e., separate the signal wave itself from the carrier wave.

There are certain differences between AM and FM receivers. In an AM transmission the carrier wave is constant in frequency and varies in amplitude (strength) according to the sounds present at the microphone; in FM the carrier is constant in amplitude and varies in frequency. Because the noise that affects radio signals is partly, but not completely, manifested in amplitude variations, wideband FM receivers are inherently less sensitive to noise. In an FM receiver, the limiter and discriminator stages are circuits that respond solely to changes in frequency. The other stages of the FM receiver are similar to those of the AM receiver but require more care in design and assembly to make full use of FM's advantages. FM is also used in television sound systems. In both radio and television receivers, once the basic signals have been separated from the carrier wave they are fed to a loudspeaker or a display device (usually a cathode-ray tube), where they are converted into sound and visual images, respectively. ~ 3358

**Comments:**

**a propagation** - распространение

**an interception** - перехватывание

**information-bearing signals** – сигналы, несущие информацию

**a sideband** - боковая полоса (частот)

**to resemble** - подходить, иметь сходство

**IF** - intermediate frequency - промежуточная частота

**a selectivity** – избирательность

**a gain** - коэффициент усиления

**a threshold** -порог

**manifested**- обнародованный

**a discriminator** – селектор, выделитель

**an assembly** - сборка, монтаж

**a cathode-ray tube** - электронно-лучевая трубка

## The Science of Radio Astronomy

One of the earliest modern investigations into extraterrestrial sources of radio waves was by Karl Guthe Jansky, an engineer with Bell Telephone Laboratories, in the early 1930s. The first object actually detected was the center of the Milky Way, followed by the sun. These early discoveries were confirmed by Grote Reber by 1938.

What was the nature of the discrete radio sources, or "radio stars'? Where were they, what were they, what were their properties, how many were there, how did they work and what was their significance in the Universe? Of parallel importance was the puzzle of how to devise new kinds of radio telescope which would elucidate these astronomical questions. Nikola Tesla in the Colorado Springs lab recorded cosmic waves emitting from interstellar clouds and red giant stars. He observed repeating signals conducted by his transceiver. He announced that he received extraterrestrial radio signals. But the scientific community did not believe him, and rejected Tesla's data. Tesla spent the latter part of his life trying to signal Mars.

Modern Radio Astronomy is a universally recognized subfield of astronomy. Just like in the visible, at low radio frequencies the sky is dominated by small bright sources, but the sources are typically active galaxies and supernova remnants rather than stars. Radio astronomy is the study of celestial phenomena through measurement of the characteristics of radio waves emitted by physical processes occurring in space. Radio waves have a much greater wavelength than light waves. In order to receive good signals, radio astronomy requires large antennas, or arrays of smaller antennas all working together. Most radio telescopes use a parabolic dish to reflect the waves to a receiver which detects and amplifies the signal into usable data. This allows astronomers to see a region of the radio sky. If they take multiple scans of overlapping strips of the sky they can piece together an image ('mosaicking').

Radio astronomers use different types of techniques to observe objects in the radio spectrum. Instruments may simply be pointed at an energetic radio source to analyze what type of emissions it makes. The types of instruments being used depends on the weakness of the signal and the amount of detail needed. Radio telescopes may need to be extremely large in order to receive signals with large [signal-to-noise ratio](http://en.wikipedia.org/wiki/Signal-to-noise_ratio). Also since [angular resolution](http://en.wikipedia.org/wiki/Angular_resolution) is a function of the diameter of the "[objective](http://en.wikipedia.org/wiki/Objective_%28optics%29)" in proportion to the wavelength of the electromagnetic radiation being observed, [radio telescopes](http://en.wikipedia.org/wiki/Radio_telescope) have to be much larger in comparison to their [optical](http://en.wikipedia.org/wiki/Optical_telescope) counterparts. For example a 1 meter diameter optical telescope is two million times bigger than the wavelength of light observed giving it a resolution of a few [arc seconds](http://en.wikipedia.org/wiki/Arc_second), whereas a radio telescope "dish" many times that size may, depending on the wavelength observed, may only be able to resolve an object the size of the full moon (30 minutes of arc).

Radio astronomy has led to substantial increases in astronomical knowledge, particularly with the discovery of several classes of new objects, including [pulsars](http://en.wikipedia.org/wiki/Pulsar), [quasars](http://en.wikipedia.org/wiki/Quasar) and [radio galaxies](http://en.wikipedia.org/wiki/Radio_galaxy). This is because radio astronomy allows us to see things that are not detectable in optical astronomy. Such objects represent some of the most extreme and energetic physical processes in the universe. Radio astronomy is also partly responsible for the idea that [dark matter](http://en.wikipedia.org/wiki/Dark_matter) is an important component of our universe; radio measurements of the rotation of [galaxies](http://en.wikipedia.org/wiki/Galaxy) suggest that there is much more mass in galaxies than has been directly observed. The [cosmic microwave background radiation](http://en.wikipedia.org/wiki/Cosmic_microwave_background_radiation) was also first detected using radio telescopes. However, radio telescopes have also been used to investigate objects much closer to home, including observations of the [Sun](http://en.wikipedia.org/wiki/Sun) and solar activity, and radar mapping of the [planets](http://en.wikipedia.org/wiki/Solar_system). And still there is a lot to be discovered. ~ 3299

**Comments:**

**extraterrestrial** – внеземной

**Milky Way-**млечный путь

**to elucidate –** объяснять, разъяснять

**red giant –** красный гигант - звезда, в конце своей жизни, относительно холодная (ее температура 2000-4000 K), она обладает высокой красной светимостью.

**a transceiver –** приемник-передатчик

**supernova –** сверхновая (звезда), заканчивающая свою эволюцию в катастрофическом взрывном процессе. Вспышка при этом может быть на несколько порядков больше чем в случае новой звезды. Столь мощный взрыв – это следствие процессов, протекающих в звезде на последний стадии эволюции.

**to overlap –** перекрывать, нахлестывать, покрывать

**a counterpart-** копия, дубликат

**an arc second –** угловое разрешение **—** минимальный угол между объектами, который может различить [телескоп](http://ru.wikipedia.org/wiki/%D0%A2%D0%B5%D0%BB%D0%B5%D1%81%D0%BA%D0%BE%D0%BF).

[**pulsar**](http://en.wikipedia.org/wiki/Pulsar) **–** пульсар - астрономический объект, испускающий мощные, строго периодические импульсы электромагнитного излучения.

[**quasar**](http://en.wikipedia.org/wiki/Quasar) **–** квазар **-** класс внегалактических объектов, отличающихся очень высокой [светимостью](http://ru.wikipedia.org/wiki/%D0%A1%D0%B2%D0%B5%D1%82%D0%B8%D0%BC%D0%BE%D1%81%D1%82%D1%8C) и малым [угловым размером](http://ru.wikipedia.org/wiki/%D0%A3%D0%B3%D0%BB%D0%BE%D0%B2%D0%BE%D0%B9_%D1%80%D0%B0%D0%B7%D0%BC%D0%B5%D1%80).

[**radio galaxy**](http://en.wikipedia.org/wiki/Radio_galaxy) **радиогалактика**— тип [галактик](http://ru.wikipedia.org/wiki/%D0%93%D0%B0%D0%BB%D0%B0%D0%BA%D1%82%D0%B8%D0%BA%D0%B0), который обладает намного большим [радиоизлучением](http://ru.wikipedia.org/wiki/%D0%A0%D0%B0%D0%B4%D0%B8%D0%BE%D0%B8%D0%B7%D0%BB%D1%83%D1%87%D0%B5%D0%BD%D0%B8%D0%B5), нежели обычные галактики. Радиоизлучение наиболее «ярких» радиогалактик превышает их оптическую [светимость](http://ru.wikipedia.org/wiki/%D0%A1%D0%B2%D0%B5%D1%82%D0%B8%D0%BC%D0%BE%D1%81%D1%82%D1%8C)..

[**dark matter**](http://en.wikipedia.org/wiki/Dark_matter) – скрытая масса (также тёмная материя, тёмное вещество, [тёмная энергия](http://ru.wikipedia.org/wiki/%D0%A2%D1%91%D0%BC%D0%BD%D0%B0%D1%8F_%D1%8D%D0%BD%D0%B5%D1%80%D0%B3%D0%B8%D1%8F))— общее название совокупности астрономических объектов, недоступных прямым наблюдениям современными средствами астрономии (то есть не испускающие [электромагнитного излучения](http://ru.wikipedia.org/wiki/%D0%AD%D0%BB%D0%B5%D0%BA%D1%82%D1%80%D0%BE%D0%BC%D0%B0%D0%B3%D0%BD%D0%B8%D1%82%D0%BD%D0%BE%D0%B5_%D0%B8%D0%B7%D0%BB%D1%83%D1%87%D0%B5%D0%BD%D0%B8%D0%B5) достаточной для наблюдений интенсивности), но наблюдаемым косвенно по [гравитационным](http://ru.wikipedia.org/wiki/%D0%93%D1%80%D0%B0%D0%B2%D0%B8%D1%82%D0%B0%D1%86%D0%B8%D1%8F) эффектам, оказываемым на наблюдаемые объекты.

## Digital Radio

The oldest form of digital broadcast was spark gap telegraphy, used by pioneers such as Marconi. By pressing the key, the operator could send messages in Morse code by energizing a rotating commutating spark gap. Spark gap transmitters are now illegal, because their transmissions span several hundred megahertz. This is very wasteful of both radio frequencies and power.

The next advance was continuous wave telegraphy, or CW, in which a radio frequency produced by a vacuum tube electronic oscillator was switched on and off by a key. CW uses less than 100Hz of bandwidth. CW is still used, these days primarily by amateur radio operators (hams). Strictly, on-off keying of a carrier should be known as Interrupted Continuous Wave or ICW.

Radio teletypes usually operate on short-wave (HF) and are much loved by the military because they create written information without a skilled operator. They send a bit as one of two tones. Groups of five or seven bits become a character printed by a teletype. From about 1925 to 1975, radio teletype was how most commercial messages were sent to less developed countries. They are still used by the military and weather services.

Aircraft use a 1200 Baud radio teletype service over VHF to send their ID, altitude and position, and get gate and connecting-flight data.

Microwave dishes on satellites, telephone exchanges and TV stations usually use quadrature amplitude modulation (QAM). QAM sends data by changing both the phase and the amplitude of the radio signal. QAM packs the most bits into a radio signal. Usually the bits are sent in "frames" that repeat. A special bit pattern is used to locate the beginning of a frame.

Systems that need reliability, or that share their frequency with other services may use corrected orthogonal frequency-division multiplexing or COFDM. COFDM breaks a digital signal into several hundred slower subchannels. The digital signal is often sent as QAM on the subchannels. Modern COFDM systems use a small computer to make and decode the signal with digital signal processing which is more flexible and far less expensive than older systems that implemented separate electronic channels. COFDM resists fading and ghosting because the narrow-channel QAM signals can be sent slowly. An adaptive system or one that sends error-correction codes can also resist interference, because most interference can affect only a few of the QAM channels. COFDM is used for Wi-Fi, some cell phones and many other local area network, digital TV and radio standards. ~2123

**Comments:**

**a spark gap telegraphy** – искровое телеграфирование

**to span** – измерять, охватывать

**a continuous wave telegraphy** – однополосное телеграфирование

**a ham -** радиолюбитель

**Interrupted Continuous Wave** – короткая (электромагнитная) волна; прерывистая незатухающая волна.

**Baud (Emile Baudot)** – Эмиль Бодо, создатель кода Бодо

**dishes -** особенности

**a quadrature amplitude modulation** – квадратурная амплитудная манипуляция

**frames** – блоки, группы

**a corrected orthogonal frequency-division multiplexing** – мультиплексирование на основе ортогонального разделения частот

**a digital signal processing** – цифровая обработка сигналов (ЦОС)

**a fading** – затухание сигнала, фединг

**an interference** – помеха

**a ghosting**- двоение изображения

**Wi-Fi**-Wireless Fidelity - беспроводная точность. Стандарт на оборудование Wireless LAN (Wireless Loсal Area Network; WLAN — беспроводная локальная вычислительная сеть). Он разработан консорциумом Wi-Fi Alliance на базе стандартов IEEE 802.11, «Wi-Fi» — торговая марка «Wi-Fi Alliance».

## HD Radio

HD Radio offers a new and better way to broadcast radio programs. The "HD" in HD radio is a trademarked brand name that's given by its developer and that doesn't stand for anything. HD Radio technology is developed without any intention to replace traditional FM and AM radio broadcast. HD Radio is currently being broadcast along with conventional FM and AM signals.

The main difference of HD Radio compared to [Amplitude Modulation](http://www.tech-faq.com/amplitude-modulation.shtml) (AM) and [Frequency Modulation](http://www.tech-faq.com/frequency-modulation.shtml) (FM) is the form of signal that it uses to carry information. Both AM and FM signals are analog radio waves while HD Radio signals are in the compressed digital form.

Digitizing radio broadcast has provided a lot of improvements to sound quality and broadcast signal quantity. With an HD radio, sounds produced are a lot better in quality as compared to conventional radio broadcast. AM and FM signals carry little amount of information. HD Radio signals carry a lot more. More information-carrying capability means better sound quality.

If one is familiar with audio and video compression, he should be able to understand why HD Radio produces better sounds that traditional AM and FM broadcast. One usually sees videos and audio with the same content and length but with different sizes. Once these files are played or viewed, one immediately notices the difference in quality between the two. The larger file plays better that than the smaller one. The smaller file has been reduced to a form where it only contains enough information to be viewed fairly.

Aside from better sound quality, HD Radio has multicasting or multiplexing capability. Multicasting refers to the ability of HD radio to carry multiple channels in one frequency. For example, if one tune in to a certain [radio frequency](http://www.tech-faq.com/hd-radio.shtml) and this frequency is multicasting, the HD Radio will tell you so. One could then access the other channels on the said frequency through a separate dial on the HD Radio.

In addition to this, HD Radio also has the ability to carry information like text that could display song data, lyrics and many more options through the HD Radio display.

There is very little difference between how HD radio and conventional radio work. A radio station is contracted to broadcast both HD and conventional radio signals. Once a radio station agrees to broadcast HD signals, it is then required to transmit both digital and analog audio broadcast. The digital signal passes through a computer system which compresses digital information. The analog signal is broadcast unaffected by the compression. Both signals are then transmitted at the same time. During broadcast, digital signals for HD Radio are less prone to interference, reflections and dropout. This eliminates the static and hissing sound from the audio produced.

Conventional radio is not equipped with the capability to receive HD Radio signals. Thus, to be able to enjoy the benefits of HD Radio one should purchase an HD Radio receiver. This receiver lets one enjoy FM, AM and HD Radio broadcast. ~ 2509

**Comments:**

**a multicasting -** мультивещание

**multiplexing -** многократность

**prone –** склонный, предрасположенный

**a dropout** – выпадение сигнала

## Crystal Radio

The crystal radio is a rudimentary radio receiver that can be made from a few easy-to-obtain and inexpensive parts. It is unique for this type of radio does not require a battery pack, has no moving parts, and can be built using ordinary household materials, yet it actually works. The only power it receives comes from the radio signals.

The basic properties and mechanics of radio broadcasting had been discovered and worked out in the early 1900s and radio stations began broadcasting news and other information to the general public. However, the cost of factory-manufactured radios was prohibitive. The US government therefore taught the general public how to make crystal radios.

Later, radios with amplifiers and speakers became much more inexpensive so more people could afford to purchase a unit. This brought an end to the popularity of crystal radios. Hobbyists, however, still continue to build crystal radios.

It should not be surprising that crystal radios work. The basic principles of radio broadcasting make radio crystal operations more than possible. First, the function of a radio broadcasting station (with all its equipment, transmission tower, power supply, etc.) is to convert sounds produced within the studio (whether from CDs, DJs talking, or live bands) into radio signals. These radio signals are then transmitted from the tower outwards, after which they will be picked up by radio receivers.

In the case of crystal radio receivers, the antenna picks up radio signals from the air. The ground wire creates a continuum - a point of entry (the antenna) and a point of exit (the ground) so radio signal electricity is generated. This low-voltage electricity flows through to the radio and is adjusted through the radio crystal tuner to choose a particular radio station's broadcast.

The electricity is then directed to the apparatus that converts radio signal electricity into sound energy. This converter is the crystal detector, composed of a slender wire touching a semi-conducting crystal; primitive radio crystals used galena but more recent models made use of germanium [diodes](http://www.tech-faq.com/crystal-radio.shtml).

At this point, electrical energy is successfully converted into sound energy that humans can hear.

Conventional radio receivers have an antenna and ground wire, too. The process of picking up a certain station's broadcast and the process of conversion from radio signal electricity into sound energy follows the same basic pattern as that of radio crystals.

However, conventional radios require an external power source because they add another process to sound production. This process is amplification. Amplification boosts the electrical signal to the point that it can be heard through speakers.

A basic crystal radio receiver does not have an amplifier. Thus, it requires the use of an earphone or other such device so that the sound it produces can be heard by the user. Crystal radio receivers also require a long antenna to function properly (standard antenna length is from 30 to 50 feet). ~ 2529

**Comments:**

**rudimentary** – элементарный

**a battery pack** – портативный батарейный источник питания

**a live band -** действующий диапазон

**galena** – свинцовая руда, сернистый свинец, галенит

## Internet Radio

Internet radio is essentially the same as regularly broadcast radio, with a few distinguishing characteristics. Whereas there is a minimal lag time with regular radio because it broadcasts through the air, Internet radio has a lag time of 2.5 to 10 seconds or so, depending on the server. Internet radio is streamed, and so does not involve downloading. You simply log on to the particular site and in it comes.

Receiving the stream is much like listening to your [MP3 player](http://www.tech-faq.com/internet-radio.shtml), as the format is the same. Several formats are on offer, but the MP3 and ACC formats are currently the most frequently used. As the medium continues to find its footing, there will likely be modifications, which are difficult to predict today.

Who Is Doing It?

Anybody with the content, software, and hardware can run an Internet radio station. Because of this, most Internet radio stations are existing radio stations that are simply simulcasting their regular programming. The fact that it is separate, however, allows for a certain amount of variation if the station would like to change things a bit during the course of the day.

One of the more positive aspects of Internet radio is that it is international in flavor. Anybody around the world can get international access to Internet radio. Expatriates can keep up on news from home and revolutionaries can get their word out. The recent events in Burma are an example in this regard.

Royalties and Fees

Unfortunately, there is one limiting factor in the United States, particularly with regard to music programming and generally getting started. As the digital age was really getting going, the United States government started imposing copyright fees and license fees on Internet broadcasters. A minimum fee of $500 was imposed, and a royalty fee structure in excess of the budgets of many Internet radio stations' business models was added.

Needless to say, this did not sit well with many Internet radio operators in the United States. It also did not sit well with many recording artists who had their own business models relying on play time to build a following. They felt the new structure would drive stations away, and it appears that this may be true. Several Internet radio concerns are now moving to international locations where fee structures are more favorable or nonexistent.

International Regulation

One of the features that bring many listeners to Internet radio is the fact that they can hear such a varied mix of formats from around the world. If you would like to hear the surf report in [Australia](http://www.expatintelligence.com/expat-australia.shtml) from London, you can. The fact that the Voice of America was one of the very first broadcasters to adopt Internet radio speaks to its international appeal. Unfortunately, many countries are beginning to impose limitations on Internet radio. They would like to keep streams within their borders or keep streams out. Fortunately, hackers enjoy these types of challenges, so the future is a question mark in this regard. ~ 2473

**Comments:**

**a lag** –отставание

**a downloading** - загрузка

**to log on** – начинать работу

**ACC -** Advanced Audio Coding — собственнический (патентованный) формат аудиофайла с меньшей потерей качества при кодировании, чем MP3 при одинаковых размерах.

t**o simulcast** - транслировать одновременно по радио и телевидению

## Ham Radio

More than three million people enjoy ham radio hobbies, which is basically amateur radio. These enthusiasts create a network of people that enjoy communicating with one another over different frequencies. However, ham radio operators do use a variety of methods to communicate with one another.

The amateur radio operators are known as Hams, and they communicate with one another for fun, self-improvement, or even public service. These operators communicate by transmitting messages by voice, Morse code, or even messages through computers. There are some new ways that allow hams to communicate via television with pictures that are transmitted around the world.

Ham radio is something that everyone can enjoy. There are people from all walks of life that enjoy this hobby such as homemakers, students, doctors, engineers, and drivers. All of these people have an interest and enjoyment in communicating with others through wireless technology. Many hams get together so that the younger generations can learn from those that have a lot of experience. Licensed hams actually communicate with one another from regional locations such as across town, across the country, although they can even communicate when they are across the world from one another if they so choose.

Hams have different reasons for participating. Many ham radio operators simply enjoy talking to friends, while others enjoy volunteering to help assist people in emergency situations, and are able to transmit messages if normal communications are not possible. Many hams are available to emergency medical teams, specialize in spotting severe weather, and disaster response. Ham radios can even be used to communicate with astronauts in outer space! Astronauts have communicated with many operators such as teachers, parents, and children while they have been in the space station and in orbit.

More than 600,000 Americans have a ham radio license. The Federal Communications Commission must license all people that use ham radios in the United States. To receive the license one must pass an exam. Most of these hams will tell you that they have a dedicated area of their home for their radio and other equipment, this room is often known as the "shack" in ham slang.

Hams enjoy meeting one another and often hold organized events to get together and have a great time. These gatherings are usually called Hamfest, with the largest Hamfest gathering being held in Dayton, Ohio. This is always an exciting event for most ham radio enthusiasts because they get to meet other with similar interests, talk shop, and meet new friends.~2188

**Comments:**

**to spot -** предсказывать

**a dedicated area –** предназначенное пространство

**shack -** лачуга, хижина

# Telephone

## The Invention of Telephone

On March 10, 1876, Alexander Graham Bell changed the course of history. After years of experiments with home-made inventions and just three days after the patent office granted a patent for his telephone, he finally stumbled upon the secrets of sending human speech over the wires by electrical means. In his attic laboratory in Boston, Bell worked day and night with his assistant, Thomas A. Watson, trying to develop a working telephone. Like most people, he knew little about electricity, so he learned as he went along. Because electricity was such a new phenomenon, he had to make all of his own equipment, including batteries.

While Bell sat in his attic with a cone-shaped telephone that looked like a small upright megaphone, Watson waited on the ground floor with the receiver. As he adjusted the wire connecting the two devices, Watson was taken aback when he heard Bell's clear voice Mr. Watson, come here, I want you." According to legend, Bell spilled a dish of acid and was calling for Watson to help him clear up the mess. Watson rushed upstairs and burst into attic to deliver the fantastic news:" - Mr. Bell, I understood what you said!"

They continued experimenting with the machine, each taking turns speaking into the telephone while the other listened at the receiver. Bell's fascination with the telephone started many years earlier while working on the "harmonic telegraph". This invention made it possible to send multiple messages over the same telegraph wire at the same time, and it brought Bell to the realization that it should also be possible to send speech over the telegraph wires.

In addition Bell, a small group of other scientists in the United States understood the concept of how a telephone should work. The problem they all faced was creating a working model, and as the month progressed, the competition became intense. Each inventor was in desperate race against the others.

When Bell finally succeeded, he proudly unveiled his invention at the 1876 Centennial Exposition in Philadelphia, which was the year's most important display-case for new invention and discoveries. At the exposition, Bell demonstrated the wonders of his telephone to eager and attentive audiences. With the transmitter and receiver set up 100 yards apart in different halls, he astounded everyone and walked away with first prize for the best new invention.

Bell envisioned his telephone as a more practical alternative to the telegraph, because telephones could provide two-way communication. In fact, he saw no limits to stop it from spreading to every home and business in the nation.

Despite the excitement the telephone caused at public demonstration, not everyone was impressed. The first telephones were large and bulky. People had to shout in order to be heard at the other end, and static often made the words impossible to hear. Many people did not believe that such a machine would ever become practical for everyday use. Newspapers ridiculed the telephone as a passing novelty, and Western Union Telegraph failed to recognize its importance and even rejected an offer to buy Bell's patent for only $100,000.

Thanks in part to the rejection by Western Union, Bell and Watson formed the Bell Telephone Company, through which they promoted their telephone. By August of 1877, there were 600 telephones in use in Boston alone, all with private lines. Telephone systems grew in cities and towns across the United States, and soon, operators at switchboards were busy fielding an ever-increasing number of calls from more subscribers. Bell's invention was literally changing the face of America. It also threatened to make the telegraph obsolete, because people realized the convenience and necessity of being able to talk directly to one another. Each year, thousand of new telephones were installed in homes, and businesses started to replace old fashioned telegraphs with new telephones. What's more, dozen of companies joined the competition for customer with their own patented telephone design.

Famous people gave the telephone added publicity. Congressman James A Garfield was the one of the first to have a telephone installed in his home. Writer Mark Twain also had in his home in Hartfort, and when Bell visited England on his honeymoon, he made a personal demonstration for Queen Victoria. The Queen was so impressed that she asked for her own telephone set.

Eventually, Western Union realized its mistake and joined the frenzy by establishing its own telephone system. At this time, each telephone company had its own wires, its own operators, and its own telephones, which often caused confusion and frustration for customers.

After the national telephone network was in place, it was time to rich beyond the border of the United States. Telegraph messages could already be sent to Europe over Atlantic Cable, but telephones calls were sent overseas by radio signal because the electric current was not strong enough to carry voices the entire length of the cable. As a result, international telephone calls were usually of poor quality. Starting in 1956, the first specially-designed telephone cable were laid on Atlantic Ocean's floor to give the United States a direct telephone connection with England. The improvement in quality was dramatic. Other cable quickly followed across both the Atlantic and Pacific Oceans, and soon it was possible to call directly to most telephones in Europe as well as in Asia and around the world. The telephone was making global communication a reality.

To make overseas calling faster and ever more efficient, NASA launched the first communications satellite in 1960. Known as Echo 1, it was a giant silver balloon which orbited the Earth and simply reflected telephone transmission from a sending station to a receiving station. Two years later, the more powerful TelStar 1 became the first two-way communications satellite and was a vital step towards the future of a true global telephone system.

By the time it reached its 100th anniversary in 1976, the telephone was already an essential part of business life, and a few homes were without at least one telephone. Today, the world wide network of computers and satellite makes the modern telephone system a far cry from the primitive machine first pioneered by Alexander Graham Bell in 1876.~5293

**Comments:**

**an attic –** мансарда, чердак

**cone-shaped -** конусовидный, конусообразный

**a megaphone** - мегафон, рупор

**to unveil -** торжественно открывать

**to astound -** изумлять, поражать

**to envision -** воображать что-л., рисовать в своем воображении, представлять себе, предвидеть

**a switchboard –** коммутатор, распределительный щит

## **Mobile Phone**

Mobile (also called cellphone and handphone, as well as cell phone, wireless phone, cellular phone, cell, cellular telephone, mobile telephone or cell telephone) is a long-range, [electronic device](http://en.wikipedia.org/wiki/Electronic_device) used for mobile voice or data communication over a network of specialized base stations known as [cell sites](http://en.wikipedia.org/wiki/Cell_site).

In addition to the standard voice function of a mobile phone, [telephone](http://en.wikipedia.org/wiki/Telephone), current mobile phones may support many additional [services](http://en.wikipedia.org/wiki/GSM_services), and [accessories](http://en.wikipedia.org/wiki/Mobile_phone_accessories), such as [SMS](http://en.wikipedia.org/wiki/Short_message_service) for [text messaging](http://en.wikipedia.org/wiki/Text_messaging), [email](http://en.wikipedia.org/wiki/Email), [packet switching](http://en.wikipedia.org/wiki/Packet_switching) for access to the [Internet](http://en.wikipedia.org/wiki/Internet), gaming, [Bluetooth](http://en.wikipedia.org/wiki/Bluetooth), [infrared](http://en.wikipedia.org/wiki/Infrared), [camera](http://en.wikipedia.org/wiki/Camera) with video recorder and [MMS](http://en.wikipedia.org/wiki/Multimedia_Messaging_Service) for sending and receiving [photos](http://en.wikipedia.org/wiki/Photo) and [video](http://en.wikipedia.org/wiki/Video), [MP3 player](http://en.wikipedia.org/wiki/MP3_player), [radio](http://en.wikipedia.org/wiki/Radio) and [GPS](http://en.wikipedia.org/wiki/GPS). Most current mobile phones connect to a [cellular network](http://en.wikipedia.org/wiki/Cellular_network) consisting of switching points and [base stations](http://en.wikipedia.org/wiki/Base_station) owned by a [mobile network operator](http://en.wikipedia.org/wiki/Mobile_network_operator) (the exception is [satellite phones](http://en.wikipedia.org/wiki/Satellite_phone), which are mobile but not cellular).

A mobile phone, as opposed to a [radio telephone](http://en.wikipedia.org/wiki/Radio_telephone), offer [full duplex](http://en.wikipedia.org/wiki/Full_duplex)-communication, automatised calling to and paging from a [public switched telephone network](http://en.wikipedia.org/wiki/Public_switched_telephone_network) ([PSTN](http://en.wikipedia.org/wiki/PSTN)), [handoff](http://en.wikipedia.org/wiki/Handoff) (am. English) or handover (European term) during a phone call when the user moves from one cell (base station coverage area) to another. A cell phone offer wide area service, and should not be confused with a [cordless telephone](http://en.wikipedia.org/wiki/Cordless_telephone), which also is a wireless phone, but only offer telephony service within a limited range, e.g. within a home or an office, through a fixed line and a base station owned by the subscriber.

The [International Telecommunication Union](http://en.wikipedia.org/wiki/International_Telecommunication_Union) estimated that mobile cellular subscriptions worldwide had reached approximately 4.1 billion by the end of 2008. Mobile phones have gained increased importance in the sector of [Information and communication technologies for development](http://en.wikipedia.org/wiki/Information_and_communication_technologies_for_development) in the 2000s and have effectively started to reach the [bottom of the economic pyramid](http://en.wikipedia.org/wiki/Bottom_of_the_pyramid)

In 1908, [U.S. Patent 887,357](http://www.google.com/patents?vid=887357) for a wireless telephone was issued in to [Nathan B. Stubblefield](http://en.wikipedia.org/wiki/Nathan_Stubblefield) of [Murray, Kentucky](http://en.wikipedia.org/wiki/Murray,_Kentucky). He applied this patent to "cave radio" telephones and not directly to [cellular telephony](http://en.wikipedia.org/wiki/Cellular_telephony) as the term is currently understood. Cells for mobile phone base stations were invented in 1947 by [Bell Labs](http://en.wikipedia.org/wiki/Bell_Labs) engineers at [AT&T](http://en.wikipedia.org/wiki/AT%26T) and further developed by Bell Labs during the 1960s.

[Radiophones](http://en.wikipedia.org/wiki/Radiophone) have a long and varied history going back to [Reginald Fessenden](http://en.wikipedia.org/wiki/Reginald_Fessenden)'s invention and shore-to-ship demonstration of radio telephony, through the [Second World War](http://en.wikipedia.org/wiki/Second_World_War) with military use of radio telephony links and civil services in the 1950s, while hand-held cellular radio devices have been available since 1973. A patent for the first wireless phone as we know today was issued in [US Patent Number 3,449,750](http://www.google.com/patents?id=sidyAAAAEBAJ&dq=george+sweigert) to [George Sweigert](http://en.wikipedia.org/wiki/George_Sweigert) of Euclid, Ohio on June 10, 1969.

In 1945, the zero generation ([0G](http://en.wikipedia.org/wiki/0G)) of mobile telephones was introduced. Like other technologies of the time, it involved a single, powerful base station covering a wide area, and each telephone would effectively monopolize a channel over that whole area while in use. The concepts of frequency reuse and handoff, as well as a number of other concepts that formed the basis of modern cell phone technology, are first described in [U.S. Patent 4,152,647](http://www.google.com/patents?vid=4152647), issued May 1, 1979 to Charles A. Gladden and Martin H. Parelman, both of [Las Vegas, Nevada](http://en.wikipedia.org/wiki/Las_Vegas,_Nevada) and assigned by them to the United States Government.

This is the first embodiment of all the concepts that formed the basis of the next major step in [mobile telephony](http://en.wikipedia.org/wiki/Mobile_telephony), the Analog cellular telephone. Concepts covered in this patent (cited in at least 34 other patents) also were later extended to several satellite communication systems. Later updating of the cellular system to a digital system credits this patent.

[Martin Cooper](http://en.wikipedia.org/wiki/Martin_Cooper_(inventor)), a [Motorola](http://en.wikipedia.org/wiki/Motorola) researcher and executive is widely considered to be the inventor of the first practical mobile phone for hand-held use in a non-vehicle setting. Cooper is the inventor named on "Radio telephone system" filed on [October 17](http://en.wikipedia.org/wiki/October_17), [1973](http://en.wikipedia.org/wiki/1973) with the [US Patent Office](http://en.wikipedia.org/wiki/United_States_Patent_and_Trademark_Office) and later issued as US Patent 3,906,166. Using a modern, if somewhat heavy portable handset, Cooper made the first call on a hand-held mobile phone on April 3, 1973 to a rival, Dr. [Joel S. Engel](http://en.wikipedia.org/wiki/Joel_S._Engel) of [Bell Labs](http://en.wikipedia.org/wiki/Bell_Labs).

The first commercial citywide cellular network was launched in Japan by [NTT](http://en.wikipedia.org/wiki/Nippon_Telegraph_and_Telephone) in 1979. Fully automatic cellular networks were first introduced in the early to mid 1980s (the [1G](http://en.wikipedia.org/wiki/1G) generation). The [Nordic Mobile Telephone](http://en.wikipedia.org/wiki/Nordic_Mobile_Telephone) (NMT) system went online in Denmark, Finland, Norway and Sweden in 1981.

In 1983, [Motorola DynaTAC](http://en.wikipedia.org/wiki/Motorola_DynaTAC) was the first approved mobile phone by [FCC](http://en.wikipedia.org/wiki/Federal_Communications_Commission) in the United States. In 1984, [Bell Labs](http://en.wikipedia.org/wiki/Bell_Labs) developed modern commercial cellular technology (based, to a large extent, on the Gladden, Parelman Patent), which employed multiple, centrally controlled base stations, each providing service to a small area (a cell). The cell sites would be set up such that cells partially overlapped. In a cellular system, a signal between a base station (cell site) and a terminal (phone) only need be strong enough to reach between the two, so the same channel can be used simultaneously for separate conversations in different cells.

Cellular systems required several leaps of technology, including [handover](http://en.wikipedia.org/wiki/Handoff), which allowed a conversation to continue as a mobile phone traveled from cell to cell. This system included variable transmission power in both the base stations and the telephones (controlled by the base stations), which allowed range and cell size to vary. As the system expanded and neared capacity, the ability to reduce transmission power allowed new cells to be added, resulting in more, smaller cells and thus more capacity. The evidence of this growth can still be seen in the many older, tall cell site towers with no antennae on the upper parts of their towers. These sites originally created large cells, and so had their antennae mounted atop high towers; the towers were designed so that as the system expanded—and cell sizes shrank—the antennae could be lowered on their original masts to reduce range.

The first "modern" network technology on digital [2G](http://en.wikipedia.org/wiki/2G) (second generation) cellular technology was launched by [Radiolinja](http://en.wikipedia.org/wiki/Radiolinja) (now part of [Elisa Group](http://en.wikipedia.org/wiki/Elisa_Oyj)) in 1991 in [Finland](http://en.wikipedia.org/wiki/Finland) on the GSM standard which also marked the introduction of competition in mobile telecoms when Radiolinja challenged incumbent [Telecom Finland](http://en.wikipedia.org/w/index.php?title=Telecom_Finland&action=edit&redlink=1) (now part of [TeliaSonera](http://en.wikipedia.org/wiki/TeliaSonera)) who ran a 1G NMT network.

The first data services appeared on mobile phones starting with person-to-person SMS text messaging in Finland in 1993. First trial payments using a mobile phone to pay for a Coca Cola vending machine were set in Finland in 1998. The first commercial payments were mobile parking trialled in Sweden but first commercially launched in Norway in 1999. The first commercial payment system to mimic banks and credit cards was launched in the Philippines in 1999 simultaneously by mobile operators Globe and Smart. The first content sold to mobile phones was the ringing tone, first launched in 1998 in Finland. The first full internet service on mobile phones was i-Mode introduced by NTT DoCoMo in Japan in 1999.

In 2001 the first commercial launch of [3G](http://en.wikipedia.org/wiki/3G) (Third Generation) was again in Japan by [NTT DoCoMo](http://en.wikipedia.org/wiki/NTT_DoCoMo) on the [WCDMA](http://en.wikipedia.org/wiki/WCDMA) standard.

Until the early 1990s, following introduction of the [Motorola MicroTAC](http://en.wikipedia.org/wiki/Motorola_MicroTAC), most mobile phones were too large to be carried in a jacket pocket, so they were typically installed in vehicles as [car phones](http://en.wikipedia.org/wiki/Car_phone). With the [miniaturization](http://en.wikipedia.org/wiki/Miniaturization) of digital components and the development of more sophisticated batteries, mobile phones have become smaller and lighter.~6277

**Comments:**

[**GPS**](http://en.wikipedia.org/wiki/GPS) **-** Global Positioning System - глобальная система позиционирования

[**full duplex**](http://en.wikipedia.org/wiki/Full_duplex) **-** полнодуплексный (канал или устройство, выполняющее одновременно прием и передачу данных)

**a** [**handoff**](http://en.wikipedia.org/wiki/Handoff) **-** передача обслуживания при использовании помощи самой мобильной станции. Вариант эстафетной передачи, при котором решение о выборе наилучшей доступной ячейки принимается с помощью мобильной станции. Критерием такого выбора является качество канала связи.

**a** [**cordless telephone**](http://en.wikipedia.org/wiki/Cordless_telephone) **-** беспроводный телефон, радиотелефон

[**Bell Labs**](http://en.wikipedia.org/wiki/Bell_Labs) **-** Bell Laboratories - бывшая американская корпорация, крупный исследовательский центр в области телекоммуникаций, электронных и компьютерных систем.

[**AT&T**](http://en.wikipedia.org/wiki/AT%26T) **-** компания American Telephone and Telegraph, одна из крупнейших американских телекоммуникационных компаний.

**an embodiment –** интеграция, объединение, слияние

[**Nordic Mobile Telephone**](http://en.wikipedia.org/wiki/Nordic_Mobile_Telephone) **(NMT) -** аналоговый стандарт мобильной связи в диапазоне частот от 453 до 468 МГц.

[**TeliaSonera**](http://en.wikipedia.org/wiki/TeliaSonera) **-** телекоммуникационная компания, лидер рынков сотовой связи Швеции и Финляндии. Штаб-квартира — в Стокгольме.

**NTT DoCoMo —** крупнейший японский оператор мобильной связи.

[**WCDMA**](http://en.wikipedia.org/wiki/WCDMA) **–** Wideband Code Division Multiple Access — широкополосный множественный доступ с кодовым разделением. Технология радиоинтерфейса, избранная большинством операторов сотовой связи для обеспечения широкополосного радиодоступа с целью поддержки услуг 3G.

## Bluetooth

Bluetooth is a radio standard and communications protocol designed for wireless personal area networks (PANs), also known as IEEE 802.15.1. Bluetooth provides a way to connect and exchange information between devices such as mobile phones, laptops, PCs, printers, digital cameras, and video game consoles over a secure, globally unlicensed short-range radio frequency (power class dependent: 1metre, 10 metres, 100 metres). Using a radio communication system, the devices don’t have to be in line of sight of each other and can even be in other rooms, so long as the received transmission is powerful enough.

Origin of the name and the logo

Bluetooth was named after the 10th century king of Denmark and Norway Harald Bluetooth. He is known for his unification of previously warring tribes from Denmark and Norway. Bluetooth likewise was intended to unify different technologies, such as computers and mobile phones. The Bluetooth logo merges the Nordic runes analogous to the modern Latin H and B: Haglaz and Berkanan forming a bind rune.

Bluetooth Basics

Bluetooth wireless technology is a short-range communication technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. The key features of Bluetooth technology are robustness, low power, and low cost. The Bluetooth specification defines a uniform structure for a wide range of devices to connect and communicate with each other.

Bluetooth technology has achieved global acceptance such that any Bluetooth enabled device, almost everywhere in the world, can connect to other Bluetooth enabled devices in proximity. Bluetooth enabled electronic devices connect and communicate wirelessly through short-range, radio networks known as piconets. Each device can simultaneously communicate with up to seven other devices within a single piconet. Each device can also belong to several piconets simultaneously. Piconets are established dynamically and automatically as Bluetooth enabled devices enter and leave radio proximity.

A fundamental Bluetooth wireless technology strength is the ability to simultaneously handle both data and voice transmissions. This enables users to enjoy variety of innovative solutions such as a hands-free headset for voice calls, printing and fax capabilities, and synchronizing PDA, laptop, and mobile phone applications to name a few.

Bluetooth applications

* Wireless control and communication between a cell phone and a hands-free headset. This is the most popular use.
* Wireless networking between PCs in a confined space and where little bandwidth is required.
* Wireless communications with PC input and output devices, the most common being the mouse, keyboard and printer.
* Transfer of files between devices via OBEX.
* Replacement of traditional wired serial communications in test equipment, GPS receivers and medical equipment.
* For remote controls where infrared was traditionally used.
* Sending small advertisements from Bluetooth enabled advertising hoardings to other Bluetooth devices.
* Wireless control of a games console, Nintendo and Sony PlayStation will both use Bluetooth technology for their wireless controllers.

Bluetooth cavities

These days there are a lot of problems in the Bluetooth kingdom. The promises of a Bluetooth-united world have become hyperbole, diminished expectations, and security loopholes. These so-called Bluetooth cavities have generated a vocabulary of new words and phrases to name and describe them.

First of all it is the practice of bluejacking: temporarily hijacking another person’s cellphone by sending it an anonymous text message using the Bluetooth wireless networking system. In this way people bluejack nearby devices to send them unsolicited commercial messages, a practice called, inevitably, bluespamming.

Then it is warchalking, using chalk to place a special symbol on a sidewalk or other surface that indicates a nearby wireless network, especially one that offers Internet access. Now hackers are wandering around neighborhoods looking for vulnerable Bluetooth devices. Randomly searching for hackable Bluetooth devices is called bluestumbling; generating an inventory of the available services on the devices – such as voice or fax capabilities – is called bluebrowsing. When they find them, they’re chalking the Bluetooth symbol (the Nordic runes for the letters H and B, for Harald Bluetooth) on the sidewalk, a practice known as bluechalking.

Bluetooth crackers have recently learned to exploit problems in the OBEX Protocol, used to synchronize files between two Bluetooth devices – a practice called pairing, which is a normal part of the connection process, but in this case it’s done without the other person’s permission. Once pairing is achieved, the crackers can copy the person’s e-mail messages, calendar, and so on. This is known as bluesnarfing, and the criminals are called bluesnarfers. (The verb to snarf means to grab or steal something.)

A different Bluetooth security breach enables miscreants to perform bluebugging. This lets them not only read data on a Bluetooth-enabled cellphone but also eavesdrop on conversations and even send commands to the phone to initiate phone calls, send text messages, connect to the Internet, and more.

Perhaps the worst of the Bluetooth hacks is the Bluesniper, a Bluetooth scanning device that looks like a sniper rifle. Point the Bluesniper in any direction and it picks up the signals of vulnerable devices up a kilometer away (compared with the usual Bluetooth scanning distance of 10 meters). And, of course, the Bluesniper also lets you attack those distant devices with your favourite Bluetooth hack. ~ 4829

**Comments:**

**a communications protocol –** протокол обмена данными, протокол связи

**IEEE 802.15.1 –** стандарт, разработанный для технологии беспроводной ближней коротковолновой радиосвязи Bluetooth, получил обозначение IEEE 802.15 . Он определяет работу на частоте 2,4 ГГц, со скоростями передачи 722-784 Кбит/с.

**IEEE (**The Institute of Electrical and Electronics Engineers, Inc.) –Институт инженеров по электротехнике и радиоэлектронике США. Крупнейшая в мире организация ([www.ieee.org](http://www.ieee.org)), объединяющая более 300 тыс. технических специалистов из 147 стран, ведущая организация по стандартизации, отвечающая также за сетевые стандарты.

**a console –** консоль, пульт (управления)

**an unification -** консолидация, слияние; объединение, союз

**Nordic runes –** скандинавские руны (буквы рунического алфавита)

**to merge -** сливать(ся), соединять(ся) (into, with), поглощать

**a piconet -** беспроводная персональная сеть, которая может соединить без использования проводов минимум – 2, и максимум – 8 устройств. . **a robustness –** надёжность, ошибкоустойчивость

**PDA (**Personal Digital Assistant**) –** карманный ПК

**OBEX (**Object Exchange Technology**) –** технология обмена объектами внутри рабочей группы

**a hoarding -** накопление

**a loophole (=cavity, breach) –** дыра, лазейка (в защите компьютерной системы)

**bluejacking (блюдже́кинг)** — атака с использованием особенностей профиля Object Exchange (OBEX). Этот профиль предназначен для обеспечения обмена данными (скажем, электронными визитными карточками или записями в календарях) между двумя оснащенными средствами Bluetooth устройствами без обязательной аутентификации. Когда одно устройство направляет некоторые данные на другое, получающее устройство отображает эту информацию в своем формате и затем спрашивает пользователя, нужно ли сохранять эту информацию. При совершении атаки Bluejacking отправитель изменяет содержимое поля «Имя» отправляемого сообщения, помещая в нем короткий текст. Bluejacking можно определить как спам на платформе Bluetooth.

**unsolicited –** незапрашиваемый, представленный без просьбы

**spamming -** рассылка коммерческой, политической и иной рекламы или иного вида сообщений лицам, не выражавшим желания их получать.

**warchalking -** Оставление простых условных знаков, в основном мелом, на тротуаре, стене или другой поверхности в местах близкого расположения точек доступа Wi-Fi (802.11) и местах частого появления пользователей Wi-Fi-устройств. Символ определяет, какой тип интернет-доступа возможен и используются ли средства защиты беспроводной сети (WEP или др.). Идея уорчокинга основана на языке символов странствующих рабочих начала 20 века в США.

**a sidewalk -** тротуар

**vulnerable –** уязвимый

**bluestumbling -** процесс, позволяющий хакеру обнаруживать устройства Bluetooth, расположенные в непосредственной близости, и в первую очередь устройства, функционирующие в режиме безопасности 1, либо дефектные устройства, допускающие обращения к службам без прохождения аутентификации.

**an inventory –** список, инвентарь

**browsing -** просмотр (напр., файла), оиск путем просмотра

**bluechalking -** это способ знакомиться и общаться с людьми, пользоваться сервисами сетей (игра по сети, доступ к файл серверам, интрнет) при помощи устройств оборудованных беспроводным интерфейсом Bluetooth. Им оснащаються многие современные мобильные телефоны, КПК, ноутбуки.

**a cracker -** программа взлома (чужого ПО), взломщик (человек или программа, взламывающие фирменную защиту от копирования)

**a pairing –** спаривание, соединение

**bluesnarfing -** получение информации от устройства Bluetooth без предварительного образования пары. Целью первых атак Bluesnarfing было получение информации о контактах, которая хранилась на мобильных телефонах различных марок, изготовленных известными производителями. Злоумышленники пользовались недостатками в реализации стандарта Bluetooth в этих устройствах — недостатками, которые позднее были признаны изготовителями и устранены.

**a miscreant –** злодей

**bugging -** тайное наблюдение (подслушивание) с помощью малогабаритных электронных устройств; установка аппаратуры для тайного наблюдения (подслушивания)

**to eavesdrop –** подслушивать, перехватывать сообщения

**a sniper rifle –** снайперская винтовка

## GSM

During the early 1980s, cellular telephone systems were experiencing rapid growth in Europe, particularly in Scandinavia and the United Kingdom, but also in France and Germany. Each country developed its own system, which was incompatible with others in equipment and operation. This was an undesirable situation.

The Europeans realized this and in 1982 the Conference of European Posts and Telegraphs formed a study group called the Groupe Spécial Mobile (GSM) to study and develop an all-European public land mobile system.

Commercial service was started in 1991, and by 1993 there were 36 GSM networks in 22 countries. Although standardized in Europe, GSM is not only a European standard. Over 200 GSM networks operate in 110 countries around the world. With North America with a derivative of GSM called PCS 1900, GSM systems exist on every continent, and the acronym GSM now stands for Global System for Mobile communications.

A GSM network is composed of several functional entities with specific functions and interfaces. The GSM network can be divided into three broad parts.

The Mobile Station (MS) is carried by the subscriber. It consists of the mobile equipment and a smart card called the Subscriber Identity Module (SIM). The SIM provides personal mobility. By inserting the SIM card into another GSM terminal, the user is able to receive calls at that terminal, make calls from that terminal, and receive other services. The SIM card may be protected against unauthorized use by a password or personal identity number.

The Base Station Subsystem (BSS) controls the radio link with the Mobile Station. The Base Station Subsystemis composed of two parts, the Base Transceiver Station (BTS) and the Base Station Controller (BSC). These communicate across the standardized Abis interface allowing operation between components made by different suppliers. The BTS contains the radio transceivers that define a cell and handles the radio-link protocols with the Mobile Station. The BSC manages the radio resources for one or more BTSs. It is the connection between the Mobile Station and the Mobile service Switching Center (MSC).

The Network Subsystem (NSS), the main part of which is the Mobile services Switching Center (MSC), performs the switching of calls between the mobile users, and between mobile and fixed network users. The central component of the Network Subsystem is the Mobile services Switching Center (MSC). It acts like a switching node of the PSTN or ISDN, and provides all the functionality needed to handle a mobile subscriber, such as registration, authentication, location updating, handovers, and call routing to a roaming subscriber.

The Mobile Station and the Base Station Subsystem communicate across the Um interface, also known as the air interface or radio link.

GSM is a cellular network which means that mobile phones connect to it by searching for cells in the immediate area. GSM networks operate on four different frequency ranges. Most GSM networks operate on the 900 MHz or 1800 MHz bands. Some countries in the Americas (including the USA and Canada) use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated. The International Telecommunication Union, which manages the international allocation of radio spectrum, allocated the bands 890-915 MHz for the uplink (mobile station to base station) and 935-960 MHz for the downlink (base station to mobile station) for mobile networks in Europe.

Since radio spectrum is a limited resource shared by all users, a method must be devised to divide up the bandwidth among as many users as possible. The method chosen by GSM is a combination of Time- and Frequency-Division Multiple Access (TDMA/FDMA). The FDMA part involves the division of the 25 MHz bandwidth into 124 carrier frequencies spaced 200 kHz apart. One or more carrier frequencies are assigned to each base station. Each of these carrier frequencies is then divided in time, using a TDMA scheme. The fundamental unit of time in this TDMA scheme is called a burst period which lasts 15/26 ms (or approx. 0.577 ms). Eight burst periods are grouped into a TDMA frame (approx. 4.615 ms). One physical channel is one burst period per TDMA frame. ~ 3557

**Comments:**

**an entity -** суть, существо, сущность

**a roaming -** роуминг (автоматическое подключение к местной сети связи)

**an air interface** - радиоинтерфейс

**a derivative -** дериват, производное (происшедшее от чего-л. ранее существовавшего)

**TDMA (Time Division Multiple Access)** – множественный доступ с временным разделением каналов (временное разделение каналов с многостанционным доступом).

**FDMA** **(Frequency Division Multiple Access)** – множественный доступ с разделением частот.

## Smartphone

A smartphone is a [mobile phone](http://en.wikipedia.org/wiki/Mobile_phone) offering advanced capabilities, often with [PC](http://en.wikipedia.org/wiki/Personal_computer)-like functionality. There is no [industry standard](http://en.wikipedia.org/wiki/Industry_standard) definition of a smartphone. For some, a smartphone is a phone that runs complete [operating system](http://en.wikipedia.org/wiki/Operating_system) software providing a standardized interface and platform for application developers. For others, a smartphone is simply a phone with advanced features like e-mail, Internet and e-book reader capabilities, and/or a built-in full keyboard or external USB keyboard and [VGA connector](http://en.wikipedia.org/wiki/VGA_connector). In other words, it is a miniature computer that has phone capability.

Growth in demand for advanced mobile devices boasting powerful [processors](http://en.wikipedia.org/wiki/Microprocessor), abundant [memory](http://en.wikipedia.org/wiki/Non-volatile_memory), large screens and open operating systems has outpaced the rest of the mobile phone market for several years.

The first smartphone was called [Simon](http://en.wikipedia.org/wiki/Simon_(phone)); it was designed by [IBM](http://en.wikipedia.org/wiki/IBM) in 1992 and shown as a concept product that year at [COMDEX](http://en.wikipedia.org/wiki/COMDEX), the computer industry trade show held in [Las Vegas, Nevada](http://en.wikipedia.org/wiki/Las_Vegas,_Nevada). It was released to the public in 1993 and sold by [BellSouth](http://en.wikipedia.org/wiki/BellSouth). Besides being a mobile phone, it also contained a calendar, [address book](http://en.wikipedia.org/wiki/Address_book), world clock, calculator, note pad, e-mail, send and receive [fax](http://en.wikipedia.org/wiki/Fax), and games. It had no physical buttons to dial with. Instead of customers used a [touch-screen](http://en.wikipedia.org/wiki/Touch-screen) to select [phone numbers](http://en.wikipedia.org/wiki/Telephone_number) with a finger or create [facsimiles](http://en.wikipedia.org/wiki/Facsimile) and memos with an optional stylus. Text was entered with a unique on-screen "predictive" keyboard. By today's standards, the Simon would be a fairly low-end product, however its feature set at the time was incredibly advanced.

The [Nokia Communicator](http://en.wikipedia.org/wiki/Nokia_Communicator) line was the first of Nokia's smartphones starting with the [Nokia 9000](http://en.wikipedia.org/wiki/Nokia_9000), released in 1996. This distinctive palmtop computer style smartphone was the result of a collaborative effort of an early successful and expensive PDA model by [Hewlett Packard](http://en.wikipedia.org/wiki/Hewlett_Packard) combined with Nokia's bestselling phone around that time and early prototype models had the two devices fixed via a hinge; the [Nokia 9210](http://en.wikipedia.org/wiki/Nokia_9210) as the first color screen Communicator model which was the first true smartphone with an open operating system; the [9500](http://en.wikipedia.org/wiki/Nokia_9500) Communicator that was also Nokia's first cameraphone Communicator and Nokia's first [WiFi](http://en.wikipedia.org/wiki/WiFi) phone; the [9300](http://en.wikipedia.org/wiki/Nokia_9300) Communicator was the third dimensional shift into a smaller form factor; and the latest [E90](http://en.wikipedia.org/wiki/Nokia_E90) Communicator includes [GPS](http://en.wikipedia.org/wiki/GPS). The Nokia Communicator model is remarkable also having been the most expensive phone model sold by a major brand for almost the full lifespan of the model series, easily 20% and sometimes 40% more expensive than the next most expensive smartphone by any major manufacturer.

The [Ericsson R380](http://en.wikipedia.org/wiki/Ericsson_R380) was sold as a 'smartphone' but could not run native third-party applications. Although the [Nokia 9210](http://en.wikipedia.org/wiki/Nokia_9210) was arguably the first true smartphone with an open operating system, Nokia continued to refer to it as a Communicator.

In 2001 RIM released the first [BlackBerry](http://en.wikipedia.org/wiki/BlackBerry) which was the first smartphone optimized for wireless email use and has achieved a total customer base of 8 million subscribers by June 2007, of which three quarters are in North America.

Although the [Nokia 7650](http://en.wikipedia.org/wiki/Nokia_7650), announced in 2001, was referred to as a 'smart phone' in the media, and is now called a 'smartphone' on the Nokia support site, the press release referred to it as an 'imaging phone'. [Handspring](http://en.wikipedia.org/wiki/Handspring_(company)) delivered the first widely popular smartphone devices in the US market by marrying its Palm OS based Visor PDA together with a piggybacked GSM phone module, the [VisorPhone](http://en.wikipedia.org/w/index.php?title=VisorPhone&action=edit&redlink=1). By 2002, Handspring was marketing an integrated smartphone called the [Treo](http://en.wikipedia.org/wiki/Treo); the company subsequently merged with Palm primarily because the PDA market was dying but the Treo smartphone was quickly becoming popular as a phone with extended PDA organizer features. That same year, Microsoft announced its [Windows CE](http://en.wikipedia.org/wiki/Windows_CE) Pocket PC OS would be offered as "Microsoft Windows Powered Smartphone 2002". Microsoft originally defined its [Windows Smartphone](http://en.wikipedia.org/wiki/Windows_Mobile) products as lacking a touchscreen and offering a lower screen resolution compared to its sibling Pocket PC devices. Palm has since largely abandoned its own Palm OS in favor of licensing Microsoft's WinCE-based operating system now referred to as [Windows Mobile](http://en.wikipedia.org/wiki/Windows_Mobile).

In 2005 Nokia launched its N-Series of 3G smartphones which Nokia started to market not as mobile phones but as multimedia computers.

Out of 1 billion [camera phones](http://en.wikipedia.org/wiki/Camera_phones) to be shipped in 2008, smartphones, the higher end of the market with full email support, will represent about 10% of the market or about 100 million units.

The Smartphone Summit semi-annual conference details smartphone industry market data, trends, and updates among smartphone related hardware, software, and accessor

[Android](http://en.wikipedia.org/wiki/Android_(mobile_device_platform)), a cross platform OS for smartphones was released in 2008. Android is an [Open Source](http://en.wikipedia.org/wiki/Open_Source) platform backed by [Google](http://en.wikipedia.org/wiki/Google), along with major hardware and software developers (such as [Intel](http://en.wikipedia.org/wiki/Intel), [HTC](http://en.wikipedia.org/wiki/HTC_Corporation), [ARM](http://en.wikipedia.org/wiki/ARM_Holdings), and [eBay](http://en.wikipedia.org/wiki/EBay), to name a few), that form the [Open Handset Alliance](http://en.wikipedia.org/wiki/Open_Handset_Alliance).

The first phone to use the [Android OS](http://en.wikipedia.org/wiki/Android_OS) is the [HTC Dream](http://en.wikipedia.org/wiki/HTC_Dream), branded for distribution by [T-Mobile](http://en.wikipedia.org/wiki/T-Mobile) as the [G1](http://en.wikipedia.org/wiki/G1)[http://en.wikipedia.org/wiki/Smartphone - cite\_note-16](http://en.wikipedia.org/wiki/Smartphone#cite_note-16). The phone features a full, capacitive [touch screen](http://en.wikipedia.org/wiki/Touch_screen), a flip out [QWERTY keyboard](http://en.wikipedia.org/wiki/QWERTY_keyboard), and a [track ball](http://en.wikipedia.org/wiki/Track_ball) for navigating web pages. The software suite included on the phone consists of integration with Google's proprietary applications, such as Maps, Calendar, and Gmail, as well as Google's Chrome Lite full HTML web browser. Third party apps are available for free via the [Android Market](http://en.wikipedia.org/wiki/Android_Market), with premium apps slated for Q1 2009.

In July 2008 Apple introduced its innovative [App Store](http://en.wikipedia.org/wiki/App_Store) with both for fee and free applications. The app store was a new way to deliver smartphone applications developed by third parties directly to the [iPhone](http://en.wikipedia.org/wiki/IPhone) or [iPod Touch](http://en.wikipedia.org/wiki/IPod_Touch) without using a PC via download over wifi or cellular network. The App Store has been a huge success for Apple and by April 2009 hosted more than 30,000 applications. The app store delivered its billionth application to users on April 23, 2009.

Following the popularity of Apple's App Store, many other mobile platforms are following Apple with their own application stores. Palm, Microsoft and Nokia have all announced they will launch Apple-like app stores. [RIM](http://en.wikipedia.org/wiki/Research_In_Motion) recently launched its app store, [BlackBerry App World](http://en.wikipedia.org/wiki/BlackBerry_App_World). ~ 5156

**Comments:**

[**VGA**](http://en.wikipedia.org/wiki/VGA_connector) **-** Video Graphics Array.Графическая система, разработанная IBM. Имеет разрешение G40 x 480 пикселов и использует 16 цветов. Широко распространенный стандарт компьютерных графических систем**.**

[**IBM**](http://en.wikipedia.org/wiki/IBM) **-** International Business Machines, NYSE: IBM — транснациональная корпорация со штаб-квартирой в Армонке, штат Нью-Йорк (США), один из крупнейших в мире производителей вычислительной техники, периферийного оборудования, программного обеспечения, и консалтинга.

[**COMDEX**](http://en.wikipedia.org/wiki/COMDEX) **-** самое большое в мире компьютерное коммерческое шоу и самые большие конференции.

[**BellSouth**](http://en.wikipedia.org/wiki/BellSouth) **–** американская телекоммуникационная холдинговая компания, расположенная в Атланте, штат Джорджия

**a palmtop -** карманный компьютер, наладонник

[**Hewlett Packard**](http://en.wikipedia.org/wiki/Hewlett_Packard) **-** крупная технологическая компания со штаб-квартирой в Пало-Альто (Калифорния, США). HP является мировым поставщиком ключевых технологий для корпоративных заказчиков и конечных пользователей.

**a hinge –** шарнир, стержень, подвижный механический элемент

**arguably -** возможно, вероятно

**Palm OS -** операционная система для наладонных компьютеров и коммуникаторов.

**Visor PDA -** карманный компьютер (КПК), работает на базе операционной системы Palm OS

[**Windows CE**](http://en.wikipedia.org/wiki/Windows_CE) **-** это вариант операционной системы Microsoft Windows для наладонных компьютеров, мобильных телефонов и встраиваемых систем.

**a sibling -** букв. - брат или сестра вершины дерева, имеющие общего "родителя"

[**Android**](http://en.wikipedia.org/wiki/Android_(mobile_device_platform)) **OS -** основанная на Linux платформа для мобильных телефонов, разрабатываемая Open Handset Alliance (OHA), инициированным Google. Она позволяет создавать Java приложения, управляющие устройством через разработанные Google библиотеки.

**the** [**Open Handset Alliance**](http://en.wikipedia.org/wiki/Open_Handset_Alliance) **-** бизнес-альянс 48 компаний по разработке открытых стандартов для мобильных устройств, включающий Google, HTC, Intel, Motorola, Qualcomm, Samsung, LG, T-Mobile, Nvidia и Wind River Systems.

[**HTC Dream**](http://en.wikipedia.org/wiki/HTC_Dream) **-** T-Mobile G1 (кодовое название HTC Dream) — смартфон компании HTC, основанный на платформе Google Android.

[**T-Mobile**](http://en.wikipedia.org/wiki/T-Mobile)- это группа компаний, работающих в области мобильной связи, которые находятся в собственности германского телекоммуникационного холдинга Deutsche Telekom.

[**QWERTY keyboard**](http://en.wikipedia.org/wiki/QWERTY_keyboard) -наиболее популярная в настоящее время латинская раскладка клавиатуры, используемая для английского языка. Название пошло от 6 левых символов верхнего ряда раскладки.

**a** [**track ball**](http://en.wikipedia.org/wiki/Track_ball) **-** шаровой манипулятор (для управления движением курсора)

[**App Store**](http://en.wikipedia.org/wiki/App_Store) **-** это онлайн магазин (др. словами — онлайн-сервис) от Apple или точнее — отдел онлайнового супермаркета iTunes Store, позволяющий владельцам мобильных телефонов iPhone и плееров iPod Touch покупать различные приложения

## Operating Systems

Market share of Smartphone operating systems

Operating systems that can be found on mobile devices include [Symbian OS](http://en.wikipedia.org/wiki/Symbian_OS), [iPhone OS](http://en.wikipedia.org/wiki/IPhone_OS), [RIM](http://en.wikipedia.org/wiki/Research_in_Motion)'s [BlackBerry](http://en.wikipedia.org/wiki/BlackBerry), [Windows Mobile](http://en.wikipedia.org/wiki/Windows_Mobile), [Linux](http://en.wikipedia.org/wiki/Linux), [Palm WebOS](http://en.wikipedia.org/wiki/Palm_WebOS) and [Android](http://en.wikipedia.org/wiki/Android_(operating_system)).

The most common [operating systems](http://en.wikipedia.org/wiki/Operating_system) (OS) used in smartphones by Q4 2008 sales are:

[Symbian OS](http://en.wikipedia.org/wiki/Symbian_OS) from [Symbian Ltd.](http://en.wikipedia.org/wiki/Symbian_Ltd.)

Symbian has the largest share in most markets worldwide, but lags behind other companies in the relatively small but highly visible North American market. This matches the success of its largest shareholder and customer, [Nokia](http://en.wikipedia.org/wiki/Nokia), in all markets except Japan. Nokia itself enjoys 52.9% of the smartphone market. In Japan Symbian is strong due to a relationship with [NTT DoCoMo](http://en.wikipedia.org/wiki/NTT_DoCoMo), with only one of the 44 Symbian handsets released in Japan coming from Nokia. It is used by many major handset manufacturers, including [BenQ](http://en.wikipedia.org/wiki/BenQ), [LG](http://en.wikipedia.org/wiki/LG_Group), [Motorola](http://en.wikipedia.org/wiki/Motorola), [Samsung](http://en.wikipedia.org/wiki/Samsung), and [Sony Ericsson](http://en.wikipedia.org/wiki/Sony_Ericsson). Various implementations of user interfaces on top of Symbian (most notable being [UIQ](http://en.wikipedia.org/wiki/UIQ) and Nokia's own [S60](http://en.wikipedia.org/wiki/S60_platform)) are incompatible, which along with the requirement that applications running on mobile phones be signed is hindering the potential for a truly widely accepted mobile application platform. It has received some adverse press attention due to [virus](http://en.wikipedia.org/wiki/Computer_virus) threats (namely [trojan horses](http://en.wikipedia.org/wiki/Trojan_horse_(computing))).

[RIM](http://en.wikipedia.org/wiki/Research_In_Motion) [BlackBerry](http://en.wikipedia.org/wiki/BlackBerry) operating system

This OS is focused on easy operation and was originally designed for [business](http://en.wikipedia.org/wiki/Business). Recently it has seen a surge in third-party applications and has been improved to offer full multimedia support.

[Windows Mobile](http://en.wikipedia.org/wiki/Windows_Mobile) from [Microsoft](http://en.wikipedia.org/wiki/Microsoft)

The [Windows CE](http://en.wikipedia.org/wiki/Windows_CE) operating system and Windows Mobile middleware are widely spread in Asia. The two improved variants of this operating system, [Windows Mobile 6 Professional](http://en.wikipedia.org/wiki/Windows_Mobile#Windows_Mobile_6) (for touch screen devices) and [Windows Mobile 6 Standard](http://en.wikipedia.org/wiki/Windows_Mobile#Next_Versions), were unveiled in February 2007. Windows Mobile benefits from the low barrier to entry for third-party developers to write new applications for the platform. It has been criticized for having a user interface which is not optimized for touch input by fingers; instead, it is more usable with a [stylus](http://en.wikipedia.org/wiki/Stylus). However, unlike iPhone OS, it does support both touch screen and physical keyboard configurations.

[iPhone OS](http://en.wikipedia.org/wiki/IPhone_OS) from [Apple Inc.](http://en.wikipedia.org/wiki/Apple_Inc.)

The [iPhone](http://en.wikipedia.org/wiki/IPhone) uses an operating system called [iPhone OS](http://en.wikipedia.org/wiki/IPhone_OS), which is derived from [Mac OS X](http://en.wikipedia.org/wiki/Mac_OS_X). Third party applications were not officially supported until the release of iPhone OS 2.0 on July 11th 2008. Before this,"[jailbreaking](http://en.wikipedia.org/wiki/Privilege_escalation)" allowed third party applications to be installed, and this method is still available.

[Linux](http://en.wikipedia.org/wiki/Linux) operating system.

Linux is strongest in China where it is used by Motorola, and in Japan, used by DoCoMo. Rather than being a platform in its own right, Linux is used as a basis for a number of different platforms developed by several vendors, including [Android](http://en.wikipedia.org/wiki/Android_(operating_system)), [LiMo](http://en.wikipedia.org/wiki/LiMo_Platform), [Maemo](http://en.wikipedia.org/wiki/Maemo_Platform), [Openmoko](http://en.wikipedia.org/wiki/Openmoko_Linux) and [Qt Extended](http://en.wikipedia.org/wiki/Qt_Extended), which are mostly incompatible. [PalmSource](http://en.wikipedia.org/wiki/PalmSource) (now Access) is moving towards an interface running on Linux. Another platform based on Linux is being developed by Motorola, [NEC](http://en.wikipedia.org/wiki/NEC), NTT DoCoMo, [Panasonic](http://en.wikipedia.org/wiki/Panasonic), Samsung, and [Vodafone](http://en.wikipedia.org/wiki/Vodafone).

[Palm webOS](http://en.wikipedia.org/wiki/WebOS) and [Palm OS](http://en.wikipedia.org/wiki/Palm_OS) (developed by [PalmSource](http://en.wikipedia.org/wiki/PalmSource), renamed to [Garnet OS](http://en.wikipedia.org/wiki/Garnet_OS) when [PalmSource](http://en.wikipedia.org/wiki/PalmSource) became a subsidiary of [ACCESS](http://en.wikipedia.org/wiki/Access_Co.))

Palm webOS is Palm's next generation operating system. PalmSource traditionally used its own platform developed by Palm Inc. [Access Linux Platform](http://en.wikipedia.org/wiki/Access_Linux_Platform) (ALP) is an improvement that was planned to be launched in the first half of 2007. It will use [technical specifications](http://en.wikipedia.org/wiki/Specification) from the [Linux Phone Standards Forum](http://en.wikipedia.org/wiki/Linux_Phone_Standards_Forum). The Access Linux Platform will include an emulation layer to support applications developed for Palm-based devices.

[Binary Runtime Environment for Wireless](http://en.wikipedia.org/wiki/Binary_Runtime_Environment_for_Wireless) (BREW)

BREW was developed in the [USA](http://en.wikipedia.org/wiki/USA) by Qualcomm, Inc and is popular in [North America](http://en.wikipedia.org/wiki/North_America). BREW is a mobile application development platform and end-to-end content delivery ecosystem. BREW has recently gained a foothold in [Europe](http://en.wikipedia.org/wiki/Europe) via the [3 Skypephones](http://en.wikipedia.org/wiki/3_Skypephone_Series) offered by network 3.

[Android](http://en.wikipedia.org/wiki/Android_(operating_system)) from [Google](http://en.wikipedia.org/wiki/Google) (Released 22 Oct 2008)

Android was developed by [Google](http://en.wikipedia.org/wiki/Google). Its share of the smartphone market is still small because of its recent release date. Android is an Open Source, Linux-derived platform backed by Google, along with major hardware and software developers (such as Intel, HTC, ARM, and eBay, to name a few), that form the Open Handset Alliance. This OS, though very new, already has a cult following among programmers eager to develop apps for its flexible, Open Source, back end. Android promises to give developers access to every aspect of the phone's operation. This lends many to foresee the promise of further growth for the Android platform. ~ 3797

**Comments:**

[**Symbian OS**](http://en.wikipedia.org/wiki/Symbian_OS) **-** это операционная система для смартфонов и коммуникаторов, разрабатываемая консорциумом Symbian, основанным в июне 1998 года компаниями: Psion, Nokia, Ericsson и Motorola.

[**UIQ**](http://en.wikipedia.org/wiki/UIQ) **-** User Interface Quartz — программная платформа на основе Symbian OS, разрабатывавшаяся компанией UIQ Technology.

[**Windows Mobile**](http://en.wikipedia.org/wiki/Windows_Mobile) **-** компактная операционная система для мобильных устройств с основным набором приложений, основанных на Microsoft Win32 API. Windows Mobile может работать на ряде устройств, включающем Pocket PC, смартфоны, коммуникаторы.

**a middleware -** программное обеспечение средней сложности

[**Mac OS X**](http://en.wikipedia.org/wiki/Mac_OS_X)- Mac OS X POSIX-совместимая операционная система корпорации AppleOSI. POSIX - Portable Operating System Interface for Unix - Переносимый интерфейс операционных систем Unix - набор стандартов, описывающих интерфейсы между операционной системой и прикладной программой.

[**jailbreaking**](http://en.wikipedia.org/wiki/Privilege_escalation) **-** получение полного доступа к файловой системе

[**Linux**](http://en.wikipedia.org/wiki/Linux) **– (**полное название GNU/Linux**)** общее название UNIX-подобных операционных систем на основе одноимённого ядра и собранных для него библиотек и системных программ, разработанных в рамках проекта GNU.

**UNIX** - группа переносимых, многозадачных и многопользовательских операционных систем.

**a vendor** - поставщик, производитель, продавец

[**NEC**](http://en.wikipedia.org/wiki/NEC) **- N**ippon Electric Corporation - японская компания, производитель электронной, компьютерной техники, телекоммуникационного оборудования, одна из крупнейших мировых телекоммуникационных компаний.

[**Palm webOS**](http://en.wikipedia.org/wiki/WebOS) **-** это встраиваемая операционная система, разработанная компанией Palm для смартфона Pre. Palm Pre - это смартфон фирмы Palm, Inc. с мульти-сенсорным экраном и физической клавиатурой.

[**Garnet OS**](http://en.wikipedia.org/wiki/Garnet_OS) **–** синоним [Palm OS](http://en.wikipedia.org/wiki/WebOS)

[**ACCESS**](http://en.wikipedia.org/wiki/Access_Co.)Linux Platform — операционная система с открытым кодом для мобильных устройств, продвигаемая японской компанией Access Co.

[**Binary Runtime Environment for Wireless**](http://en.wikipedia.org/wiki/Binary_Runtime_Environment_for_Wireless) **-** платформа разработки приложений для мобильных устройств разработанная компанией Qualcomm. Данная платформа может использоваться на мобильных устройствах разных стандартов, таких как GSM/GPRS, UMTS и CDMA, однако в основном она представлена для мобильных телефонов стандарта CDMA.

[**3 Skypephones**](http://en.wikipedia.org/wiki/3_Skypephone_Series) **–** телефон от Skype и оператора 3

[**Google**](http://en.wikipedia.org/wiki/Google) **-** американская компания, владеющая первой по популярности (77,04 %) в мире поисковой системой Google, обрабатывающей 41 млрд 345 млн запросов в месяц (доля рынка 62,4 %).

## Cell Phone Jammer

With so many people using cell phones these days, one of the devices that have popped - up on the market are cell phone jammers. Be advised that cell phone jammers are usually black market devices, since using them is illegal in most municipalities.

However, for those that are tired of hearing endless cell phone conversations or constantly being interrupted by incessant cell phone ring tones, a cell phone jammer seems like the perfect device to own.

How Cell Phone Jammers Work

Cell phone jammers work in a similar way to radio jammers by sending out the same radio frequencies that cell phones operate on. Doing so creates enough interference so that a call can not connect with a cell phone.

There are two types of cell phone jammers currently available.

The first type is usually smaller devices that block the signals coming from cell phone towers to individual cell phones. The frequency blocked is somewhere between 800MHz and 1900MHz. Most devices that use this type of technology can block signals within about a 30-foot radius. Cell phones within this range simply show no signal.

The second type of cell phone jammer is usually much larger in size and more powerful. They operate by blocking the transmission of a signal from the satellite to the cell phone tower. Some powerful models can block cell phone transmissions within a 5 mile radius. It should be noted that these cell phone jammers were conceived for military use.

Once again, it should be noted that operating or even owning a cell phone jammer is illegal in most municipalities and specifically so in the United States. Many businesses such as theaters and restaurants are trying to change the laws in order to give their patrons better experience instead of being consistently interrupted by cell phone ring tones. ~ 1491

**Comments:**

**to pop up** - неожиданно возникнуть

**a jammer** - станция умышленных помех

**incessant** - непрекращающийся, непрерывный, постоянный

**to conceive** - задумывать

**a patron** - патрон, шеф; глава, руководитель

## Walkie-Talkies

A Walkie-Talkie is a portable two-way radio transceiver. A transceiver is a device that has a transmitter and a receiver which are combined together to share common circuitry. A Walkie-Talkie is a handheld communication device and it includes a half-duplex channel i.e. it supports communication in both directions but only one person can transmit at a given instant. However, any number of people can receive the transmitted message. A Walkie-Talkie also feature a push-to-talk switch which is used to switch to the transmit mode from the reception mode.

A Walkie-Talkie has an antenna coming out from the top and it resembles a telephone handset. Some Walkie-Walkies come with advanced capabilities such as trunking capabilities, voice scrambling capabilities and even advanced squelch capabilities. It is also possible to attach speakers and external microphones to some walkie-talkie models and some models even support hands-free operation because of the VOX capability. The communication range is short as the output power is limited to few watts and so, repeaters are used for reliable communication. A repeater listens on one frequency and it then retransmits the message on another frequency. The repeaters are located at different points within the desired area so as to support reliable communication.

Some low-power Walkie-Talkies that operate in 49 Hz band are also available and these are generally used as toys for children. Walkie-Talkies with 'code key' are used to transmit Morse code to other Walkie-Talkies on the same frequency. A Morse code is basically an encoding scheme which uses short and long elements to represent punctuation, numerals, special characters and letters. It is used for transmitting telegraphic information.

Apart from commercial and amateur Walkie-Talkies, personal Walkie-Talkies are also available which are designed to work in the UHF. Some personal Walkie-Talkies have the ability to send pictures and text messages to similar devices and some personal Walkie-Talkies also include receivers for the FM and the AM broadcast radio. These personal Walkie-Talkies are designed to work in the 27 MHz area. Personal Walkie-Talkies are usually used by people to stay in touch when they are at an over crowded place. ~ 1908

**Comments:**

circuitry - график, диаграмма, схема

handheld - ручной; передвижной, переносной, портативный

half-duplex - полудуплексный (устройство или канал, способный в каждый момент только передавать или принимать информацию; прием и передача выполняются поочередно)

push-to-talk - полудуплексный стандарт голосовой связи с двусторонним радиоинтерфейсом и возможностью передачи сигнала одновременно только в одном направлении

trunking - группообразование

scrambling - засекречивание

VOX - Voice Operated Transmit - "Управляемая голосом передача". Система автоматического включения какой-либо функции, например, радиостанции на передачу или диктофона на запись, при появлении звукового сигнала.

## How are Mobile Phones Dangerous to OurHealth?

With practically everyone owning a [mobile phone](http://www.tech-faq.com/how-are-mobile-phones-dangerous-to-our-health.shtml) and spending a considerable amount of time on them each day, it is wise to ask the question: Are [mobile phones](http://www.tech-faq.com/how-are-mobile-phones-dangerous-to-our-health.shtml) dangerous to our health? While there are no conclusive answers at the moment, there are conflicting studies. Some show that mobile phones are safe and others show that mobile phones may pose a health risk.

Mobile phones may be considered potentially dangerous in a few ways. First, they are a device that both sends and receives high-frequency radio waves. Second, these devices have batteries in them that may be unstable in extreme heat or in certain circumstances where a battery or other part is defective. It should be noted that these occurrences are extremely rare.

The jury is still out on whether or not mobile phones are actually dangerous to our health. While the short term risks are extremely low or non existent, the fact that mobile phones have been used by millions in the last decade, the moderate length and long term risks are still unproven. Here are some arguments for and against mobile phone safety according to facts that the BBC printed in November 2004.

Arguments Supporting the Belief That Mobile Phones are Dangerous

There are a few arguments that support the theory that mobile phones are dangerous to the user's health

1. While the evidence is still not clear, it is possible that using a mobile phone on a regular basis can increase the susceptibility to brain tumors or brain cancer by 2.5 times.
2. Mobile phones operate using magnetic fields. Studies based on research in the past have shown that in certain circumstances, magnetic fields can affect living cells.
3. Those that spend long periods of time talking on a mobile phone have mentioned fatigue, a loss of concentration and sometimes headaches.
4. It is possible that radio waves that are given off by mobile phones can heat up and damage tissue.

Arguments Supporting the Belief That Mobile Phones are Safe

1. Radio waves emitted when a mobile phone is used are not hot enough to affect or damage near by tissue.
2. Regarding brain tumor incidence, researchers admit that the evidence still is not clear as to whether tumors or cancer are directly related to mobile phone use.
3. Factors regarding loss of concentration, fatigue or headaches are likely false, since they can not be replicated in the laboratory
4. Magnetic fields emitted by a mobile phone are extremely small and not likely to affect living cells in harmful ways.

Some Tips on Mobile Phone Safety

Obviously, the jury is still out on whether or not mobile phones are dangerous to our health. If you feel threatened by the potential health aspects of using a mobile phone, the easiest way to avoid this threat is to simply not use these phones. While extremely convenient, our society lived comfortably without mobiles in the past. If you would like to have the convenience of a mobile phone, but also want to lessen your risk, there are a few simple things you can do.

* Use a headset to keep the mobile phone away from your head
* Only talk for short periods of time on a mobile phone.- Use a land line for longer conversations. ~ 2602

**Comments:**

**the jury is still out** **-** вопрос еще не решен

**a tumor -** опухоль

**a cancer -** рак

**fatigue -** усталость, утомление

**a tissue –** ткань

# ****Television****

## Who is the Inventor of Television?

You have really opened up a can of worms with that question! Probably no other invention in history has been as hotly disputed as the prestigious claim to the invention of 'Tele-vision or 'long-distance sight' by wireless.”

Since Marconi’s invention of wireless telegraphy in 1897, the imagination of many inventors have been sparked with the notion of sending images as well as sound, wirelessly. The first documented notion of sending components of pictures over a series of multiple circuits is credited to George Carey. Another inventor, W. E. Sawyer, suggested the possibility of sending an image over a single wire by rapidly scanning parts of the picture in succession.

On December 2, 1922, in Sorbonne, France, Edwin Belin, an Englishman, who held the patent for the transmission of photographs by wire as well as fiber optics and radar, demonstrated a mechanical scanning device that was an early precursor to modern television. Belin’s machine took flashes of light and directed them at a selenium element connected to an electronic device that produced sound waves. These sound waves could be received in another location and remodulated into flashes of light on a mirror.

Up until this point, the concept behind television was established, but it wasn’t until electronic scanning of imagery (the breaking up of images into tiny points of light for transmission over radio waves), was invented, that modern television received its start. But here is where the controversy really heats up.

The credit as to who was the inventor of modern television really comes down to two different people in two different places both working on the same problem at about the same time: Vladimir Kosma Zworykin, a Russian-born American inventor working for Westinghouse, and Philo Taylor Farnsworth, a privately backed farm boy from the state of Utah.

“Zworykin had a patent, but Farnsworth had a picture…”

Zworykin is usually credited as being the father of modern television. This was because the patent for the heart of the TV, the electron scanning tube, was first applied for by Zworykin in 1923, under the name of an iconoscope. The iconoscope was an electronic image scanner - essentially a primitive television camera. Farnsworth was the first of the two inventors to successfully demonstrate the transmission of television signals, which he did on September 7, 1927, using a scanning tube of his own design. Farnsworth received a patent for his electron scanning tube in 1930. Zworykin was not able to duplicate Farnsworth’s achievements until 1934 and his patent for a scanning tube was not issued until 1938. The truth of the matter is this, that while Zworykin applied for the patent for his iconoscope in 1923, the invention was not functional until some years later and all earlier efforts were of such poor quality that Westinghouse officials ordered him to work on something “more useful.”

Another player of the times was John Logie Baird, a Scottish engineer and entrepreneur who 'achieved his first transmissions of simple face shapes in 1924 using mechanical television. On March 25, 1925, Baird held his first public demonstration of 'television' at the London department store Selfridges on Oxford Street in London. In this demonstration, he had not yet obtained adequate half-tones in the moving pictures, and only silhouettes were visible.

In the late thirties, when RCA and Zworykin, who was now working for RCA, tried to claim rights to the essence of television, it became evident that Farnsworth held the priority patent in the technology. The president of RCA sought to control television the same way that they controlled radio and vowed that, “RCA earns royalties, it does not pay them,” and a 50 million dollar legal battle subsequently ensued.

In the height of the legal battle for patent priority, Farnsworth’s high school science teacher was subpoenaed and traveled to Washington to testify that as a 14 year old; Farnsworth had shared his ideas of his television scanning tube with his teacher.

With patent priority status ruled in favor of Farnsworth, RCA for the first time in its history began paying royalties for television in 1939.

Philo Farnsworth was recently named one of TIME Magazine's 100 Greatest Scientists and Thinkers of the 20th Century.~3589

**Comments:**

**a precursor -** вестник, предвестник

**an imagery -** совокупность, ряд изображений, фото-, видео- и т. п. материалов, объединенных по какому-л. признаку; получение изображения

**a controversy -** дебаты, дискуссия, полемика, прения, спор

**Westinghouse –** компания, образованная Джорджем Вестингаузем

**an iconoscope -** иконоскоп (передающая телевизионная трубка, предназначенная для преобразования оптического изображения в электрический сигнал)

**RCA -** Radio Corporation of America - американская радиокомпания, основанная в 1919 году.

**to subpoena smb. to testify —** вызывать кого-л. для дачи свидетельских показаний

## **Cable Television**

Cable television is the transmission of televised images to viewers by means of coaxial cables. Cable systems receive the television signal, which is sent out over cables to individual subscribers, by a common antenna (CATV) or satellite dish. Early cable systems developed in the late 1940s to improve reception of commercial programming in rural areas. In the 1960s, cable systems expanded to large urban areas, where reception can also be poor, and the cable television industry began introducing its own networks, such as Home Box Office (HBO), founded in 1972, to provide programming exclusively to subscribers. Beginning in 1975, cable networks began distributing their shows to local cable operators via satellite, thus increasing the amount of programming available nationally. Heavily regulated in their early years, cable systems in many instances were required to provide channels for community access programming, and rate increases were controlled by local authorities. The financial problems caused by the high cost of wiring cities for cable led to legislation deregulating the industry in 1984. Cable operators were able to set their own rates until 1992, when complaints about the industry's monopoly power led to new legislation that gave the Federal Communications Commission the authority to limit rate increases.

During the 1980s and early 90s, the growing number of cable networks, improved programming, increased channel capacity (which reached 150 in some systems by 1992), and greater freedom in terms of programming content greatly expanded the industry. There are 10,828 operating cable systems in the United States serving 28,798 communities and 62 million subscribers; this comprises about 64% of all households. Viewers pay a monthly fee for a package of cable television programming, known as basic cable, and additional monthly fees for networks such as HBO, which are known as pay TV services. Cable television offers a wide variety of specialized programming, including channels devoted to specific interests, such as news, sports, movies, business information, weather, cooking, home shopping, and family viewing. It can also transmit programs from foreign cities, such as the proceedings of the British House of Commons. The industry finances its programming from subscriber fees and advertising revenue. New technologies, such as fibre optics, digital compression, and interactive television, allow cable operators to offer more programming choices and services. The cable lines installed by cable operators are also to use to provide broadband Internet access to the homes of subscribers.~2232

**Comments:**

**coaxial -** соосный, коаксиальный, имеющий общую ось

**Home Box Office (HBO)** — американский кабельный телевизионный канал, осуществляющий вещание по двум 24-часовым кабельным каналам: HBO и Cinemax. Аудитория HBO в США — более 40 млн. подписчиков. Кроме телевещания, HBO предлагает также видео на заказ и другие медиа-услуги. Подразделения HBO и совместные предприятия с её участием вещают более чем в 50 странах мира. Передачи производства HBO (главным образом телесериалы) были закуплены более чем в 150 стран.

**proceedings –** доклады, записки, труды

**a broadband Internet access –** широкополосный доступ в интернет

## Digital Television

The first country to make a wholesale [switch](http://en.wikipedia.org/wiki/Digital_television_transition) to digital over-the-air (terrestrial) broadcasting was [Luxembourg](http://en.wikipedia.org/wiki/Luxembourg), in 2006. Since then, [the Netherlands](http://en.wikipedia.org/wiki/Netherlands), [Finland](http://en.wikipedia.org/wiki/Finland), [Andorra](http://en.wikipedia.org/wiki/Andorra), [Sweden](http://en.wikipedia.org/wiki/Sweden), [Switzerland](http://en.wikipedia.org/wiki/Switzerland), [Belgium (Flanders)](http://en.wikipedia.org/wiki/Flanders), [Germany](http://en.wikipedia.org/wiki/Germany), and the [United States](http://en.wikipedia.org/wiki/United_States) and have followed suit.

In the United States, over-the-air broadcasts are solely in the [ATSC](http://en.wikipedia.org/wiki/ATSC) digital format since [June 12](http://en.wikipedia.org/wiki/June_12), [2009](http://en.wikipedia.org/wiki/2009), the date that the [FCC](http://en.wikipedia.org/wiki/FCC) set for the end of all analog TV transmissions. The switchover was originally scheduled for February 17, 2009 until the [US Congress](http://en.wikipedia.org/wiki/United_States_Congress) passed the DTV Delay Act. By special dispensation, some analog TV signals ceased on the original date and earlier in Hawaii.

In Japan, the switch to digital is scheduled to happen July 24, 2011. In Canada, it is scheduled to happen August 31, 2011. China is scheduled to switch in 2015. In the United Kingdom, the digital switchover has different times for each part of the country; however, the whole of the UK will be digital by 2012. Brazil switched to digital on December 2, 2007 in major cities and it is estimated it will take seven years for complete signal expansion over all of the Brazilian territory.

In Malaysia, the Malaysian Communications & Multimedia Commission (MCMC) will call for tender bids in the third quarter of 2009 for the UHF 470–742 megahertz spectrum which will pave the way for the country to move into the digital television era. The awarding of the spectrum will see the winner having to build a single digital terrestrial transmission/TV broadcast (DTTB) infrastructure for all broadcasters to ride on to transmit their TV programs. The winner will be announced at the end of 2009 or early 2010 and has to commence digital roll-out soon after the award where the analog switch-off is planned for 2015.

While the majority of the viewers of over-the-air broadcasting in the USA watch full-power stations (which number about 1800), there are three other categories of TV stations in the USA: [low-power stations](http://en.wikipedia.org/wiki/Low-power_broadcasting), [Class A stations](http://en.wikipedia.org/wiki/Class_A_television_service), and [TV translator stations](http://en.wikipedia.org/wiki/Broadcast_relay_station). There is presently no deadline for these stations, about 7100 in number, to convert to digital broadcasting.

Formats and bandwidth

Digital television supports many different picture formats defined by the combination of size, aspect ratio (height to width ratio) and interlacing. With terrestrial broadcasting in the USA, the range of formats can be coarsely divided into two categories: HDTV and SDTV.

[High-definition television](http://en.wikipedia.org/wiki/High-definition_television) (HDTV), one of several different formats that can be transmitted over DTV, uses one of two formats: 1280 × 720 [pixels](http://en.wikipedia.org/wiki/Pixel) in [progressive scan](http://en.wikipedia.org/wiki/Progressive_scan) mode (abbreviated [720p](http://en.wikipedia.org/wiki/720p)) or 1920 × 1080 pixels in [interlace](http://en.wikipedia.org/wiki/Interlace) mode ([1080i](http://en.wikipedia.org/wiki/1080i)). Each of these utilizes a [16:9](http://en.wikipedia.org/wiki/16:9) [aspect ratio](http://en.wikipedia.org/wiki/Aspect_ratio). (Some televisions are capable of receiving an HD resolution of 1920 × 1080 at a 60 Hz progressive scan frame rate — known as [1080p](http://en.wikipedia.org/wiki/1080p)60, but this standard is not currently used for transmission.) HDTV cannot be transmitted over current analog channels.

Standard definition TV (SDTV), by comparison, may use one of several different formats taking the form of various aspect ratios depending on the technology used in the country of broadcast. For [4:3](http://en.wikipedia.org/wiki/4:3) aspect-ratio broadcasts, the 640×480 format is used in [NTSC](http://en.wikipedia.org/wiki/NTSC) countries, while 720×576 (rescaled to 768×576) is used in [PAL](http://en.wikipedia.org/wiki/PAL) countries. For [16:9](http://en.wikipedia.org/wiki/16:9) broadcasts, the 704×480 (rescaled to 848×480) format is used in NTSC countries, while 720×576 (rescaled to 1024×576) is used in PAL countries. However, broadcasters may choose to reduce these resolutions to save bandwidth (e.g., many DVB-T channels in the United Kingdom use a horizontal resolution of 544 or 704 pixels per line). This is done through the use of interlacing, in which the effective vertical resolution is halved to 288 lines.

Each commercial terrestrial DTV channel in North America is permitted to be broadcast at a data rate up to 19 megabits per second, or 2.375 megabytes per second. However, the broadcaster does not need to use this entire bandwidth for just one broadcast channel. Instead the broadcast can be subdivided across several video subchannels of varying quality and compression rates, including non-video [datacasting](http://en.wikipedia.org/wiki/Datacasting) services that allow one-way high-bandwidth streaming of data to computers.

A broadcaster may opt to use a standard-definition digital signal instead of an HDTV signal, because current convention allows the bandwidth of a DTV channel (or "[multiplex](http://en.wikipedia.org/wiki/Multiplex_(TV))") to be subdivided into multiple [subchannels](http://en.wikipedia.org/wiki/Digital_subchannel) (similar to what most FM stations offer with [HD Radio](http://en.wikipedia.org/wiki/HD_Radio)), providing multiple feeds of entirely different programming on the same channel. This ability to provide either a single HDTV feed or multiple lower-resolution feeds is often referred to as distributing one's "[bit budget](http://en.wikipedia.org/w/index.php?title=Bit_budget&action=edit&redlink=1)" or multicasting. This can sometimes be arranged automatically, using a [statistical multiplexer](http://en.wikipedia.org/wiki/Statistical_multiplexer) (or "stat-mux"). With some implementations, image resolution may be less directly limited by bandwidth; for example in [DVB-T](http://en.wikipedia.org/wiki/DVB-T), broadcasters can choose from several different modulation schemes, giving them the option to reduce the transmission [bitrate](http://en.wikipedia.org/wiki/Bitrate) and make reception easier for more distant or mobile viewers. Michael Bisk was instrumental in developing dual multiplexed RISC processors coupled with ultrafast 128-bit A/D converters for enhanced bandwidth LCD monitor reception. This is presently under prototype in the EU.

Reception

There are a number of different ways to receive digital television. One of the oldest means of receiving DTV (and TV in general) is using an [antenna](http://en.wikipedia.org/wiki/Antenna_(radio)) (known as an aerial in some countries). This way is known as [Digital Terrestrial Television](http://en.wikipedia.org/wiki/Digital_terrestrial_television) (DTT). With DTT, viewers are limited to whatever channels the antenna picks up. Signal quality will also vary.

Other ways have been devised to receive digital television. Among the most familiar to people are [digital cable](http://en.wikipedia.org/wiki/Digital_cable) and [digital satellite](http://en.wikipedia.org/wiki/Digital_satellite). In some countries where transmissions of TV signals are normally achieved by [microwaves](http://en.wikipedia.org/wiki/Microwaves), digital [MMDS](http://en.wikipedia.org/wiki/MMDS) is used. Other standards, such as [DMB](http://en.wikipedia.org/wiki/Digital_multimedia_broadcasting) and [DVB-H](http://en.wikipedia.org/wiki/DVB-H), have been devised to allow handheld devices such as [mobile phones](http://en.wikipedia.org/wiki/Mobile_phones) to receive TV signals. Another way is [IPTV](http://en.wikipedia.org/wiki/IPTV) that is receiving TV via Internet Protocol, relying on DSL or optical cable line. Finally, an alternative way is to receive digital TV signals via the open Internet. For example, there is a lot of P2P Internet Television software that can be used to watch TV on your computer.

Some signals carry encryption and specify use conditions (such as "may not be recorded" or "may not be viewed on displays larger than 1m in diagonal measure") backed up with the force of law under the [WIPO Copyright Treaty](http://en.wikipedia.org/wiki/WIPO_Copyright_Treaty) and national [legislation](http://en.wikipedia.org/wiki/Legislation) implementing it, such as the U.S. [Digital Millennium Copyright Act](http://en.wikipedia.org/wiki/Digital_Millennium_Copyright_Act). Access to encrypted channels can be controlled by a removable [smart card](http://en.wikipedia.org/wiki/Smart_card), for example via the Common Interface ([DVB-CI](http://en.wikipedia.org/wiki/DVB-CI)) standard for Europe and via [Point Of Deployment](http://en.wikipedia.org/w/index.php?title=Point_Of_Deployment&action=edit&redlink=1) (POD) or named differently [CableCard](http://en.wikipedia.org/wiki/CableCard).

Advantages to conversion

DTV has several advantages over analog TV, the most significant being that digital channels take up less bandwidth (and the bandwidth needs are continuously variable, at a corresponding cost in image quality depending on the level of compression). This means that digital broadcasters can provide more digital channels in the same space, provide [high-definition television](http://en.wikipedia.org/wiki/High-definition_television) service, or provide other non-television services such as multimedia or interactivity. DTV also permits special services such as multiplexing (more than one program on the same channel), electronic program guides and additional languages, spoken or subtitled. The sale of non-television services may provide an additional revenue source.

Digital signals react differently to interference than analog signals. For example, common problems with analog television include [ghosting](http://en.wikipedia.org/wiki/Ghosting_(television)) of images, noise from weak signals, and many other potential problems which, whilst degrading the quality of the image, don't necessarily degrade watchability. Digitized signals don't suffer from ghosting or noise because DTV Tuners and converter boxes receive numeric information by the antenna. The decoder only needs enough information to put the picture together. The only way it fails is when the decoder does not receive enough information from the antenna - there is too much interference in the signal for the decoder to read the number and produce the picture. This will render a digital signal unwatchable with much less interference than an analog signal, even in urban areas.~7118

**Comments:**

[**ATSC**](http://en.wikipedia.org/wiki/ATSC)- Advanced Television Systems Committee - организация, разрабатывающая и утверждающая стандарты для передовых телевизионных систем, в том числе и HDTV. Наиболее широко стандарты ATSC распространены в США и Канаде.

[**FCC**](http://en.wikipedia.org/wiki/FCC) **-** Federal Communications Commission - Федеральная Комиссия по коммуникациям. Независимое правительственное агентство Соединенных Штатов, созданное, управляемое и уполномоченное в соответствии с уставом Конгресса.

**a switchover -** переключение, переход в другой режим

**a dispensation -** распределение, распространение

**to cease -** прекращать, переставать (делать что-л.)

**a roll-out -** свёртывание процесса; откачка; выгрузка (из оперативной памяти)

[**Class A station**](http://en.wikipedia.org/wiki/Class_A_television_service) **–** класс телевизионное обслуживание. Система в Соединенных Штатах., которая регулирует некоторые телевизионные станции с низкой мощностью.

**HDTV -** High-Definition Television, телевидение высокой чёткости, или телевидение повышенной чёткости. Набор стандартов телевизионного вещания повышенного качества посредством цифровых каналов связи (кабельные, спутниковые сети, цифровые носители).

**SDTV -** Standard Definition TeleVision - телевидение с обычным (стандартным) разрешением, не более 576 строк.

[**pixel**](http://en.wikipedia.org/wiki/Pixel) **-** пиксел, минимальный элемент изображения.

[**NTSC**](http://en.wikipedia.org/wiki/NTSC) **-** National Television Standards Committee. Национальный комитет по телевизионным стандартам. Система аналогового цветного телевидения, разработанная в США. 18 декабря 1953 года впервые в мире было начато цветное телевизионное вещание с применением именно этой системы.

[**PAL**](http://en.wikipedia.org/wiki/PAL) **-** phase-alternating line — система аналогового цветного телевидения, разработана инженером немецкой компании «Telefunken» Вальтером Брухом и представленная как стандарт телевизионного вещания в 1967 году.

**DVB-T** - Digital Video Broadcasting — Terrestrial. Европейский стандарт наземного цифрового вещания, один из семейства стандартов DVB. Используется, прежде всего, в различных европейских, азиатских и африканских государствах, а также в Австралии как стандарт для передачи цифрового телевидения и радио.

**a** [**datacasting**](http://en.wikipedia.org/wiki/Datacasting) **–** распределение данных

**a** [**statistical multiplexer**](http://en.wikipedia.org/wiki/Statistical_multiplexer) **–** статистический мультиплексор,коммутатор,селектор, переключатель

**an implementation –** реализация, выполнение

**a** [**bitrate**](http://en.wikipedia.org/wiki/Bitrate) **-** битрейт - это количество передаваемой информации за единицу времени. Или, применительно к сети Интернет и файлам, битрейт - это сколько бит или байт расходуется на одну секунду записи. Чаще всего битрейт указывается в килобитах (kbps или kbit/s).

**RISC** -Reduced Instruction Set Computer - вычисления с сокращённым набором команд.

**A/D converter** – преобразователь переменного тока в постоянный ток

**LCD (**liquid crystal display) - жидкокристаллический дисплей (ЖК-дисплей). Плоский дисплей на основе жидких кристаллов, а также монитор на основе такого дисплея.

[**MMDS**](http://en.wikipedia.org/wiki/MMDS) **-** Multichannel Multipoint Distribution Service – Многоканальная многоадресная распределенная служба, относится к технологии фиксированных беспроводных сетей и использует микроволновый диапазон частот 2,5-2,7 Ггц

**DMB -** Digital Multimedia Broadcasting - это технология, позволяющая передавать цифровой сигнал на мобильные устройства, такие как мобильный телефон или КПК, что позволяет прослушивать на них радио и смотреть телевизионные программы.

[**DVB-H**](http://en.wikipedia.org/wiki/DVB-H) **-** Digital Video Broadcasting – Handheld. Технология мобильного вещания, позволяющая передавать цифровой видеосигнал на мобильные устройства, такие как КПК, мобильный телефон или портативный телевизор. [**IPTV**](http://en.wikipedia.org/wiki/IPTV) **-** Internet Protocol Television. Технология IPTV (IP-TV, IP-телевидение). Цифровое интерактивное телевидение в сетях передачи данных по протоколу IP, новое поколение телевидения.

**Internet Protocol (IP) -** межсетевой протокол. Маршрутизируемый сетевой протокол, основа стека протоколов TCP/IP.

**P2P** (peer-to-peer) — точка-точка. Однора́нговые, децентрализо́ванные или пи́ринговые компьютерные сети, основанные на равноправии участников. В таких сетях отсутствуют выделенные серверы, а каждый узел (peer) является как клиентом, так и сервером.

**an encryption –** шифрование, шифровка

[**WIPO Copyright Treaty**](http://en.wikipedia.org/wiki/WIPO_Copyright_Treaty) **-** World Intellectual Property Organization Copyright Treaty **-** международное соглашение по охране авторского права, разработанное Всемирной организацией интеллектуальной собственности (ВОИС) и принятое на Дипломатической конференции организации 20 декабря 1996 года.

[**Digital Millennium Copyright Act**](http://en.wikipedia.org/wiki/Digital_Millennium_Copyright_Act) **-** Закон об авторском праве в цифровую эпоху, дополняющий законодательство США в области авторского права директивами, учитывающими современные технические достижения в области копирования и распространения информации.

[**CableCard**](http://en.wikipedia.org/wiki/CableCard) **–** карта приблизительно имеет размер кредитной карточки. Она позволяет потребителям в Соединенных Штатах просматривать и делать запись каналов с цифрового кабельного телевидения на цифровых видеомагнитофонах и персональных компьютерах без использования другого оборудования.

**to render -** приводить в какое-л. состояние, изменять состояние

## Digital Video

With digital video we are able to take two of our senses, sight and sound, convert the analog signals, and combine them in the digital realm. By converting our analog world into the digital realm, we can more easily manipulate sight and sound.

Our vision is inherently analog based. To convert that analog world to a digital one, we need a device to sample analog signals and convert them into the digital domain. This is done using a Charged Coupled Device (CCD). A CCD performs sampling and outputs digital information. Once an image is captured, raw video is converted to more efficient formats that can be manipulated, transported, and stored. In order for businesses to take advantage of the benefits of digital video and to make digital video applications more affordable to implement, numerous compression techniques have been developed. Video compression methodologies take the original, raw video data and shrink it using methods that can either restore the video back to its original state called lossless compression when uncompressed or to a close approximation to the original called lossy compression.

Historically, video transmission (synchronous video with audio) was accomplished using traditional analog communication techniques over a coaxial cable physical infrastructure. For both residential and business environments this typically means supporting overlay networks. In addition to the added costs associated with designing, implementing, and maintaining separate networks, video networks have became increasingly complex as the size of the video network increases. Once the video signal (synchronous video with audio) has been digitized, transporting this signal over a communications network based on standard networking technologies like ATM and Ethernet/IP becomes much easier and cost effective for most businesses and even residential video service delivery. However, due to the latency requirements for video signals, the supporting network infrastructure must exhibit several key characteristics discussed below.

One of the most difficult tasks is to determine the level of video quality that is adequate and required for a certain need. Needs range from video conferencing in a business environment to video surveillance in a public safety environment, to broadcasting for entertainment purposes. The trade-off surrounds quality versus cost, and it centers on the level of video quality necessary to achieve the desired level of realism from the video transmission. These decisions cover the range of digital video solution components discussed above. Cameras, viewing devices, compression methods, and appropriate network infrastructure must be designed and selected to ensure that your video will meet user’s expectations. Regarding the network infrastructure segment of the overall digital video solution, latency is the main issue. Latency in networking is the amount of time it takes a packet to travel from source to destination. Together, latency and bandwidth define the speed and capacity of a network. In order to address the latency requirements of high-quality digital video transmission, a network based on ATM provides the best solution on the market today. ATM is an International Telecommunications Union – Telecommunication Standardization Sector (ITU-T) standard for cell relay. Cells are the basic unit of transferring data in an ATM network. It is fixed sized and contains destination information and payload. Since the cells are of fixed size, exacting algorithms have been invented to ensure that when data is sent, it will arrive at the appropriate destination intact, with minimal jitter. This trait is better known as Quality of Service (QoS). Today, ATM is the accepted standard technology for video networking. While there are many IP video solutions available on the market today, only ATM can provide the necessary features to support video transmission flawlessly. Since video is very loss and jitter sensitive, ATM QoS guarantees video transmissions will arrive at the destination address intact.

Another main attribute necessary for digital video transmission is network reliability. Network reliability affects latency. In the event of a network outage due to an equipment failure or physical layer problem, the network supporting digital video transmission must be robust enough to identify the outage point and re-route traffic so no interruption in service is noticed by the users. Digital video networks based on ATM technology have an inherent advantage over Ethernet-based networks due to a robust, hierarchical routing protocol called Private Network to Network Interface (PNNI). Network infrastructures leveraging PNNI technology have the proven ability to re-route traffic within 50ms of an outage. This more than supports the latency requirements of digital video. Conversely, IP/Ethernet networks based on RIP and OSPF routing protocols can take up to 30 seconds to re-route traffic due to an outage. This delay will result in unacceptable video service interruptions. Finally, ATM technology has been widely accepted as the network technology of choice in every telecommunication service provider’s network. ~ 4409

**Comments:**

**CCD** (Charged Coupled device) –прибор с зарядовой связью, ПЗС

**a raw video –** необработанное телевидение

**affordable -** допустимый

**to shrink -** уменьшать, сокращать

**ATM -** Asynchronous Transfer Mode — асинхронный способ передачи данных. Сетевая технология, основанная на передаче данных в виде ячеек (cell) фиксированного размера (53 байта), из которых 5 байтов используется под заголовок.

**Ethernet-** от лат. aether - эфир. Пакетная технология компьютерных сетей, преимущественно локальных.

**a latency -** время ожидания, латентность

**ITU-T** – Комитет по стандартизации телекоммуникаций в составе МСЭ. В недавнем прошлом CCITT (Comite Consultatif Internationale Telegraphique et Telephonique) – Международный консультативный комитет по телефонии и телеграфии (МККТТ). Переименован в Сектор стандартизации телекоммуникаций - TSS (Telecommunications Standardization Sector). В задачи ITU-T входит установление стандартов в области электросвязи. Членами комитета являются министерства связи стран - членов ООН, частные компании, научные организации и торговые объединения. Рекомендации по стандартам публикуются в книгах с цветовой кодировкой (1984 г. - "Красная книга", 1988 г. - "Синяя книга", 1990 г. - "Розовая книга").

**a payload -** полезная нагрузка

**a jitter –** дрожание

**QoS (**Quality of Service**)** – качество обслуживания, гарантированное качество обслуживания. Качество и класс услуг по передаче данных, предоставляемых пользователю АТМ - сетью. Мера производительности телефонной системы, касающаяся качества линий и количества блокировок вызовов.

**an outage –** бездействие, выход из строя; аварийное отключение

**PNNI (Private Network-to-Network Interface)** – межсетевой интерфейс частных сетей. Спецификация Форума ATM, определяющая методы маршрутизации.

**to leverage -** усиливать, использовать рычаги (для усиления)

**RIP (Routing Information Protocol)** – протокол маршрутной информации, протокол RIP. Протокол, применяемый в маршрутизаторах для динамического обмена данными о расположении маршрутизаторов в сети. Определён в RFC 1388 и 1723. В нем вычисляется, сколько переходов через другие маршрутизаторы будут включать в себя разные пути. Выбирается путь с минимальным числом переходов.

**OSPF (**Open Shortest Path First**)** –открытый протокол предпочтения кратчайшего пути. Стандарт, разработанный комитетом IETF для маршрутизаторов сети Internet. Применяется для определения оптимального маршрута. Основан на алгоритме SPF. Обеспечивает следующие дополнительные возможности: маршрутизацию пакета в соответствии с заказанным типом обслуживания; равномерное распределение нагрузки между альтернативными путями одинаковой стоимости; аутентификацию маршрутизаторов, гарантирующую защиту от злоумышленников; задание виртуального канала между маршрутизаторами, соединенными не напрямую, а через некоторую транзитную сеть.

## Digital Video Applications - User Benefits

Video Conferencing

Digital video makes it possible for businesses to enhance their capabilities to deliver more competitive products and services. Much of business is now conducted by phone, which is, by its nature, one dimensional and lacking in the ability to convey the subtleties of body language and other robust visual attributes such as a whiteboard. By having the ability to share a whiteboard over the phone makes it easier to convey ideas and graphic depictions. The solution is to combine voice/video/whiteboard so that phone-based discussions become more personal and more productive. No matter what cameras, compression techniques, and viewing devices you select, using either an ATM-based infrastructure or an IP/Ethernet edge with an ATM core will ensure that the video/audio/whiteboard will be transmitted error free even if there is other traffic on the same link.

Video Archival and Retrieval

VCR tapes are the most common vehicles for analog video archival. Typically, however, tapes must be inserted manually, which makes for a labor-intensive process. Also, VCR tapes jam periodically and have a limited shelf life. If digital video surveillance were used, your digital video would be able to travel uninterrupted from the camera source to a digital archival system, which would require little human intervention. This would be the same source that your security personal are watching. Marconi's ATM switches have the ability to efficiently make copies of data and send that data to multiple locations. This is known as multicasting. Your security personnel could be in one building while your archival system could be miles away.

Distance Learning

Distance learning is a natural use for Video Conferencing. Distance learning can be defined as any learning that takes place with the instructor and students are remote from each other in classroom environments or even to the home. Distance Learning has many benefits, including:

* School district with limited resources to hire many Foreign Language Teachers. With the proper Video setup, that one teacher can teach classes in other schools within the school district.
* Students who live in rural areas, who are not able to attend world-class universities can have high quality 2-way video with the use of ATM networking and Video Conferencing gear.

Video Surveillance

Airports and other vital facilities are under increasing scrutiny to increase their video surveillance activities to locate any suspicious activity. This has led to an increase in the number of cameras that they need to deploy, monitor and archive. Moving to a networked infrastructure, deployment of thousands of cameras is now more feasible and reliable. Video can be multicast to various locations so that an archiver can be digitally recording the same material as what is being viewed on monitors.

Video Arraignment

Large communities would like to have their police officers spend more time enforcing laws than waiting to see a judge after a criminal has been apprehended. By installing video conferencing gear, taxpayers will be able to save on the expense of transporting inmates to court is eliminated in many cases. Eliminating the possibility of escape during the transportation of inmates is one of the many benefits resulting from conducting video arraignments.

Tele Medicine

In the emerging realm of Telemedicine, digital video is making it possible to extend the best medical service to remote or underserved areas of the population. It also makes it possible to leverage the best medical expertise at multiple sites, quickly and efficiently, for collaborative and remote diagnosis, as well as evaluation of medical imagery such as X-rays and MRI images.

Digital video provides an intangible "human touch" that is invaluable to cultivating and enhancing business relationships with customers, suppliers, partners and employees. Just as significantly, digital video can help business attain tangible benefits through cost savings, reduced capital expenditures, improved operational efficiencies, better communications and enhanced customer service. It is for these reasons that businesses will increasingly adopt networked digital video as a competitive asset. **~**3568

**Comments:**

**a subtlety -** острота, тонкость (понимания, анализа и т. п.); проницательность

**a whiteboard** – виртуальная аудиторная доска, разделяемая виртуальная аудиторная доска, виртуальная "классная" доска, виртуальная лекционная доска, разделяемый блокнот. Используемое для видеоконференцсвязи программное средство в виде графического редактора растровых изображений, в котором участники конференцсвязи пишут или рисуют (как мелом на доске).

**to jam –** заедать, застревать, заклинивать; останавливать(ся) (о машине и т. п.)

**a scrutiny -** внимательный осмотр; исследование, наблюдение

**to deploy -** использовать, употреблять; развертывать

**an arraignment -** привлечение к суду; обвинение, предъявление обвинения

**X-rays** – рентгеновы лучи

**MRI (**magnetic resonance imaging**)** – магнитно-резонансное исследование

## Satellite Television

Satellite television is [television](http://en.wikipedia.org/wiki/Television) delivered by way of [communications satellites](http://en.wikipedia.org/wiki/Communications_satellite), as compared to conventional [terrestrial television](http://en.wikipedia.org/wiki/Terrestrial_television) and [cable television](http://en.wikipedia.org/wiki/Cable_television). In many areas of the world satellite television services supplement older terrestrial signals, providing a wider range of channels and services, including subscription-only services.

Satellites used for television signals are generally in either highly elliptical (with inclination of +/-63.4 degrees and orbital period of about 12 hours) or geostationary orbit 37,000 km (22,300 miles) above the earth’s [equator](http://en.wikipedia.org/wiki/Equator).

Satellite television, like other communications relayed by satellite, starts with a transmitting antenna located at an [uplink](http://en.wikipedia.org/wiki/Uplink) facility. Uplink satellite dishes are very large, as much as 9 to 12 meters (30 to 40 feet) in diameter. The uplink dish is pointed toward a specific satellite and the uplinked signals are transmitted within a specific frequency range, the leg of the signal path from the satellite to the receiving Earth station is called the downlink.

A typical satellite has up to 32 transponders for Ku-band and up to 24 for a C-band only satellite, or more for hybrid satellites. Typical transponders each have a bandwidth between 27MHz and 50MHz Each geo-stationary C-band satellite needs to be spaced 2 degrees from the next satellite (to avoid interference). For Ku the spacing can be 1 degree. This means that there is an upper limit of 360/2 = 180 geostationary C-band satellites and 360/1 = 360 geostationary Ku-band satellites. C-band transmission is susceptible to terrestrial interference while Ku-band transmission is affected by [rain](http://en.wikipedia.org/wiki/Rain_fade) (as water is an excellent absorber of microwaves).

The satellite receiver demodulates and converts the signals to the desired form (outputs for television, audio, data, etc.). Sometimes, the receiver includes the capability to [unscramble](http://en.wikipedia.org/wiki/Scrambler) or [decrypt](http://en.wikipedia.org/wiki/Encryption); the receiver is then called an [integrated receiver/decoder](http://en.wikipedia.org/wiki/Integrated_receiver/decoder) or IRD. The cable connecting the receiver to the LNBF or LNB must be of the low loss type [RG-6](http://en.wikipedia.org/wiki/RG-6) or RG-10, etc. It cannot be standard [RG-59](http://en.wikipedia.org/wiki/RG-59).

(A new form of [omnidirectional](http://en.wiktionary.org/wiki/omnidirectional) satellite antenna, which does not use a directed parabolic dish and can be used on a mobile platform such as a vehicle, was recently announced by the [University of Waterloo](http://en.wikipedia.org/wiki/University_of_Waterloo).

Analog television distributed via satellite is usually sent scrambled or unscrambled in [NTSC](http://en.wikipedia.org/wiki/NTSC), [PAL](http://en.wikipedia.org/wiki/PAL), or [SECAM](http://en.wikipedia.org/wiki/SECAM) television broadcast standards. The analog signal is [frequency modulated](http://en.wikipedia.org/wiki/Frequency_modulated) and is converted from an FM signal to what is referred to as [baseband](http://en.wikipedia.org/wiki/Baseband). This baseband comprises the video signal and the audio subcarrier(s). The audio subcarrier is further demodulated to provide a raw audio signal.

There are three primary types of satellite television usage: reception direct by the viewer, reception by local television affiliates, or reception by [headends](http://en.wikipedia.org/wiki/Headend) for distribution across terrestrial [cable systems](http://en.wikipedia.org/wiki/Cable_television).

Direct to the viewer reception includes [direct broadcast satellite](http://en.wikipedia.org/wiki/Direct_broadcast_satellite) or DBS and [television receive-only](http://en.wikipedia.org/wiki/Television_receive-only) or TVRO, both used for homes and businesses including hotels, etc.~2589

**Comments:**

**an inclination –** отклонение, угол наклона

**a geostationary orbit -** геостациона́рная орбита (ГСО) — круговая орбита, расположенная над экватором Земли (0° широты), находясь на которой, искусственный спутник обращается вокруг планеты с угловой скоростью, равной угловой скорости вращения Земли вокруг оси, и постоянно находится над одной и той же точкой на земной поверхности.

**an** [**uplink**](http://en.wikipedia.org/wiki/Uplink) **-** спутниковый канал связи

**a downlink -** пересылка данных с искусственного спутника на наземную станцию

**a transponder -** маяк-ответчик, ответчик, радиомаяк-ответчик

**Ku-band -** Ku-диапазон — диапазон частот сантиметровых длин волн, используемых в спутниковом телевидении.

**C-band –** С-диапазон - это оригинальная частота выделения для спутников связи.

**to** [**unscramble**](http://en.wikipedia.org/wiki/Scrambler) **–** расшифровывать; **syn. to** [**decrypt**](http://en.wikipedia.org/wiki/Encryption) **-** дешифрировать

[**integrated receiver/decoder**](http://en.wikipedia.org/wiki/Integrated_receiver/decoder) **or IRD -** интегральный приемник/декодер - электронное устройство, используемое для приема сигнала на радио частоте и преобразования цифровой информации, передаваемой ему.

**LNBF or LNB -** low-noise block converter - cпутниковый конвертор или дословно малошумный конвертор-моноблок — приёмное устройство, объединяющее в себе предусилитель сигнала LNA (Low-Noise Amplifier), принимаемого со спутника, и понижающий конвертор (Downconverter) он же гетеродин (стабилизированный источник высокой частоты, вырабатывающий синусоидальный сигнал), служащего для преобразования частоты электромагнитной волны Ku или С-диапазона в промежуточную частоту от 950 до 2150 МГц, называемую L-диапазоном, с целью передачи с наименьшими потерями по коаксиальному кабелю до потребителя.

[**RG-6**](http://en.wikipedia.org/wiki/RG-6) **or RG-10 -** телевизионный кабель (Broadband/Cable Television), 75 Ом. Кабель категории RG-6 имеет несколько разновидностей, которые характеризируют его тип и материал исполнения.

[**RG-59**](http://en.wikipedia.org/wiki/RG-59) - телевизионный кабель (Broadband/Cable Television), 75 Ом. Российский аналог РК-75-х-х («радиочастотный кабель»)

[**omnidirectional**](http://en.wiktionary.org/wiki/omnidirectional) - действующий по всем направлениям; не имеющий определенного направления действия; получающий и рассылающий радиоволны во все направления

**an affiliate -** филиал, отделение

[**SECAM**](http://en.wikipedia.org/wiki/SECAM) **- (**от фр. Séquentiel couleur avec mémoire, позднее Séquentiel couleur à mémoire — последовательный цвет с памятью. Система аналогового цветного телевидения, впервые применённая во Франции. Исторически она является первым европейским стандартом цветного телевидения.

**a subcarrier -** поднесущая, субнесущий

**a** [**headend**](http://en.wikipedia.org/wiki/Headend) - головной узел (в компьютерной сети)

## History and IMAX 3D Technology

How we see

The fact that our left eye and right eye see objects from different angles is the basis of 3D photography. If you try looking at an object through one eye and then the other, you will notice that it slightly changes position. However, with both eyes open, the two images that each eye observes separately are fused together as one by our brain. It is the fusion of these two images that creates normal binocular sight and allows our brain to understand depth and distance.

Pre-cinema

To replicate this process on film, two camera lenses are used in place of our two eyes. In 1838, Charles Wheatstone invented the world's first stereoscopic viewer based on Renaissance theories of perspective. Constructed of an assortment of angled mirrors, his invention contained two separate drawings - one for the left eye and one for the right. When both images were observed at the same time, Wheatstone's viewing device produced a stereo image. Weatstone's device encouraged the beginning of a new era in motion and still photography.

3D Cinema

Filmmakers place the two lenses of a 3D camera at about the same distance apart as the distance between our eyes. This space is referred to as the interocular distance, or interaxial distance, and is typically set at about 2-1/2 inches.

To project a 3D film, two individual images representing the perspective of the left and right eye are simultaneously projected on screen. Without special glasses during the presentation, it will seem like you are seeing double, because in fact you are seeing double. Fortunately, the 3D glasses correct this problem. Each lens of the 3D glasses has a special filter which blocks out the opposing image, allowing each eye to see only one image. Your brain perceives the fusion of the two separate images as one three-dimensional image.

Projecting 3D Film

There are several ways to project the dual images necessary to exhibit a 3D film; however, not all processes require two separate projectors. The anaglyphic film format simultaneously projects two different, offset images from one single strip of film. One image is coated with a green (or blue) colour; the other image is coated red. Spectators are given glasses that sort one green (or blue) lens and one red lens. The green lens of the glasses cancels out the red image on screen, while the red lens of the glasses cancel out the green (or blue) image on the screen. Your brain processes the two separated images as one 3D 'black and white' image!

To see 3D in colour, the images for the left and right eye must be kept separate. Before the advent of today's large format theaters, which use two separate synchronized projectors, previous methods placed two 35mm frames in various configurations, either over and under each other or side by side.

Modern Improvements

Contemporary 3D films have begun to use computer generated imagery (CGI) to maximize the 3D illusion. Use of computer created images allows filmmakers total control over convergence and focus, the two most problematic aspects of live action 3D production. By creating the environment in the computer, the point of convergence can be precisely set by the filmmaker. Furthermore, the entire frame can be kept in focus, something nearly impossible to do when shooting by conventional means. What this means is that when the film is projected onto the screen, you will absorb the visual information much like you would in the real world, thus maximizing the illusion.~2889

**Comments:**

**a fusion -** интеграция, объединение, слияние, сращивание

**stereoscopic –** объемный, стереоскопический

**an assortment -** классификация, сортировка

**interocular –** межокулярный, название расстояния между двумя осями линз

**interaxial –** междуосный, название расстояния между двумя осями линз

**anaglyphic –** анаглифный. Анаглифический метод основан на свойствах светофильтров пропускать одни и задерживать другие лучи. Как правило, при построении изображения используются два светофильтра - red и aqua (красный и смесь зелёного и синего), но можно использовать другие очки (красно-зелёные, красно-синее).

**an offset -** противовес,контраст

**a convergence -** конвергенция; сближение

## HDTV

HDTV stands for High Definition TV and while the FCC does not have a standard definition for HDTV, it is widely agreed upon that HDTV is defined as having higher quality video, audio and a wider image aspect ratio than standard television broadcast signals.

HDTV is part of a larger set of standards called ATSC (Advanced Television Systems Committee). This is a group which defines the standards for digital television transmission in the United States and many other counties.

The FCC (Federal Communications Commission) has mandated that all licensed television stations be capable of broadcasting DTV by 2007.

To understand how much higher the quality HDTV is, you need to know the quality of standard TV. In the US, a standard TV has 525 scanned lines for each image. An image is refreshed every 30th of a second, however only half the image is refreshed every 30th of a second, so a full image is refreshed every 60th of a second. This format of refreshing an image is called interlaced. Progressive is when an image is refreshed in its entirety every 30th of a second. Out of the 525 lines of resolution that are scanned, only 480 lines are visible on the TV. Standard TV is also known as 480i (480 lines of usable resolution, interlaced).

HDTV Resolution

There are 4 formats that can be viewed on a High Definition TV; they are 480i, 480p, 720p and 1080p. The higher the number, the higher the resolution. Although HDTV's can play all 4 formats, most experts refer to High Definition TV broadcasts as having either 720p or 1080p resolution.

High quality image resolution is the main selling point for HDTV's. All HDTV's signals are digital signals; no longer does your TV rely on analog signals for broadcasts. Most HDTV's are able to process either HDTV format (720p and 1080p). HDTV signals require 19.39Mbps of bandwidth -- five times the bandwidth of standard TV signals. This is true even though HDTV utilizes [MPEG-2](http://www.tech-faq.com/mpeg-2.shtml) (Motion Picture Experts Group - 2 that is a compression standard for digital television.) compression to conserve as much bandwidth as possible.

The 720p format offers 720 lines of horizontal resolution with progressive scan. Progressive scan means that every line is refreshed in each frame update.

The 1080i format offers 1080 lines of horizontal resolution with interlacing. Interlacing means that every other line is refreshed in each frame update. This means that it requires two frame updates to repaint the entire screen.

1080p offers the best of both worlds, 1080 lines of progressively scanned video.

HDTV Screen Ratio

Standard TV's use a 4.3 [aspect ratio](http://www.tech-faq.com/aspect-ratio.shtml). Aspect Ratio is the ratio of a picture's width to its height. This means that the screen format is more like a square than a cinema screen. Cinema screens usually have an aspect ratio of 16:9, which also is the screen ratio of all HDTV screens. This means that you can watch most movies on your TV as they would be shown in the theater. Most TV's crop off the sides of movies and programming that does not fit the ratio, so you are missing about 1/3 of the picture. However, with HDTV, you get to see the entire image without any cropping or letter boxes.

HDTV Digital Sound

Another great feature is that HDTV is able to receive and reproduce 5.1 independent channels of digital sound. This format is generally termed Dolby AC3 and reproduces CD quality digital sound. 5.1 means that you can hook up 5 separate speakers, plus one subwoofer. AC3 is the audio format utilized by [ATSC](http://www.tech-faq.com/atsc.shtml). The 5 speakers hooked up are usually part of a [home theater](http://www.tech-faq.com/home-theater.shtml) [surround sound](http://www.tech-faq.com/surround-sound.shtml) system and consist of 2 front channel speakers, one center channel speaker and 2 rear or sometimes referred to as surround sound speakers.

It is important to note that HDTV requires either a built in HDTV receiver or a stand alone receiver to watch HDTV programming. Just having a High Definition television set will not allow you to receive HDTV broadcast and view them on your HDTV set. You must also have an HDTV receiver.

Watching High Definition TV

There are three ways to watch High Definition TV. The first way is to receive free broadcasts via the airwaves. You just need an HDTV, a HDTV receiver and an antenna. You can pick up HDTV signals from local broadcasters. These channels usually include all the major networks such as NBC, CBS, ABC, FOX and PBS.

The other way to watch High Definition TV is to have a cable or satellite signal piped into your home using an addressable set top box. Most cable and satellite TV boxes include the feature to view HDTV signals.

The third way to watch High Definition TV is with a DVD or DVR player. Many [DVD players](http://www.tech-faq.com/hdtv.shtml) can play progressive format video which includes 780p. Newer DVD or DVR players can play formats of either 780p or 1080p.

HD Television Sets

Most of today's HDTV sets come in either LCD or Plasma. These sets are usually about 30% more expensive than traditional TV sets and can be thousands of dollars more for extremely large sets, usually over 60 inches. All HD television sets are in 16:9 ration, have outputs for 5.1 [AC3](http://www.tech-faq.com/ac3.shtml) digital sound and are extremely thin. Most LCD and [Plasma TV's](http://www.tech-faq.com/hdtv.shtml) are only a few inches thick; ranging from about 2 inches to less than 6 inches in width.~ 4289

**Comments:**

**Dolby -** системы обработки звука, созданные фирмой «Dolby Laboratories, Inc.» («Dolby Labs»), руководимой Реем Долби, пионером аудио - и видеопромышленности.

**to hook up -** подключать

**NBC -** National Broadcast Company — Национальная вещательная компания) - одна из крупнейших американских телерадиовещательных компаний. Основана в 1926 году.

**CBS -** Broadcasting Inc. — американская телерадиосеть. Название происходит от Columbia Broadcasting System - прежнего юридического названия компании.

**FOX -** Fox Broadcasting Company - американская телекомпания. Владельцем Fox является Fox Entertainment Group. Одна из крупнейших телекомпаний мира**.**

**PBS -** Public Broadcasting Service - Общественная вещательная компания США.

**DVR -** digital video recorder - устройство, которое делает запись видео в цифровом формате на дисковод или другой носитель в пределах устройства.

## MPEG

MPEG (Moving Picture Experts Group) is an International Standards Organization (ISO) group which sets standards for compressing and storing video, audio, and animation in digital form.

Moving Picture Experts Group's first meeting was in Ottawa, Canada, in May of 1988. Over the years, MPEG has developed to include around 350 members per meeting from several industries, research institutions, and universities. The official designation of Moving Picture Experts Group is ISO/IEC JTC1/SC29 WG11.

Pronounced "m-peg", the term MPEG represents the entire [digital video](http://www.tech-faq.com/mpeg.shtml) compression techniques and the digital file formats created by the Moving Picture Experts Group. Generally, MPEG can create high quality video files when compared with other competing formats like Video for Windows, QuickTime, and Indeo. MPEG files can be decoded with the help of software programs or by using special hardware.

MPEG files attain high compression rates by only storing the changes which occur between two frames, rather than storing the entire frame. The technique used by MPEG to encode video information is known as DCT. Much like [JPEG](http://www.tech-faq.com/jpeg.shtml) (Joint Photographic Experts Group is a lossy compression technique for color pictures.), MPEG utilizes a lossy compression technique in which certain data is removed from the files. However, end users cannot normally notice a reduction in quality as the reduction of data is hardly noticeable to the human eye.

MPEG Standards

Though there are several MPEG standards, MPEG-1, [MPEG-2](http://www.tech-faq.com/mpeg.shtml), and MPEG-4 are three most popular MPEG standards:

**MPEG-1:** MPEG-1, the first video and audio compression standard, supports a video resolution of 352x240 at the rate of 30 fps (frames per second). However, the video quality of MPEG-1 is slightly lower than the video quality offered by a normal VCR. MPEG-1 also has the ability to include audio compressed in the MP3 audio format.

[**MPEG-2**](http://www.tech-faq.com/mpeg-2.shtml)**:** MPEG-2 can support video resolutions of 720x480 and 1280x720 at 60 frames per second, with an audio quality equal to conventional CD audio. MPEG-2 is suitable for almost all television standards, including [ATSC](http://www.tech-faq.com/atsc.shtml), [NTSC](http://www.tech-faq.com/ntsc.shtml) and [HDTV](http://www.tech-faq.com/hdtv.shtml). MPEG-2 has the capability to reduce a two hour video file to a few gigabytes of data. Encoding video to MPEG-2 requires fairly significant processing power, but decoding MPEG-2 data to video is not as processor intensive. The MPEG-2 standards are also used to store data on DVD's.

**MPEG-4:** Introduced in late 1998, MPEG-4 is base on MPEG-1, MPEG-2, and Apple QuickTime technology. This graphics and video compression algorithm standard comes with the ability to create wavelet-based files which are smaller than QuickTime or JPEG files. MPEG-4 files are designed so as to transmit images and video while using less network bandwidth. MPEG-4 files can combine video with graphics, text, and 2-D and 3-D animation layers.

Additional features which can be seen in MPEG-4 include object oriented composite files (such as video, audio, and VRML objects), VRML support for 3D rendering, and support for externally specified DRM (Digital Rights Management).

Other MPEG standards

**MPEG-3:** MPEG-3 was originally developed for HDTV; but as the MPEG-2 standard was found to be more efficient for HDTV, MPEG-3 was abandoned.

**MPEG-7:** MPEG-7 is a formal standard for illustrating multimedia content.

**MPEG-21:** MPEG-21 is designed to share machine-readable license information in an "ubiquitous, unambiguous and secure" manner. ~2896

**Comments:**

**MPEG** (Moving Picture Experts Group) **-** экспертная группа по вопросам движущегося изображения. Группа специалистов в подчинении ISO, собирающаяся для выработки стандартов сжатия цифрового видео и аудио.

**QuickTime -** собственническая технология Apple Computer, разработанная в 1989 году, для воспроизведения цифрового видео, звука, текста, анимации, музыки и панорамных изображений в различных форматах.

**Indeo Video –** видеокодек, разработанный Intel в 1992. Видеокодекпрограмма/алгоритм сжатия (то есть уменьшения размера) видеоданных (видеофайла, видеопотока).

**DCT -** Discrete Cosine Transform - дискретное косинусное преобразование. Одно из ортогональных преобразований. Вариант косинусного преобразования для вектора действительных чисел.

**VCR -** videocassette recorder. Видеомагнитофон — устройство для записи или чтения видеосигнала на магнитную ленту.

**a wavelet** –короткий волновой цуг

**VRML –** Virtual Reality Modeling Language — язык моделирования виртуальной реальности. Стандартный формат файлов для демонстрации трёхмерной интерактивной векторной графики, чаще всего используется в WWW.

**DRM -** Digital Rights Management - Технические средства защиты авторских прав (ТСЗАП). Ими являются чаще программные, реже программно-аппаратные средства, которые затрудняют создание копий защищаемых произведений (распространяемых в электронной форме), либо позволяют отследить создание таких копий.

## The Future of Television

Much of the new technology has come from Nippon Television Network, Japan's largest commercial TV company. Its system is known as progressive-scan digital television. Negotiations to put this into use through one of Japan's three new digital-satellite-television services (PerfecTV!, DirecTV and JSkyB) are expected to be concluded within a month.

What distinguishes progressive-scan broadcasting from conventional television is that it transmits the full 525 lines of the screen image (i.e, one full frame) every sixtieth of a second. Current technology sends only half the lines in a frame (first the odd-numbered ones, then the even-numbered ones) every sixtieth of a second. The picture perceived by the eye is an optical illusion created by the "interlacing" of the two alternating sets of lines.

Transmitting signals this way helps reduce the amount of bandwidth needed for broadcasting. The price viewers pay is a blurrier image and a slightly flickering screen. Such compromises, however, are no longer necessary. Unlike its analogue counterpart, the signal used in digital television can easily be compressed by a computer chip to remove redundant information and thus make it more compact. The picture is then decompressed by a second chip in the receiver.

This allows what is actually broadcast to remain well within the bandwidth available even when it is transmitted a full frame at a time. So a 525-line progressive-scan system offers twice the resolution of a conventional 525-line interlaced system. That means that the progressive-scan system is delivering the same amount of information to the screen as a 1,050-line interlaced television—not far short of the resolution of the 1,125-line interlaced HiVision picture.

Engineers at Nippon Television reckon that the decoder needed to decompress the digital signal at the receiving end should add no more than 10% to the price of an existing wide-screen television set. Indeed, receivers capable of showing progressive-scan pictures as well as ordinary interlaced ones have already been announced by Sony, Matsushita and JVC. Prices start at around ¥330,000 ($2,850) for 80cm (32-inch) models.

But pin-sharp pictures for modest outlays are only the beginning. The video techniques can also be used to broadcast images in three dimensions. Nippon Television is working on this idea, too. Its system, developed jointly with Sanyo Electric, is also based on progressive scanning. The main difference is that two closely spaced cameras are used in the studio to feed stereoscopic information to the encoders that compress the image for transmission.

To squeeze the two images into a single frame for transmission, both must first be squashed to half their normal height. (Their widths remain unaltered.) The easiest way to do that is to use interlacing. In this sense, the arrangement works more like conventional broadcasting. The difference is that, thanks to compression, twice as much information is transmitted in any given frame – the left-eye perspective and a slightly different right-eye version.

At the receiving end, the composite image is decompressed and split into its right-eye and left-eye components. These are then displayed alternately on the TV set as if they were ordinary interlaced images. The result is a picture with the same quality as a 525-line television but displaying two sets of slightly different images on the screen.

To see them in 3D, a viewer must wear special spectacles. The lenses of these spectacles contain shutters made of liquid crystals (chemicals that can be rendered temporarily opaque by the application of an electric current). When an image is flashed on the screen, an infrared beam from the TV set momentarily closes the shutter in front of the eye that is not supposed to see it.

Strictly, even the spectacles are unnecessary. By building special lenses into the surface of a television screen, the two images can be beamed separately to the appropriate eyes.

The unanswered question is whether the public is ready for 3D television. Clearly, TV producers will have to learn how to use it effectively; too much of it could quickly become tiresome.~3505

**Comments:**

**Nippon Television Network -** корпорация телевизионной сети Ниппон. Японская телевизионная сеть, расположенная на площади Сёдомэ в Токио. Она также известна, как Nihon TV или NTV. В концепцию вещания Nippon Television входят: информационная программа, кино, спорт, развлекательные передачи, мультфильмы аниме и т. д.

**a blurring**- размывание границ (метод имитации зрительного восприятия движущихся объектов)

**flickering -** мерцательный, мерцающий

**redundant –** избыточный, излишний, резервированный, чрезмерный

**to reckon -** считать, подсчитывать, вычислять; насчитывать; подводить итог

**modest outlay —** скромные расходы

**to squash -** сжимать, сдавливать

**to split –** распределять, расщеплять

**a shutter –** обтюратор, затвор, заслонка

**opaque -** непрозрачный; непроницаемый, темный

# Computers

## The Invention of Computer

There is not just one inventor of the computer, as the ideas of many scientists and engineers led to its invention. These ideas were developed in the 1930s and 1940s, mostly independently of each other, in Germany, Great Britain and the USA, and were turned into working machines.

In Germany, Konrad Zuse hit upon the idea of building a program-controlled calculating machine when he had to deal with extensive calculations in statics. In 1935, he began to design a program-controlled calculating machine in his parents' home in Berlin. It was based on the binary system and used punched tape for the program input. The Z1, which was built between 1936 and 1938, was a purely mechanical machine which was not fully operational. In 1940, Zuse began to build a successor to the Z1 based on relay technology. In May 1941, he finished the Z3 - worldwide the first freely programmable program-controlled automatic calculator that was operational.

Several similar developments were in progress in the USA at the same time. In 1939, IBM started to build a program-controlled relay calculator on the basis of a concept that Howard H. Aiken had put forward in 1937. This machine - the IBM Automatic Sequence Controlled Calculator (Mark I) - was used on production work from 1944.

However, it was not Aiken's and Stibitz's relay calculators that were decisive for the development of the universal computer but the ENIAC, which was developed at the Moore School of Electrical Engineering at the University of Pennsylvania. Extensive ballistic computations were carried out there for the U.S. Army during World War II with the aid of a copy of the analog Differential Analyzer, which had been designed by Vannevar Bush, and more than a hundred women working on mechanical desk calculators. Nevertheless, capacity was barely sufficient to compute the artillery firing tables that were needed. In August 1942, John W. Mauchly, a physicist, presented a memo at the Moore School for a vacuum tube computer that was conceived as a digital version of the Differential Analyzer.

Mauchly had adopted John Vincent Atanasoff's idea for an electronic computer. Atanasoff had developed the ABC special-purpose computer at the Iowa State College (now Iowa State University) to solve systems of linear equations. Mauchly had viewed the ABC in June 1940. John Presper Eckert, a young electronic engineer at the Moore School, was responsible for the brilliant engineering of the new ENIAC. The work began on 31 May 1943 with funding from the U.S. Army. In February 1946, successful program runs were demonstrated.

At almost the same time, the Model I to Model VI relay calculators were built at Bell Laboratories in New York following a suggestion by George R. Stibitz.

John von Neumann, an influential mathematician, turned his attention to the ENIAC in the summer of 1944. While this computer was being built, von Neumann and the ENIAC team drew up a plan for a successor to the ENIAC. The biggest problem with the ENIAC was that its memory was too small. Eckert suggested a mercury delay-line memory which would increase memory capacity by a factor of 100 compared with the electronic memory used in the ENIAC.

An equally big problem was programming the ENIAC, which could take hours or even days.

In meetings with von Neumann, the idea of a stored-program, universal machine evolved. Memory was to be used to store the program in addition to data. This would enable the machine to execute conditional branches and change the flow of the program. The concept of a computer in the modern sense of the word was born.

In spring 1944, von Neumann wrote his "First Draft of a Report on the EDVAC which described the stored-program, universal computer. The logical structure that was presented in this draft report is now referred to as the von Neumann architecture. This EDVAC report was originally intended for internal use only but it became the "bible" for computer pioneers throughout the world in the 1940s and 1950s.

The first two computers featuring the von Neumann architecture were not built in America but in Great Britain. On 21 June 1948, Frederic C. Williams of the University of Manchester managed to run the prototype of the Manchester Mark I, and thus proved it was possible to build a stored-program, universal computer. The first really functional von Neumann computer was built by Maurice Wilkes at Cambridge University. This machine called EDSAC first ran a program on 6 May 1949 computing a table of square numbers.~3758

**Comments:**

**a punched tape –** перфораторная лента

**IBM (**International Business Machines) - транснациональная корпорация со штаб-квартирой в [Армонк](http://ru.wikipedia.org/w/index.php?title=%D0%90%D1%80%D0%BC%D0%BE%D0%BD%D0%BA&action=edit&redlink=1), штат [Нью-Йорк](http://ru.wikipedia.org/wiki/%D0%9D%D1%8C%D1%8E-%D0%99%D0%BE%D1%80%D0%BA) ([США](http://ru.wikipedia.org/wiki/%D0%A1%D0%A8%D0%90)), один из крупнейших в мире производителей вычислительной техники, периферийного оборудования, [программного обеспечения](http://ru.wikipedia.org/wiki/%D0%9F%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%BD%D0%BE%D0%B5_%D0%BE%D0%B1%D0%B5%D1%81%D0%BF%D0%B5%D1%87%D0%B5%D0%BD%D0%B8%D0%B5), и консалтинга.

**ENIAC (**Electronic Number Integrator And Computer) – электронный числовой интегратор и вычислитель. Первый широкомасштабный, электронный, цифровой компьютер, который можно было перепрограммировать для решения полного диапазона задач.

**ABC –** American Broadcasting Corporation – американская радиовещательная корпорация

**EDVAC (**Electronic Discrete Variable **A**utomatic Computer) - одна из первых [электронных вычислительных машин](http://ru.wikipedia.org/wiki/%D0%AD%D0%BB%D0%B5%D0%BA%D1%82%D1%80%D0%BE%D0%BD%D0%BD%D0%B0%D1%8F_%D0%B2%D1%8B%D1%87%D0%B8%D1%81%D0%BB%D0%B8%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D0%B0%D1%8F_%D0%BC%D0%B0%D1%88%D0%B8%D0%BD%D0%B0). В отличие от [ENIAC](http://ru.wikipedia.org/wiki/ENIAC), это компьютер на двоичной, а не десятичной основе.

a delay-line memory - память [запоминающее устройство] на линиях задержки

**EDSAC (**Electronic Delay Storage Automatic Computer) - [электронная вычислительная машина](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80). Первый действующий в мире и практически используемый компьютер с хранимой в [памяти](http://ru.wikipedia.org/wiki/%D0%9F%D0%B0%D0%BC%D1%8F%D1%82%D1%8C_(%D0%BA%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F)) [программой](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F_%D0%BF%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0). Архитектура компьютера наследовала архитектуру американского [EDVAC](http://ru.wikipedia.org/wiki/EDVAC).

## Personal Computers

Personal Computers, microcomputers were made possible by two technical innovations in the field of microelectronics: the integrated circuit, or IC, which was developed in 1959; and the microprocessor, which first appeared in 1971. The IC permitted the miniaturization of computer-memory circuits, and the microprocessor reduced the size of a computer's CPU to the size of a single silicon chip.

The invention of the microprocessor, a machine which combines the equivalent of thousands of transistors on a single, tiny silicon chip, was developed by Ted Hoff at Intel Corporation in the Santa Clara Valley south of San Francisco, California, an area that was destined to become known to the world as Silicon Valley because of the microprocessor and computer industry that grew up there. Because a CPU calculates, performs logical operations, contains operating instructions, and manages data flows, the potential existed for developing a separate system that could function as a complete microcomputer.

The first such desktop-size system specifically designed for personal use appeared in 1974; it was offered by Micro Instrumentation Telemetry Systems (MITS). The owners of the system were then encouraged by the editor of a popular technology magazine to create and sell a mail-order computer kit through the magazine. The computer, which was called Altair, retailed for slightly less than $400.

The demand for the microcomputer kit was immediate, unexpected, and totally overwhelming. Scores of small entrepreneurial companies responded to this demand by producing computers for the new market. The first major electronics firm to manufacture and sell personal computers, Tandy Corporation (Radio Shack), introduced its model in 1977. It quickly dominated the field, because of the combination of two attractive features: a keyboard and a cathode-ray display terminal (CRT). It was also popular because it could be programmed and the user was able to store information by means of cassette tape.

Soon after Tandy's new model was introduced, two engineer-programmers—Stephen Wozniak and Steven Jobs—started a new computer manufacturing company named Apple Computers. I

In 1976, in what is now the Silicon Valley, Steve Jobs and Steve Wozniak created a homemade microprocessor computer board called Apple I. Working from Jobs’ parents’ garage, the two men began to manufacture and market the Apple I to local hobbyists and electronics enthusiasts. Early in 1977, Jobs and Wozniak founded Apple Computer, Inc., and in April of that year introduced the Apple II, the world’s first personal computer. Based on a board of their design, the Apple II, complete with keyboard and color graphics capability, retailed for $1290.Some of the new features they introduced into their own microcomputers were expanded memory, inexpensive disk-drive programs and data storage, and color graphics. Apple Computers went on to become the fastest-growing company in U.S. business history. Its rapid growth inspired a large number of similar microcomputer manufacturers to enter the field. Before the end of the decade, the market for personal computers had become clearly defined.

In 1981, IBM introduced its own microcomputer model, the IBM PC. Although it did not make use of the most recent computer technology, the PC was a milestone in this burgeoning field. It proved that the microcomputer industry was more than a current fad, and that the microcomputer was in fact a necessary tool for the business community. The PC's use of a 16-bit microprocessor initiated the development of faster and more powerful micros, and its use of an operating system that was available to all other computer makers led to a de facto standardization of the industry.

In the mid-1980s, a number of other developments were especially important for the growth of microcomputers. One of these was the introduction of a powerful 32-bit computer capable of running advanced multi-user operating systems at high speeds. This has dulled the distinction between microcomputers and minicomputers, placing enough computing power on an office desktop to serve all small businesses and most medium-size businesses.

Another innovation was the introduction of simpler, "user-friendly" methods for controlling the operations of microcomputers. By substituting a graphical user interface (GUI) for the conventional operating system, computers such as the Apple Macintosh allow the user to select icons—graphic symbols of computer functions—from a display screen instead of requiring typed commands. Douglas Engelbart, invented an "X-Y Position Indicator for a Display System": the prototype of the computer "mouse" whose convenience has revolutionized personal computing. New voice-controlled systems are now available, and users may eventually be able to use the words and syntax of spoken language to operate their microcomputers. ~ 4144

**Comments:**

**IC** - integrated circuit – интегральная схема

**CPU** – central processing unit - центральный процессор

**Micro Instrumentation Telemetry Systems (**MITS) -

**a kit** - оборудование

**to inspire** – способствовать, влиять, воздействовать

**a fad** - прихоть, причуда; фантазия

**de facto** - на деле, фактически, де-факто

## Master of Invention

Nolan Bushnell (Born in 1943)

The father of home video games. He built Pong in 1972, starting the video-game craze that led to today's powerful super systems.

During the 1950's and 1960's, computers improved enormously. Still, only big businesses, universities and the military had them. Then in 1972, the video-game craze began. Computers were scaled down to small boxes, using electronic circuitry instead of the Mark Fs switches. They could do more than analyse data. They could play games.

The first big hit was a simple game called Pong. Two players sat in front of a television screen where a "ball" - a point of light - bounced back and forth. Using knobs on a cabinet, the players could hit the ball with inch-long "paddles" on the screen.

Pong was created by Nolan Bushnell, who grew up near Salt Lake City, Utah. He loved to tinker with machines and became an electrical engineer. He played primitive computer games that were even older than Pong.

"I build it with my own two hands and a soldering iron," Bushnell said of his creation of the first Pong game.

In 1972 Bushnell founded Atari Inc. In Sunnyvale, California, to build Pong games. By 1975 there were 150,000 Pong games in American homes.

Steve Wozniak (Born in 1950) and Steven Jobs (Born in 1955)

Working out of a garage, the young video game fanatics invented the Apple computer in 1976. The age of home computers was born.

One of Atari's early employees was 19-year-old Steve Wozniak, who worked for another computer company, both loved video games.

Jobs and Wozniak dreamed of a personal computer, one that could do more than play games. From this dream, the Apple Computer Company started in family garage.

In 1977 Jobs and Wozniak sold their first Apple II, which launched the personal computer industry. By 1985 they had sold more than two million Apple II's.

The Apple II was more than a toy. People could use it to write letters, to keep financial records and teach their children. And, yes, they could play games on it. The Apply II envolved into today's high-tech Macintosh computers. These computers popularised the use of the mouse, the hand-controlled device that moved the cursor on a computer display.~1814

**Comments:**

**Pong -** видеоигра, игровой процесс которой основан на пинг-понге.

**a paddle -** лопатка

**to tinker -** паять

**soldering –** паяльный, спаянный

**to evolve -** развивать

**Macintosh** или Mac - линейка персональных компьютеров, спроектированных, разработанных, производимых и продаваемых фирмой Apple Inc. Работают под управлением операционной системы Mac OS (в настоящее время — Mac OS X). Своё название получили от сорта яблок «Макинтош» (McIntosh).

## Microsoft Windows

Microsoft Windows (or simply Windows) is a software programme that makes your IBM PC (or compatible) easy to use. It does this by simplifying the computer's user interface.

The word interface refers to the way you give your computer commands, the way you interact with it.

Usually the interface between you and the computer consists of the screen and the keyboard; you interact with the computer by responding to what's on the screen, typing in commands at the DOS command line to do your work.

DOS often isn't very intelligent at interpreting your commands and most people consider it awkward or intimidating as a user interface. These commands can be confusing and difficult to remember. Who wants to learn lots of computer commands just to see what's on your disk, copy a file, or format a disk?

Windows changes much of this. What's been missing from the PC is a programme that makes the computer easy to use. Windows is just such a program. With Windows, you can run programmes, enter and move data around, and perform DOS-related tasks simply by using the mouse to point at objects on the screen. Of course, you also use the keyboard to type in letters and numbers.

Windows interprets your actions and tells DOS and your computer what to do.

In addition to making DOS housekeeping tasks such as creating directories, copying files, deleting files, formatting disks, and so forth, easier, Windows makes running your favorite applications easier, too. (An application is a software package that you use for a specific task, such as word processing).

Windows owes its name to the fact that it runs each programme or document in its own separate window. (A window is a box or frame on the screen.) You can have numerous windows on the screen at a time, each containing its own programme and/or document. You can then easily switch between programs without having to close one down and open the next.

Another feature is that Windows has a facility - called the Clipboard - that lets you copy material between dissimilar document types, making it easy to cut and paste information from, say, a spreadsheet into a company report or put a scanned photograph of a house into a real estate brochure. In essence, Windows provides the means for seamlessly joining the capabilities of very different application programs. Not only can you paste portions of one document into another, but by utilizing more advanced document-linking features those pasted elements remain "live". That is, if the source document (such as some spreadsheet data) changes, the results will also be reflected in the secondary document containing the pasted data.

As more and more application programmes are written to run with Windows, it'll be easier for anyone to learn how to use new programmes. This is because all application programmes that run in Windows use similar commands and procedures.

Windows comes supplied with a few of its own handy programmes. There's a word-processing programme called Write, a drawing programme called Paintbrush, a communications programme called Terminal for connecting to outside information services over phone lines, small utility programmes that are helpful for keeping track of appointments and notes, a couple of games to help you escape from your work, and a few others.

Years of research went into developing the prototype of today's popular graphical user interfaces. It was shown in the early 1980s that the graphical user interface, in conjunction with a hand-held pointing device (now called the mouse), was much easier to operate and understand than the older-style keyboard-command approach to controlling a computer. A little-known fact is that this research was conducted by the Xerox Corporation and first resulted in the Xerox Star computer before IBM PCs or Macintoshes existed. It wasn't until later that the technology was adapted by Apple Computer for its Macintosh prototype, the Lisa. ~3273

**Comments:**

**DOS (**Disk Operating System) - дисковая операционная система, семейство операционных систем для персональных компьютеров, которое ориентировано на использование дисковых накопителей, таких как [жёсткий диск](http://ru.wikipedia.org/wiki/%D0%96%D1%91%D1%81%D1%82%D0%BA%D0%B8%D0%B9_%D0%B4%D0%B8%D1%81%D0%BA) и [дискета](http://ru.wikipedia.org/wiki/%D0%94%D0%B8%D1%81%D0%BA%D0%B5%D1%82%D0%B0).

**to switch –** переключать

**to paste -** вставлять

**Clipboard -** буфер обме́на — промежуточное хранилище данных, предоставляемое операционной системой и доступное для приложений через определённый интерфейс.

## Windows XP

**Windows XP** is a line of operating systems developed by Microsoft for use on general-purpose computer systems, including home and business desktops, notebook computers, and media centres. The letters "XP" stand for eXPerience Codenamed "Whistler" after Whistler, British Columbia, as many Microsoft employees skied at the Whistler-Blackcomb ski resort during its development, Windows XP is the successor to both Windows 2000 and Windows Me, and is the first consumer-oriented operating system produced by Microsoft to be built on the Windows NT kernel and architecture. Windows XP was first released on October 25, 2001, and over 400 million copies are in use, according to a January 2006 estimate by an IDC analyst. It is succeeded by Windows Vista, which was released to volume license customers on November 8, 2006 and worldwide to the general public on January 30, 2007.

The most common editions of the operating system are Windows XP Home Edition, which is targeted at home users, and Windows XP Professional, which has additional features such as support for Windows Server domains and dual processors, and is targeted at power users and business clients. Windows XP Media Center Edition has additional multimedia features enhancing the ability to record and watch TV shows, view DVD movies, and listen to music. Windows XP Tablet PC Edition is designed to run the ink-aware Tablet PC platform. Two separate 64-bit versions of Windows XP were also released, Windows XP 64-bit Edition for IA-64 (Itanium) processors and Windows XP Professional x64 Edition for x86-64 processors.

Windows XP is known for its improved stability and efficiency over previous versions of Microsoft Windows. It presents a significantly redesigned graphical user interface, a change Microsoft promoted as more user-friendly than previous versions of Windows. New software management capabilities were introduced to avoid the "DLL hell" that plagued older consumer versions of Windows. It is also the first version of Windows to use product activation to combat software piracy, a restriction that did not sit well with some users and privacy advocates. Windows XP has also been criticized by some users for security vulnerabilities, tight integration of applications such as Internet Explorer and Windows Media Player, and for aspects of its user interface.

Windows XP had been in development since early 1999, when Microsoft started working on Windows Neptune, an operating system intended to be the "Home Edition" equivalent to Windows 2000 Professional. It was eventually cancelled and became Whistler, which later became Windows XP. Many ideas from Neptune and Odyssey (another cancelled Windows version) were used in Windows XP.~2294

**Comments:**

**a desktop –** настольный компьютер

**Blackcomb ski resort - Уистлер-Блэккомб** — лыжный курорт в [канадской](http://ru.wikipedia.org/wiki/%D0%9A%D0%B0%D0%BD%D0%B0%D0%B4%D0%B0) провинции [Британская Колумбия](http://ru.wikipedia.org/wiki/%D0%91%D1%80%D0%B8%D1%82%D0%B0%D0%BD%D1%81%D0%BA%D0%B0%D1%8F_%D0%9A%D0%BE%D0%BB%D1%83%D0%BC%D0%B1%D0%B8%D1%8F)

**Windows NT kernel -** является частью семейства операционных систем на ядре NT, повторно используемая операционная система с приоритетным прерыванием. Она разработана для работы, как с однопроцессорными, так и с [симметричными мультипроцессорными компьютерами](http://ru.wikipedia.org/wiki/%D0%A1%D0%B8%D0%BC%D0%BC%D0%B5%D1%82%D1%80%D0%B8%D1%87%D0%BD%D0%B0%D1%8F_%D0%BC%D1%83%D0%BB%D1%8C%D1%82%D0%B8%D0%BF%D1%80%D0%BE%D1%86%D0%B5%D1%81%D1%81%D0%BE%D1%80%D0%BD%D0%BE%D1%81%D1%82%D1%8C).

**IDC - International Data Corporation** — аналитическая фирма, специализирующаяся на исследованиях рынка информационных технологий

**Windows Server** **domain** — группа [компьютеров](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80) одной сети, имеющих единый центр (который называется [контроллером домена](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BD%D1%82%D1%80%D0%BE%D0%BB%D0%BB%D0%B5%D1%80_%D0%B4%D0%BE%D0%BC%D0%B5%D0%BD%D0%B0)), использующий единую базу пользователей, единую [групповую](http://ru.wikipedia.org/wiki/%D0%93%D1%80%D1%83%D0%BF%D0%BF%D0%BE%D0%B2%D0%B0%D1%8F_%D0%BF%D0%BE%D0%BB%D0%B8%D1%82%D0%B8%D0%BA%D0%B0) и локальную политики, единые параметры безопасности, ограничение времени работы учётной записи и прочие параметры, значительно упрощающие работу [системного администратора](http://ru.wikipedia.org/wiki/%D0%A1%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%BD%D1%8B%D0%B9_%D0%B0%D0%B4%D0%BC%D0%B8%D0%BD%D0%B8%D1%81%D1%82%D1%80%D0%B0%D1%82%D0%BE%D1%80) организации, если в ней эксплуатируется большое число компьютеров.

**Itanium -** [микропроцессор](http://ru.wikipedia.org/wiki/%D0%9C%D0%B8%D0%BA%D1%80%D0%BE%D0%BF%D1%80%D0%BE%D1%86%D0%B5%D1%81%D1%81%D0%BE%D1%80) с архитектурой [IA-64](http://ru.wikipedia.org/wiki/IA-64), разработанный совместно компаниями [Intel](http://ru.wikipedia.org/wiki/Intel) и [Hewlett-Packard](http://ru.wikipedia.org/wiki/Hewlett-Packard).

**DLL hell -** (DLL-кошмар, буквально: [DLL](http://ru.wikipedia.org/wiki/DLL)-ад) - тупиковая ситуация, связанная с управлением динамическими библиотеками [DLL](http://ru.wikipedia.org/wiki/DLL) в операционной системе [Microsoft Windows](http://ru.wikipedia.org/wiki/Microsoft_Windows).

## Windows Vista

Microsoft began work on Windows Vista, known at the time by its codename Longhorn, in May 2001, five months before the release of Windows XP. It was originally expected to ship sometime late in 2003 as a minor step between Windows XP and Blackcomb, which was planned to be the company's next major operating system release. Gradually, "Longhorn" assimilated many of the important new features and technologies slated for Blackcomb, resulting in the release date being pushed back several times. Many of Microsoft's developers were also re-tasked to build updates to Windows XP and Windows Server 2003 to strengthen security. Faced with ongoing delays and concerns about [feature creep](http://en.wikipedia.org/wiki/Feature_creep), Microsoft announced on August 27, 2004 that it had revised its plans. The original Longhorn, based on the [Windows XP](http://en.wikipedia.org/wiki/Windows_XP) source code, was scrapped, and Longhorn's development started anew, building on the Windows Server 2003 Service Pack 1 codebase, and re-incorporating only the features that would be intended for an actual operating system release. Some previously announced features such as [WinFS](http://en.wikipedia.org/wiki/WinFS) were dropped or postponed, and a new software development methodology called the [Security Development Lifecycle](http://en.wikipedia.org/wiki/Security_Development_Lifecycle) was incorporated in an effort to address concerns with the security of the Windows codebase.

After Longhorn was named Windows Vista in July 2005, an unprecedented [beta-test](http://en.wikipedia.org/wiki/Development_stage) program was started, involving hundreds of thousands of volunteers and companies. In September of that year, Microsoft started releasing regular [Community Technology Previews](http://en.wikipedia.org/wiki/Community_Technology_Preview) (CTP) to beta testers. The first of these was distributed at the 2005 Microsoft [Professional Developers Conference](http://en.wikipedia.org/wiki/Professional_Developers_Conference), and was subsequently released to beta testers and [Microsoft Developer Network](http://en.wikipedia.org/wiki/Microsoft_Developer_Network) subscribers. The builds that followed incorporated most of the planned features for the final product, as well as a number of changes to the user interface, based largely on feedback from beta testers. Windows Vista was deemed feature-complete with the release of the "February CTP", released on February 22, 2006, and much of the remainder of work between that build and the final release of the product focused on stability, performance, application and driver compatibility, and documentation. Beta 2, released in late May, was the first build to be made available to the general public through Microsoft's Customer Preview Program. It was downloaded by over five million people. Two release candidates followed in September and October, both of which were made available to a large number of users.

While Microsoft had originally hoped to have the consumer versions of the operating system available worldwide in time for Christmas 2006, it was announced in March 2006 that the release date would be pushed back to January 2007, in order to give the company–and the hardware and software companies which Microsoft depends on for providing [device drivers](http://en.wikipedia.org/wiki/Device_driver)–additional time to prepare. Development of Windows Vista came to an end when Microsoft announced that it had been finalized on November 8, 2006. Windows Vista cost Microsoft 6 billion dollars to develop.

Windows Vista contains [many changes and new features](http://en.wikipedia.org/wiki/Features_new_to_Windows_Vista), including an updated [graphical user interface](http://en.wikipedia.org/wiki/Graphical_user_interface) and [visual style](http://en.wikipedia.org/wiki/Skin_(computing)) dubbed [Windows Aero](http://en.wikipedia.org/wiki/Windows_Aero), a redesigned [search](http://en.wikipedia.org/wiki/Windows_Search) functionality, multimedia tools including [Windows DVD Maker](http://en.wikipedia.org/wiki/Windows_DVD_Maker), and redesigned networking, audio, print, and display sub-systems. Vista aims to increase the level of communication between machines on a [home network](http://en.wikipedia.org/wiki/Home_network), using [peer-to-peer](http://en.wikipedia.org/wiki/Peer-to-peer) technology to simplify sharing [files](http://en.wikipedia.org/wiki/Computer_file) and [digital media](http://en.wikipedia.org/wiki/Digital_media) between computers and devices. Windows Vista includes version 3.0 of the [.NET Framework](http://en.wikipedia.org/wiki/.NET_Framework), allowing [software developers](http://en.wikipedia.org/wiki/Software_developer) to write applications without traditional [Windows APIs](http://en.wikipedia.org/wiki/Windows_API).

Microsoft's primary stated objective with Windows Vista has been to improve the state of security in the Windows operating system. One common [criticism of Windows XP](http://en.wikipedia.org/wiki/Criticism_of_Windows_XP) and its predecessors is their commonly exploited [security vulnerabilities](http://en.wikipedia.org/wiki/Vulnerability_(computing)) and overall susceptibility to [malware](http://en.wikipedia.org/wiki/Malware), [viruses](http://en.wikipedia.org/wiki/Computer_virus) and [buffer overflows](http://en.wikipedia.org/wiki/Buffer_overflow). In light of this, Microsoft chairman [Bill Gates](http://en.wikipedia.org/wiki/Bill_Gates) announced in early 2002 a company-wide "[Trustworthy Computing](http://en.wikipedia.org/wiki/Trustworthy_Computing) initiative" which aims to incorporate security work into every aspect of software development at the company. Microsoft stated that it prioritized improving the security of Windows XP and [Windows Server 2003](http://en.wikipedia.org/wiki/Windows_Server_2003) above finishing Windows Vista, thus delaying its completion.

While these new features and security improvements have garnered positive reviews, Vista has also been the target of much criticism and negative press. [Criticism of Windows Vista](http://en.wikipedia.org/wiki/Criticism_of_Windows_Vista) has targeted its high system requirements, its more restrictive licensing terms, the inclusion of a number of new [digital rights management](http://en.wikipedia.org/wiki/Digital_rights_management) technologies aimed at restricting the copying of protected digital media, lack of compatibility with some pre-Vista hardware and software, and the number of authorization prompts for [User Account Control](http://en.wikipedia.org/wiki/User_Account_Control). As a result of these and other issues, Windows Vista had seen initial adoption and satisfaction rates lower than Windows XP. However, with an estimated 350 million internet users as of January 2009, it has been announced that Vista usage had surpassed Microsoft’s pre-launch two-year-out expectations of achieving 200 million users. As of the end of May 2009, Windows Vista is the second most widely used operating system on the internet with a 24.35% market share, the most widely used being Windows XP with a 61.54% market share. ~4632

**Comments:**

[**WinFS**](http://en.wikipedia.org/wiki/WinFS) **-** Windows Future Storage — платформа управления данными и метаданными от корпорации [Microsoft](http://ru.wikipedia.org/wiki/Microsoft).

[**Security Development Lifecycle**](http://en.wikipedia.org/wiki/Security_Development_Lifecycle) **-** стадии разработки программного обеспечения. В разработке программного обеспечения, стадии разработки программного обеспечения используются для описания степени готовности [программного продукта](http://ru.wikipedia.org/wiki/%D0%9F%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%BD%D1%8B%D0%B9_%D0%BF%D1%80%D0%BE%D0%B4%D1%83%D0%BA%D1%82).

**a** [**beta - test**](http://en.wikipedia.org/wiki/Development_stage) - публичное тестирование— Стадия активного [бета - тестирования](http://ru.wikipedia.org/wiki/%D0%91%D0%B5%D1%82%D0%B0-%D1%82%D0%B5%D1%81%D1%82%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5) и [отладки](http://ru.wikipedia.org/wiki/%D0%9E%D1%82%D0%BB%D0%B0%D0%B4%D0%BA%D0%B0_%D0%BF%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D1%8B), прошедшей [альфа-тестирование](http://ru.wikipedia.org/wiki/%D0%90%D0%BB%D1%8C%D1%84%D0%B0-%D1%82%D0%B5%D1%81%D1%82%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5) (если таковое было). Программы этого уровня могут быть использованы другими разработчиками программного обеспечения для испытания совместимости. Тем не менее, программы этого этапа могут содержать достаточно большое количество ошибок.

[**Community Technology Previews**](http://en.wikipedia.org/wiki/Community_Technology_Preview) **-**

**a** [**device driver**](http://en.wikipedia.org/wiki/Device_driver) **–** дра́йвер **-** [компьютерная программа](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F_%D0%BF%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0), с помощью которой другая программа (обычно [операционная система](http://ru.wikipedia.org/wiki/%D0%9E%D0%BF%D0%B5%D1%80%D0%B0%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D0%B0%D1%8F_%D1%81%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%B0)) получает доступ к [аппаратному обеспечению](http://ru.wikipedia.org/wiki/%D0%90%D0%BF%D0%BF%D0%B0%D1%80%D0%B0%D1%82%D0%BD%D0%BE%D0%B5_%D0%BE%D0%B1%D0%B5%D1%81%D0%BF%D0%B5%D1%87%D0%B5%D0%BD%D0%B8%D0%B5) некоторого устройства.

[**Windows Aero**](http://en.wikipedia.org/wiki/Windows_Aero) - это комплекс технических решений, применяемый в операционных системах [Microsoft](http://ru.wikipedia.org/wiki/Microsoft) [Windows Vista](http://ru.wikipedia.org/wiki/Windows_Vista) и [Windows 7](http://ru.wikipedia.org/wiki/Windows_7). Название является [акронимом](http://ru.wikipedia.org/wiki/%D0%90%D0%BA%D1%80%D0%BE%D0%BD%D0%B8%D0%BC) от Authentic, Energetic, Reflective and Open.

[peer-to-peer](http://en.wikipedia.org/wiki/Peer-to-peer) – децентрализованный

**a** [**digital media**](http://en.wikipedia.org/wiki/Digital_media) – носитель информации

**NET Framework -** программная технология, предназначенная для создания как обычных программ, так и веб-приложений (в качестве платформы для разработок впервые предложена корпорацией [Microsoft](http://ru.wikipedia.org/wiki/Microsoft)).

[**API**](http://en.wikipedia.org/wiki/Windows_API) **-** Application programming interface - Интерфейс программирования приложений. Набор готовых констант, структур и функций, используемых при программировании пользовательских приложений и обеспечивающих правильное взаимодействие между пользовательским приложением и операционной системой.

**a** [**vulnerabilit**](http://en.wikipedia.org/wiki/Vulnerability_(computing))y – уязвимость. В [компьютерной безопасности](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F_%D0%B1%D0%B5%D0%B7%D0%BE%D0%BF%D0%B0%D1%81%D0%BD%D0%BE%D1%81%D1%82%D1%8C), термин уязвимость используется для обозначения недостатка в системе, используя который, можно нарушить её целостность и вызвать неправильную работу

**a susceptibility** - восприимчивость, чувствительность

**a** [**malware**](http://en.wikipedia.org/wiki/Malware) - вредоносная программа- **mal**icious - злонамеренный и soft**ware** - программное обеспечение - злонамеренная программа, то есть программа, созданная со злым умыслом и/или злыми намерениями.

**a** [**buffer overflow**](http://en.wikipedia.org/wiki/Buffer_overflow) - переполнение буфера - явление, возникающее, когда [компьютерная программа](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F_%D0%BF%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0) записывает [данные](http://ru.wikipedia.org/wiki/%D0%94%D0%B0%D0%BD%D0%BD%D1%8B%D0%B5) за пределами выделенного в [памяти](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F_%D0%BF%D0%B0%D0%BC%D1%8F%D1%82%D1%8C) [буфера](http://ru.wikipedia.org/wiki/%D0%91%D1%83%D1%84%D0%B5%D1%80_(%D0%B8%D0%BD%D1%84%D0%BE%D1%80%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0)).

[**digital rights management**](http://en.wikipedia.org/wiki/Digital_rights_management) **-** технические средства защиты авторских прав - чаще программные, реже программно-аппаратные средства, которые затрудняют создание копий защищаемых произведений (распространяемых в электронной форме), либо позволяют отследить создание таких копий.

[**User Account Control**](http://en.wikipedia.org/wiki/User_Account_Control) **– UAC -** управление учетными записями пользователей. Компонент [Microsoft Windows](http://ru.wikipedia.org/wiki/Microsoft_Windows), впервые появившийся в [Windows Vista](http://ru.wikipedia.org/wiki/Windows_Vista). Этот компонент запрашивает подтверждение действий, требующих прав администратора, в целях защиты от несанкционированного использования компьютера. Администратор компьютера может отключить UAC в панели управления.

## The Molecule Computer

High performance computing specialist Silicon Graphics has created a concept computer called Molecule using mostly off-the-shelf consumer electronics components that packs in 10,000 cores into a single rack. While the computer sounds like a powerhouse, it isn't real. But it’s a demonstration of how chips and memory using in personal computers can be brought together to create a powerhouse, says SGI. Engineers at the company's research labs say they drew up the system to show how consumer electronics technologies could be applied to overcome some of the limits supercomputers face today.

The Molecule computer can handle 20,000 threads of execution, about 40 times more than a single rack x86 cluster system and was designed around an Intel Atom N330 chip, says SGI. The computer would offer the computing power and memory bandwidth of more than 750 high-end PCs, yet it would consume less than half the power and less than 1.4 percent of the physical space. "The Molecule concept computer balances processor speed, sustained memory bandwidth and power consumption," says SGI in a statement. Most general purpose supercomputers have up to 512 cores in a rack but can expand to tens of thousands of CPUs. The largest supercomputers use up to 100,000 cores - or even more - spread across hundreds of racks to deliver very high floating point performance and application flexibility. The SGI Molecule concept computer is focused more on memory bandwidth, density and riding the evolution of consumer CPUs, says the company. ~1281

**Comments:**

**off-the-shelf -** готовый; имеющийся в наличии на складе

**a powerhouse -** источник энергии

**a сluster -** группа

**SGI** – (Silicon Graphics Incorporation) - создал в [1982 году](http://ru.wikipedia.org/wiki/1982_%D0%B3%D0%BE%D0%B4) [Джим Кларк](http://ru.wikipedia.org/wiki/%D0%9A%D0%BB%D0%B0%D1%80%D0%BA,_%D0%94%D0%B6%D0%B5%D0%B9%D0%BC%D1%81_(%D0%BF%D1%80%D0%B5%D0%B4%D0%BF%D1%80%D0%B8%D0%BD%D0%B8%D0%BC%D0%B0%D1%82%D0%B5%D0%BB%D1%8C)) и Эбби Сильверстоун как компанию по производству графических терминалов.

**a sustained memory –** продолжительная память

## The Internet

The Internet is a magnificent global network with millions and millions of computers and people connected to one another where each day people worldwide exchange an immeasurable amount of information, electronic mail, news, resources and, more important, ideas.

It has grown at a surprising rate. Almost everyone has heard about it and an increasing number of people use it regularly. The current estimate is that over 70 million people are connected, in some way, to the Internet - whether they know it or not.

With a few touches at a keyboard a person can get access to materials in almost everywhere. One can have access to full-text newspapers, magazines, journals, reference works, and even books. The Web is one of the best resources for up-to-date information. It is a hypertext-based system by which you can navigate through the Internet. Hypertext is the text that contains links to other documents. A special program known as «browser» can help you find news, pictures, virtual museums, electronic magazines, etc. and print Web pages. You can also click on keywords or buttons that take you to other pages or other Web sites. This is possible because browsers understand hypertext markup language or code, a set of commands to indicate how a Web page is formatted and displayed.

Internet Video conferencing programmes enable users to talk to and see each other, exchange textual and graphical information, and collaborate.

Internet TV sets allow you to surf the Web and have e-mail while you are watching TV, or vice versa. Imagine watching a film on TV and simultaneously accessing a Web site where you get information on the actors of the film. The next generation of Internet-enabled televisions will incorporate a smart-card for home shopping, banking and other interactive services. Internet-enabled TV means a TV set used as an Internet device.

The Internet is a good example of a WAN. For long-distance or worldwide communications computers are usually connected into a wide area network to form a single integrated network. Networks can be linked together by telephone lines or fibre-optic cables. Modern telecommunication systems use fibre-optic cables because they offer considerable advantages. The cables require little physical space, they are safe as they don't carry electricity, and they avoid electromagnetic interference.

Networks on different continents can also be connected via satellites. Computers are connected by means of a modem to ordinary telephone lines or fibre-optic cables, which are linked to a dish aerial. Communication satellites receive and send signals on a transcontinental scale. ~ 2214

**Comments:**

**a smart-card** - смарт-карта**,** представляет собой [пластиковую карт](http://ru.wikipedia.org/wiki/%D0%9F%D0%BB%D0%B0%D1%81%D1%82%D0%B8%D0%BA%D0%BE%D0%B2%D1%8B%D0%B5_%D0%BA%D0%B0%D1%80%D1%82%D1%8B)у со [встроенной микросхемой](http://ru.wikipedia.org/wiki/%D0%98%D0%BD%D1%82%D0%B5%D0%B3%D1%80%D0%B0%D0%BB%D1%8C%D0%BD%D0%B0%D1%8F_%D1%81%D1%85%D0%B5%D0%BC%D0%B0). В большинстве случаев смарт-карты обычно содержат [микропроцессор](http://ru.wikipedia.org/wiki/%D0%9C%D0%B8%D0%BA%D1%80%D0%BE%D0%BF%D1%80%D0%BE%D1%86%D0%B5%D1%81%D1%81%D0%BE%D1%80), [операционную систему](http://ru.wikipedia.org/wiki/%D0%9E%D0%BF%D0%B5%D1%80%D0%B0%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D0%B0%D1%8F_%D1%81%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%B0), контролирующую устройство и доступ к объектам в его памяти.

**WAN (**wide area network**) -** глобальная вычислительная сеть, ГВС представляет собой [компьютерную сеть](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D0%B0%D1%8F_%D1%81%D0%B5%D1%82%D1%8C), охватывающую большие территории и включающую в себя десятки и сотни тысяч компьютеров.

**a fibre-optic cable –** оптоволоконный кабель.

**an interference –** интерференция, помехи.

**a dish aerial –** полусферическая, параболическая антенна.

## Blu-ray Disc

Blu-ray, also known as Blu-ray Disc (BD), is the name of a next-generation optical disc format jointly developed by the Blu-ray Disc Association (BDA), a group of the world's leading consumer electronics, personal computer and media manufacturers (including Apple, Dell, Hitachi, HP, JVC, LG, Mitsubishi, Panasonic, Pioneer, Philips, Samsung, Sharp, Sony, TDK and Thomson). The format was developed to enable recording, rewriting and playback of high-definition video (HD), as well as storing large amounts of data. The format offers more than five times the storage capacity of traditional DVDs and can hold up to 25GB on a single-layer disc and 50GB on a dual-layer disc. This extra capacity combined with the use of advanced video and audio codecs will offer consumers an unprecedented HD experience.

While current optical disc technologies such as DVD, DVD±R, DVD±RW, and DVD-RAM rely on a red laser to read and write data, the new format uses a blue-violet laser instead, hence the name Blu-ray. Despite the different type of lasers used, Blu-ray products can easily be made backwards compatible with CDs and DVDs through the use of a BD/DVD/CD compatible optical pickup unit. The benefit of using a blue-violet laser (405nm) is that it has a shorter wavelength than a red laser (650nm), which makes it possible to focus the laser spot with even greater precision. This allows data to be packed more tightly and stored in less space, so it's possible to fit more data on the disc even though it's the same size as a CD/DVD. This together with the change of numerical aperture to 0.85 is what enables Blu-ray Discs to hold 25GB/50GB. [Recent development by Pioneer](http://www.blu-ray.com/news/?id=1616) has pushed the storage capacity to 500GB on a single disc by using 20 layers.

Blu-ray is currently supported by about 200 of the world's leading consumer electronics, personal computer, recording media, video game and music companies. The format also has support from all Hollywood studios and countless smaller studios as a successor to today's DVD format. Many studios have also announced that they will begin releasing new feature films on Blu-ray Disc day-and-date with DVD, as well as a continuous slate of catalog titles every month. For more information about Blu-ray movies, check out our [Blu-ray movies](http://www.blu-ray.com/movies/) and [Blu-ray reviews](http://www.blu-ray.com/movies/) section which offers information about new and upcoming Blu-ray releases, as well as what movies are currently available in the Blu-ray format. ~ 2045

**Comments:**

**a high-definition (HD) –** высокая четкость

**DVD – (**Digital Versatile Disc— цифровой многоцелевой диск; также Digital Video Disc – цифровой видеодиск) - [носитель информации](http://ru.wikipedia.org/wiki/%D0%9D%D0%BE%D1%81%D0%B8%D1%82%D0%B5%D0%BB%D1%8C_%D0%B8%D0%BD%D1%84%D0%BE%D1%80%D0%BC%D0%B0%D1%86%D0%B8%D0%B8), выполненный в виде диска, внешне схожий с [компакт-диском](http://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%BC%D0%BF%D0%B0%D0%BA%D1%82-%D0%B4%D0%B8%D1%81%D0%BA), однако имеющий возможность хранить больший объём информации за счёт использования лазера с меньшей длиной волны, чем для обычных компакт-дисков.

**DVD-R -** (Recordable - записываемый) был самым первым стандартом записываемых DVD. Благодаря этому DVD-R диски сегодня совместимы с наибольшим количеством устройств записи и считывания DVD. Они являются носителями однократной записи. Информация, записанная на них один раз, изменена быть не может.

**DVD+R - э**то самый младший из существующих форматов DVD. Он основан на технологии DVD+RW и является ее вариантом с однократной записью.

**DVD-RW –** (ReWritable — перезаписываемый) представляет собой более современную технологию, основанную на DVD-R. Диски DVD-RW предоставляют возможность перезаписи не менее 1000 раз.

**DVD+RW -** . (ReWritable — перезаписываемый). Позволяют осуществлять перезапись не менее 1000 раз. При использовании DVD+RW процесс записи может быть приостановлен и возобновлен без потери областей, связывающих сеансы записей (в отличие от DVD-RW).

**DVD-RAM -** (Read Access Memory — память с произвольным доступом). Отличается от всех остальных наличием картриджа, внутри которого сам диск и находится. Производитель гарантирует, по меньшей мере, 100 000 циклов перезаписи.

**CD –** compact disc-компакт-диск - [оптический](http://ru.wikipedia.org/wiki/%D0%9E%D0%BF%D1%82%D0%B8%D0%BA%D0%B0) [носитель информации](http://ru.wikipedia.org/wiki/%D0%9D%D0%BE%D1%81%D0%B8%D1%82%D0%B5%D0%BB%D1%8C_%D0%B8%D0%BD%D1%84%D0%BE%D1%80%D0%BC%D0%B0%D1%86%D0%B8%D0%B8) в виде [диска](http://ru.wikipedia.org/wiki/%D0%94%D0%B8%D1%81%D0%BA) с отверстием в центре, [информация](http://ru.wikipedia.org/wiki/%D0%98%D0%BD%D1%84%D0%BE%D1%80%D0%BC%D0%B0%D1%86%D0%B8%D1%8F) с которого считывается с помощью [лазера](http://ru.wikipedia.org/wiki/%D0%9B%D0%B0%D0%B7%D0%B5%D1%80).

**an aperture -** отверстие

**a release -** релиз, выпуск в свет

## Computer Graphics

Computer graphics are pictures and drawings produced by computers. A graphics programme interprets the input provided by the user and transports it into images that can be displayed on the screen, printed on paper or transferred to microfilm. In the process the computer uses hundreds of mathematical formulas to convert the bits of data into precise shapes and colours. Graphics can be developed for a variety of uses including illustrations, architectural designs and detailed engineering drawings.

Mechanical engineering uses sophisticated programs for applications in computer-aided design (CAD) and computer-aided manufacturing (CAM). In the car industry CAD software is used to develop, model and test car designs before the actual parts are made. This can save a lot of time and money.

Basically, computer helps users to understand complex information quickly by presenting it in more understandable and clearer visual forms. Electric engineers use computer graphics for designing circuits and in business it is possible to present information as graphics and diagrams. These are certain to be much more effective ways of communicating than lists of figures or long explanations.

Today, three-dimensional graphics along with colour and computer animation are supposed to be essential for graphic design, computer-aided engineering (CAE) and academic research. Computer animation is the process of creating objects and pictures which move across the screen; it is used by scientists and engineers to analyze problems. With appropriate software they can study the structure of objects and how it is affected by particular changes.

A graphic package is the software that enables the user to draw and manipulate objects on a computer. Each graphic package has its own facilities, as well as a wide range of basic drawing and painting tools. The collection of tools in a package is known as a palette. The basic geometric shapes, such as lines between two points, arcs, circles, polygons, ellipses and even text, making graphical objects are called “primitives”. You can choose both the primitive you want and where it should go on the screen. Moreover, you can specify the «attributes» of each primitive, e.g., its colour, line type and so on. The various tools in a palette usually appear together as pop-up icons in a menu. To use one you can activate it by clicking on it.

After specifying the primitives and their attributes you must transform them. Transformation means moving or manipulating the object by translating, rotating and scaling the object.

Translation is moving an object along an axis to somewhere else in the viewing area. Rotation is turning the object larger or smaller in any of the horizontal, vertical or depth direction (corresponding to the x, у and z axis). The term «rendering» describes the techniques used to make your object look real. Rendering includes hidden surface removal, light sources and reflections.~ 2482

**Comments:**

**computer-aided design (CAD) -** система автоматизированного проектирования (**САПР**) - программный пакет, предназначенный для создания чертежей, конструкторской и/или технологической документации и/или 3D моделей.

**computer-aided manufacturing (CAM) -** подготовка технологического процесса производства изделий, ориентированная на использование ЭВМ. Под термином понимаются как сам процесс компьютеризированной подготовки производства, так и программно-вычислительные комплексы, используемые инженерами-технологами.

**computer-aided engineering (CAE) -** общее название для программ или программных пакетов, предназначенных для инженерных расчётов, анализа и симуляции физических процессов. Расчётная часть пакетов чаще всего основана на численных методах решения дифференциальных уравнений.

**a palette –** палитра, цветовая гамма

**a polygon -** многоугольник

**a pop-up icon –** всплывающее окно

**a rendering –** изложение, интерпретация

## JPEG

JPEG (Joint Photographic Experts Group) is a lossy compression technique for color pictures. Pronounced "jay-peg", JPEG is an ISO/IEC group of experts that creates and maintains standards for a suite of compression algorithm for computer image files.

JPEG standards help image files to be compressed to around five percent of their original size, though some details are lost during compression. The commonly used file extensions for the JPEG format are .jpg, .jpeg, .jfif, .or jpe.

The extension JPEG specifies only how an image is transformed into a stream of bytes. JFIF (JPEG File Interchange Format), another standard developed by the Independent JPEG Group, specifies how to create a file suitable for computer storage and transmission (like sending through the Internet) from a JPEG stream. There are also other JPEG-based file formats including JNG and the TIFF format which can carry JPEG data as well.

JPEG Image Formats

JPEG/JFIF is one of the most popular image formats used for storing and transmitting images on the Internet. The main reason behind this popularity is the extremely effective compression offered by the JPEG file formats. This compression enables people to quickly transmit (send or receive) image files over the Internet.

JPEG performs best on photographs and paintings of realistic scenes with smooth variations of color and tone. JPEG is not frequently used for charts, line drawings, and other iconic or textual graphics. This is because the compression method used by JPEG can distort these images. PNG (Portable Network Graphics) and GIF (Graphic Interchange Format) are used for these types of graphics. Since GIF has only eight bits per pixel, it is not well suited for color images. PNG can be used to losslessly store images; but the large size of PNG files makes it unsuitable for transmitting over the Internet.

JPEG Compression

JPEG is a lossy compression method performed using discrete cosine transformation, where some data from the original picture is lost. Though the amount of compression depends upon the original image, ratios of 10:1 to 20:1 do not typically cause noticeable loss in the original image.

In the JPEG compression method, compression is done by splitting the original image into minute pixel blocks, which are halved again and again to achieve the desired amount of compression. JPEG images can be created using software or hardware. JPEG compression hardware provides sufficient speed for realtime, on-the-fly compression. C-Cube Microsystems is credited with introducing the first JPEG chip.

When a JPEG file is created or an image is converted from another format to JPEG, the user must specify the desired quality of the image. If the user chooses to create the highest quality image possible, the file size will be large. If the user is willing to sacrifice image quality, the resulting JPEG file can be much smaller. ~ 2426

**Comments:**

**JPEG – (**Joint Photographic Experts Group**)** - объединённая группа экспертов в области фотографии. Она является широко используемым методом [сжатия](http://ru.wikipedia.org/wiki/%D0%A1%D0%B6%D0%B0%D1%82%D0%B8%D0%B5_%D0%B4%D0%B0%D0%BD%D0%BD%D1%8B%D1%85) фотоизображений.

**lossy compression -** сжатие данных с потерями — это метод [сжатия данных](http://ru.wikipedia.org/wiki/%D0%A1%D0%B6%D0%B0%D1%82%D0%B8%D0%B5_%D0%B4%D0%B0%D0%BD%D0%BD%D1%8B%D1%85), когда распакованный файл отличается от оригинального, но «достаточно близок» для того, чтобы быть полезным каким-то образом. Этот тип компрессии часто используется в Интернете, особенно в [потоковой передаче данных](http://ru.wikipedia.org/w/index.php?title=%D0%9F%D0%BE%D1%82%D0%BE%D0%BA%D0%BE%D0%B2%D0%B0%D1%8F_%D0%BF%D0%B5%D1%80%D0%B5%D0%B4%D0%B0%D1%87%D0%B0_%D0%B4%D0%B0%D0%BD%D0%BD%D1%8B%D1%85&action=edit&redlink=1) и [телефонии](http://ru.wikipedia.org/wiki/%D0%A2%D0%B5%D0%BB%D0%B5%D1%84%D0%BE%D0%BD%D0%B8%D1%8F).

**ISO -** (International Organization for Standardization) - международная организация по стандартизации, занимающаяся выпуском [стандартов](http://ru.wikipedia.org/wiki/%D0%A1%D1%82%D0%B0%D0%BD%D0%B4%D0%B0%D1%80%D1%82).

**IEC - (**International Electrotechnical Commission) - международная электротехническая комиссия - международная некоммерческая организация по [стандартизации](http://ru.wikipedia.org/wiki/%D0%A1%D1%82%D0%B0%D0%BD%D0%B4%D0%B0%D1%80%D1%82) в области [электрических](http://ru.wikipedia.org/wiki/%D0%AD%D0%BB%D0%B5%D0%BA%D1%82%D1%80%D0%B8%D1%87%D0%B5%D1%81%D1%82%D0%B2%D0%BE), [электронных](http://ru.wikipedia.org/wiki/%D0%AD%D0%BB%D0%B5%D0%BA%D1%82%D1%80%D0%BE%D0%BD%D0%B8%D0%BA%D0%B0) и смежных [технологий](http://ru.wikipedia.org/wiki/%D0%A2%D0%B5%D1%85%D0%BD%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%8F). Некоторые из стандартов МЭК разрабатываются совместно с Международной организацией по стандартизации ([ISO](http://ru.wikipedia.org/wiki/ISO)).

**JNG -** JPEG Network Graphic **–** основанный JPEG графический формат файла, который близко связан с PNG.

**TIFF – (**Tagged Image File Format) - формат хранения [растровых](http://ru.wikipedia.org/wiki/%D0%A0%D0%B0%D1%81%D1%82%D1%80%D0%BE%D0%B2%D0%B0%D1%8F_%D0%B3%D1%80%D0%B0%D1%84%D0%B8%D0%BA%D0%B0) графических изображений.

**PNG (**Portable Network Graphics**)** **-** [растровый](http://ru.wikipedia.org/wiki/%D0%A0%D0%B0%D1%81%D1%82%D1%80%D0%BE%D0%B2%D0%B0%D1%8F_%D0%B3%D1%80%D0%B0%D1%84%D0%B8%D0%BA%D0%B0) формат хранения графической информации, использующий [сжатие без потерь](http://ru.wikipedia.org/wiki/%D0%A1%D0%B6%D0%B0%D1%82%D0%B8%D0%B5_%D0%B1%D0%B5%D0%B7_%D0%BF%D0%BE%D1%82%D0%B5%D1%80%D1%8C). PNG был создан как для улучшения, так и для замены формата [GIF](http://ru.wikipedia.org/wiki/Graphics_Interchange_Format) графическим форматом, не требующим лицензии для использования.

**GIF, (**Graphic Interchange Format**)** - формат для обмена изображениями; хранения графических изображений. Формат GIF способен хранить сжатые данные без потери качества в формате [до 256 цветов](http://ru.wikipedia.org/wiki/8-%D0%B1%D0%B8%D1%82%D0%BD%D1%8B%D0%B9_%D1%86%D0%B2%D0%B5%D1%82).

**on-the-fly compression –** немедленное сжатие

**C-Cube Microsystems –** компания, которая была новатором в технологии сжатия видео изображения, первая предоставила рынку возможность преобразования изображения и видео данных из аналоговых в цифровые форматы.

# Technology

## Multimedia

Multimedia is simply multiple forms of media integrated together. Media can be text, graphics, audio, animation, video, data, etc. An example of multimedia is a web page on the topic of Mozart that has text regarding the composer along with an audio file of some of his music and can even include a video of his music being played in a hall.

Besides multiple types of media being integrated with one another, multimedia can also stand for interactive types of media such as video games CD ROMs that teach a foreign language, or an information Kiosk at a subway terminal. Other terms that are sometimes used for multimedia include hypermedia and rich media.

The term Multimedia is said to date back to 1965 and was used to describe a show by the Exploding Plastic Inevitable. The show included a performance that integrated music, cinema, special lighting and human performance. Today, the word multimedia is used quite frequently, from DVD's to CD ROMs to even a magazine that includes text and pictures.

Multimedia Applications

Multimedia has become a huge force in American culture, industry and education. Practically any type of information we receive can be categorized as multimedia, from television, to magazines, to web pages, to movies, multimedia is a tremendous force in both informing the American public and entertaining us.

Advertising is perhaps one of the biggest industry's that use multimedia to send their message to the masses. Where one type of media, let's say radio or text can be a great way to promote an item, using multimedia techniques can significantly make an item being advertised better received by the masses and in many cases with greater results.

Multimedia in Education has been extremely effective in teaching individuals a wide range of subjects. The human brain learns using many senses such as sight and hearing. While a lecture can be extremely informative, a lecture that integrates pictures or video images can help an individual learn and retain information much more effectively. Using interactive CD ROM's can be extremely effective in teaching students a wide variety of disciplines, most notably foreign language and music.

Multimedia and the Future

As technology progresses, so will multimedia. Today, there are plenty of new media technologies being used to create the complete multimedia experience. For instance, virtual reality integrates the sense of touch with video and audio media to immerse an individual into a virtual world. Other media technologies being developed include the sense of smell that can be transmitted via the Internet from one individual to another. Today's video games include bio feedback. In this instance, a shock or vibration is given to the game player when he or she crashes or gets killed in the game. In addition as computers increase their power new ways of integrating media will make the multimedia experience extremely intricate and exciting. ~ 2457

**Comments:**

**to date back -** вести начало от чего-л.; восходить (к определенной эпохе

**to immerse -** погружать

**intricate -** запутанный, сложный, замысловатый; затруднительный

## Optical Technology

One of the most interesting developments in telecommunication is the rapid progress of optical communication where optical fibers are replacing conventional telephone wires and cables. Just as digital technologies greatly improved the telephone system, optical communication promises a considerable increase in capacity, quality, performance and reliability of the global telecommunication network.

New technologies such as optical fibers will increase the speed of telecommunication and provide new, specialized information service. Voice, computer data, even video images, will be increasingly integrated into a single digital communication network capable of processing and transmitting virtually any kind of information. It is a result of combining two technologies: the laser, first demonstrated in 1960, and the fabrication 10 years later of ultra-thin silicon fibres which can serve as lightwave conductors. With the further development of very efficient lasers plus continually improved techniques to produce thin silica fibres of incredible transparency, optical systems can transmit pulses of light as far as 135 kilometers without the need for amplification or regeneration.

At present high-capacity optical transmission systems are being installed between many major US cities at a rapid rate. The system most widely used now operates at 147 megabits per second and accommodates 6,000 circuits over a single pair of glass fibres (one for each direction of transmission). This system will soon be improved to operate at 1.7 gigabits per second and handle 24,000 telephone channels simultaneously. A revolution in information storage is underway with optical disk technology. The first digital optical disks were produced in 1982 as compact disks for music. They were further developed as a storage medium for computers. The disks are made of plastics coated with aluminium. The information is recorded by using a powerful laser to imprint bubbles on the surface of the disk. A less powerful laser reads back the pictures, sound or information. An optical disk is almost indestructible and can store about 1000 times more information than a plastic disk of the same size. One CD-ROM disk (650 MB) can replace 300,000 pages of text (about 500 floppies), which represents a lot of savings in databases.

The future of optical storage is called DVD (digital versatile disk). ADVD-ROM can hold up to 17 GB, about 25 times an ordinary CD-ROM. For this reason, it can store a large amount of multimedia software and complete full-screen Hollywood movies in different languages. However, DVD-ROMs are «read-only» devices. To avoid this limitation, companies also produce DVD rewritable drives. Besides, it is reported that an optical equivalent of a transistor has been produced and intensive research on optical electronic computers is underway at a number of US companies as well as in countries around the world. It is found that optical technology is cost-effective and versatile. It finds new applications every day - from connecting communication equipment or computers within the same building or room to longdistance transcontinental, transoceanic and space communications. ~ 2705

**Comments:**

**to accommodate** - вменщать

**to imprint –** отпечатывать; ставить штамп

**indestructible -** неразрушимый

**a floppy** - гибкий магнитный диск, дискета

## The Future of Cybernetics

The new science dealing with the problems of maximum control and governing of processes, known as cybernetics, occupies a leading place among the sciences of the future. The objective of this new science of controlling complicated natural processes and phenomena of society and industry is to increase the efficiency of human labour.

The field of research which has been attracting man's resources and effort for many centuries is our environment of living nature. However, progress in biology and medicine has been comparatively slow for developments in living organisms are extremely complicated.

Advances in instruments construction, the theory of information, mathematical logic’s, electronics and cybernetics open up great prospects of accelerating the pace of research in biology and medicine.

The part played by cybernetics in increasing the efficiency of those engaged in planning, finance, supply and other spheres of economic activity will also grow. This field of human endeavour is becoming increasingly important in our rapidly expanding and well planned socialist economy, in particular. We are facing the task of continuous planning and ensuring a well balanced development of all the branches of the national economy.

At present there are thousands of electronic computers in operation throughout the world.

The existence of hundreds of computing centres equipped with learning and rapid acting machines, and connected by automatic communication lines with industry, supply centres, transport and organs of finance will fundamentally change national economic management. Controlled by cybernetics, industrial enterprises will operate at their most efficient peak. This, in its turn, will effect tremendous economy of time and resources.

The comparatively simple methods of automation used for some technologies will become more and more complicated. As production techniques become more efficient, they can be more effectively controlled, with the aim of raising the quality and the quantity of manufactured goods and improving working conditions.

Despite the numerous results of research into cybernetics, opening up breath-taking prospects for science, industry and economics generally, it is still hard to predict the achievements this wonderful science may make in the near future, since the pace of technical progress is exceptionally great and continually increasing.

The advance in the technical progress is the outcome, primarily of the talent, inventiveness and the effort of man — this great re-maker and master of nature.~2173

## What is Nanotechnology?

Nanotechnology is the creation of functional materials, devices, and systems through control of matter on the nanometer (1 to 100+ nm) length scale and the exploitation of novel properties and phenomena developed at that scale.

A scientific and technical revolution has begun that is based upon the ability to systematically organize and manipulate matter on the nanometer length scale.

What is a nanometer?

A nanometer is one billionth of a meter (10-9 m). This is roughly ten times the size of an individual atom. A cube 2.5 NM on a side would contain about a thousand atoms. The smallest feature in an integrated circuit of today is 250 NM on a side, and contains one million atoms in a layer of atomic height. Proteins, the molecules that catalyze chemical transformations in cells, are 1 to 20 NM in size. For comparison, 10 NM is 1000 times smaller than the diameter of a human hair. There are as many nanometers in an inch as there are inches in 400 miles.

Why is this length scale so important?

There are five reasons why this length scale is so important:

* The wavelike properties of electrons inside matter are influenced by variations on the nanometer scale. By patterning matter on the nanometer length scale, it is possible to vary fundamental properties of materials (for instance, melting temperature, magnetization, charge capacity) without changing the chemical composition.
* The systematic organization of matter on the nanometer length scale is a key feature of biological systems. Nanotechnology promises to allow us to place artificial components and assemblies inside cells, and to make new materials using the self-assembly methods of nature. This is a powerful new combination of materials science and biotechnology.
* Nanoscale components have very high surface areas, making them ideal for use in composite materials, reacting systems, drug delivery, and energy storage.
* The finite size of material entities, as compared to the molecular scale, determine an increase of the relative importance of surface tension and local electromagnetic effects, making nanostructured materials harder and less brittle.
* The interaction wavelength scales of various external wave phenomena become comparable to the material entity size, making materials suitable for various opto-electronic applications.

How will the new technologies help solve society problems?

The new concepts of nanotechnology are so broad and pervasive, that they will influence every area of technology and science, in ways that are surely unpredictable. We are just now seeing the tip of the iceberg in terms of the benefits that nanostructuring can bring:

* wear-resistant tires made by combining nanometer-scale particles of inorganic clays with polymers
* medicines as nanoparticles with vastly improved delivery and control characteristics
* greatly improved printing brought about by nanometer-scale particles that have the best properties of both dyes and pigments, and
* vastly improved lasers and magnetic disk heads made by controlling layer thickness to better than a nanometer.

Many further and greater advances resulting from nanotechnology are inevitable. Within a few decades, healthcare will be revolutionized by combining nanotechnology with biotechnology to produce ingestable systems that will be harmlessly flushed from the body if the patient is healthy but will notify a physician of the type and location of diseased cells and organs if there are problems.

Nanometer-scale traps will be constructed that will be able to remove pollutants from the environment and deactivate chemical warfare agents. Computers with the capabilities of current workstations will be the size of a grain of sand and will be able to operate for decades with the equivalent of a single wristwatch battery. Robotic spacecraft that weigh only a few pounds will be sent out to explore the solar system, and perhaps even the nearest stars.

What will government do for nanotechnology?

Government will play the key role in assuring that the enormous benefits of nanotechnology will be realized quickly and the U.S. will share the global benefits. The goals of nanotechnology are too long term (greater than ten years) for industry to take an immediate leadership role, although the high level of industry interest and concern for the field is almost unprecedented. Because of its interdisciplinary nature, the development of nanotechnology requires creating teams of physicists, chemists, biologists, and engineers to tackle the problems and the funding agencies will need to be organized to foster this teamwork. The enabling infrastructure and technologies must be in place for industry to take advantage of nanotechnology innovations and discoveries. Industry is frequently reluctant to invest in risky research that takes many years to develop into a product. In the US the university and government research system fills this gap. The increasing pace of technological commercialization requires a compression of past time scales and parallel development of research and commercial products and a synergy among industry, university, and government partners. New infrastructure at the universities and national labs is required for the field to grow. A worldwide competition is underway, and the US response is fragmented in comparison to the approach of European and Asian countries. For all of these reasons, this is a moment of opportunity to create an inter-agency initiative in nanotechnology to catalyze academe, industry, health, business, and national security efforts.

Looking to the future

The total societal impact of nanotechnology is expected to be greater than the combined influences that the silicon integrated circuit, medical imaging, computer-aided engineering, and man-made polymers have had in this century. Significant improvements in performance and changes of manufacturing paradigms will lead to several industrial revolutions in the 21st century. Nanotechnology will change the nature of almost every human-made object. ~ 5107

**Comments:**

**an assembly -** соединение

**a tension -** упругость

**pervasive -** распространяющийся, проникающий, пропитывающий, заполняющий

**to ingest** - засасывать

**a pollutant -** загрязняющий агент

**to tackle -** энергично, с усердием браться, приниматься (за что-л.); набрасываться

**to foster -** воспитывать, обучать

**reluctant -** делающий что-л. с большой неохотой, по принуждению; сопротивляющийся

**synergy -** успешные совместные усилия; совместная деятельность

## Quantum Teleportation

Teleportation refers to instantaneous transport of an object or matter from one place to a predetermined location. In this mode of travel, the object or matter being transported is broken down and immediately recreated somewhere else. In quantum teleportation, which is the favored teleportation type in laboratories, the properties of the origin quantum system are recreated in the destination quantum system even if the two quantum systems do not have physical contact.

Most people, however, hold to the belief that teleportation will forever remain fiction, with the more knowledgeable pointing to the Heisenberg Uncertainty Principle as the primary obstacle to teleportation becoming a reality. This principle states that you cannot know the position of a particle and its speed at the same time; if you don't know where the particle is (its position), then how can you teleport it?

Quantum Teleportation Experiments

In 1993, a team of researchers at IBM, led by physicist Charles Bennet, theoretically confirmed that quantum teleportation was possible but only if the original material was destroyed. In 1998, teams from Caltech and Europe were able to successfully teleport a photon: reading the atomic structure of the photon, sending the information across a 3-foot coaxial cable, and creating a duplicate of the original photon, and - as Charles Bennet and the IBM team predicted - the original photon no longer existed when the duplicate was created.

The experiment involved a phenomenon called entanglement, a still unexplained phenomenon between paired particles where a change in one particle instantly causes a change in the other, with no concern for the distance between them.

The Caltech experiment involved three photons (labeled A, B and C) in which the latter two are entangled. The scientists extracted some information from photon A, and the remaining information is passed to photon B through entanglement and then, from B to C. The information from photon A is therefore passed to photon C which replicates A by combining information from B. In the process, photon A is unalterably changed and disappears.

In 2004, scientists at the National Institute of Standards and Technology (NIST) in Boulder, Colorado and the University of Insbruck in Austria, were able to transmit the quantum state of an atom to another atom without a direct link between the two, in effect transporting solid matter between two atoms.

In 2006, scientists at the Niels Bohr Institute in Copenhagen succeeded in teleporting information from a laser beam into a cloud of atoms - in effect, teleporting information between two different objects, light and matter where one (light) is the carrier of information, and the other (atoms) are the storage medium.

The experiments are seen as steps forward towards one goal of quantum teleportation - the development of quantum computers which would replace current binary bits (1s and 0s) with quantum bits or qubits, transmitting and processing data using entanglement instead of circuits. Eighty entangled qubits will contain an amazing 151 trillion gigabytes of processing power - around 2.3 trillion times faster than today's currently 'fast' 64-bit architecture. ~ 2705

**Comments:**

**favored -** привилегированный; пользующийся преимуществом, поддержкой, вниманием, благосклонностью; находящийся под покровительством

**an entanglement -** сцепленность

**the latter -** последний

**to extract** - вытаскивать, извлекать

## Plastic Electronics

Plastic electronics is an offshoot of electronics which focuses on devices made from conductive plastics - otherwise known as organic polymers - rather than silicon.

Manufacturing Plastic Electronics

The "heart" of modern electronics are microchips - circuits and wiring "diagrams" are designed and micro-miniaturized to the point that thousands or even millions of circuits are contained in a one-inch square chip which is "burned" (or etched) onto ultra-thin inorganic materials like refined silicon using very high temperatures.

Plastic electronics, on the other hand, follow a different manufacturing process. The process starts with the manufacture of large sheets of PET (polyethylene terephthalate) plastic - the flexible but tough material used in the production of plastic bottles. Circuits are then printed on these sheets using ink-jet printers or using techniques much like those used to print magazines and newspapers - resulting in a process that is cheap, easy to do and faster to produce.

The plastic circuits will be used as the "active-matrix back panes" for large but flexible electronic displays. In an active-matrix display, every dot on the display is managed by a switching element such as thin film transistors (TFT) and the signals on an array of intersecting row and column electrodes. Prior to plastic electronics, these TFTs have been produced using amorphous silicon deposited on a rigid glass substrate at high temperature through a complex series of production procedures.

It is the collection of switching elements and row-column electrodes which are put together on a substrate to form the active-matrix backpane, which is then combined with different front-plane technologies (e.g., Liquid Crystal Diode or LCD screens) to form the display.

For many electronic readers, the best front plane technology is electronic paper which looks like paper and only uses the unit's power when the image shifts or changes (a property called bi-stability). Sony Reader and the iRex Illiad both use electronic paper for their display screens.

Electronic paper, however, loses its thinness and flexibility when combined with a glass-based silicon backpane. The flexible backpane technology of plastic electronics allows the reader device to become flexible, light, thin and robust enough for a wide range of uses where no paper has gone before and to include large data storage capacities.

The Future of Plastic Electronics

The thin, flexible and robust capabilities of plastic electronics have a wide range of possible applications - from hospital bracelets that are automatically updated with relevant patient info when a medical file is changed, to packaging that will say if it has reached the expiration date and to flat panels that can project individually addressed advertising.

Two European companies - Britain's Plastic Logic and Polymer Vision are today developing flexible, portable text readers - devices that can let you carry your whole library on a sheet of plastic. Polymer Vision plans to market a five-inch screen that can be folded up to the size of a [cell phone](http://www.tech-faq.com/plastic-electronics.shtml)

The key to this is the extreme cheapness of the product to manufacture and install - and recycle, as is being done with PET bottles now. ~ 2727

**Comments:**

**an offshoot -** ответвление

**etched -** вытравленный; травлёный

**refined -** очищенный, рафинированный; освобожденный от примесей

**a polyethylene terephthalate -** синтетический компонент. Продукт нефтеперерабатывающей промышленности. Получают из этиленгликоля и терефталевой кислоты (terephthalic acid**).**

**amorphous** - аморфный, бесформенный

**rigid** – твердый, недеформируемый

**a backpane -** (бекплейн) - приставка. Устройство, предназначенное, для расширение аппаратных средств сервера.

**info -** данные, информация

## IMAX

IMAX, which stands for Image Maximum, is a motion picture format with the capacity for greater size and clearer resolution than standard movie systems. It was developed by the Canadian IMAX Corporation. It dramatically enhances image resolution by making use of larger film stock (70mm with 15 perforations per frame - 10 times larger than standard). This results in a movie with incredible clarity, even on huge screens that are the hallmark of IMAX theaters worldwide. This, combined with a six-channel sound system, results in an extraordinary movie-going experience.

The key to the IMAX experience lies in several elements working together in combination:

* The large film format which allows for much better resolutions and higher clarity (the dinosaurs in the IMAX movie T-Rex: Back to the Cretaceous have five times the detail compared to Jurassic Park);
* A six-channel sound system that is separate from the film (conventional movies have the soundtrack integrated within the film strip). IMAX soundtracks are run on a Digital Theater Audio Control (DTAC) system which uses IMAX's proprietary software. The soundtrack is a single uncompressed audio file containing the six channels which are distributed directly to amplifiers, unlike other systems like Dolby Digital which requires a decoder;
* A unique projection system that is specifically designed and custom-built to accommodate the 70mm film stock - and "run" it at the standard 24 frames-per-second. This required a huge machine with a different approach to the conventional 35mm format, as well as more powerful lights to be able to project the film correctly;
* The theater itself which is designed in such a way that viewers are looking at the screen directly so their entire field of vision is engaged.

The large film size poses a challenge to producers and directors of IMAX films - an IMAX camera is a huge piece of equipment that is expensive to run and maintain. If ten setups or shots a day was standard when shooting with conventional film, three to four shots a day is going fast for IMAX.

Combine this slowness with higher quality computer-generated (CG) special effects (as noted, the IMAX T-Rex movie required five times more detail than Jurassic Park - which means five times more work and computer storage to get things right) and one has a very expensive movie.

The cost of producing an IMAX movie is the main reason it has never been seriously considered as a pure entertainment medium; most IMAX movies have been documentaries, although there have been efforts made in the past (T-Rex in 1998, Haunted Castle in 2001, both of which are IMAX 3-D films), The Old Man and the Sea, an Oscar winner in 1999, which is the first fully-animated film released on IMAX.

Feature films "in IMAX" are actually conventional movies (shot in 35mm) which were digitally blown-up using IMAX's proprietary Digital Re-Mastering (DRM) technology. Its first use was in 2002 with the conversion of Warner Brothers Apollo 13, followed by Matrix Reloaded and Matrix Revolutions in 2003. ~ 2547

**Comments:**

**a hallmark** - признак

**cretaceous -** меловой

**a shot -** кадр

**Digital Re-Mastering (DRM) –** цифровое обновление

## WiMAX

What is WiMAX? Simply put WiMAX is, Worldwide Interoperability for Microwave Access, a technology standard that enables high speed wireless internet. In other words, WiMAX combines the high speed of a broadband connection with the convenience of mobile internet connectivity. WiMAX provides wireless broadband access up to a radius of 50 kilometers (30 miles) for fixed receivers and 5-15 kilometers (3-10 miles) for mobile receivers.

WiMAX needs setting up of a tower to establish microwave connections with the users. This operates in the same way as a cell phone tower. In the case of WiMAX, the tower is connected to internet through a high speed cable like a T3 line. The difference from broadband is that here the bandwidth does not have to be divided using wires.

WiMAX is in a way an advanced version of WiFi, a similar technology. Whereas WiFi allows a network within a radius of 30-100 meters (100-300 feet), WiMAX connectivity can be extended over a radius of up to 50 kilometers. This high speed data transfer over a much larger area is made possible by lessening interference using the IEEE 802.16 Air Interface Standard. Currently WiMAX operates on both licensed and non-licensed frequencies.

As it is possible to use WiMAX over longer distances, this technology may come in handy in creating city wide networks. It is also better suited than WiFi for large area public places like airports, college and university campuses and large office set ups. It also provides for greater mobility to users. This way WiMAX may be a good option for people on the move using gadgets like laptops, iPods and PDAs.

As WiMAX follows a point-to-multipoint architecture, it is an ideal solution for delivering broadband to places where it would not be viable to establish wired connections. Rural areas and high rises are examples for this situation. Currently this last mile part of the connectivity is the biggest stumbling block to broadband providers, in terms of cost and manpower requirements. WiMAX can bring down the costs and subsequently make internet connectivity cheaper to the end user.

Another advantage over some other wireless technologies is that WiMAX does not need a direct line of sight between the source and the receptor. It also has a comparatively high shared data rate at 70Mbps, which is good enough to reach about a thousand homes.

WiMAX is also an excellent saver of time. As it does not need cables to connect with the receptors, it is possible to establish connection to an entire campus or even city in a matter of a few days.

WiMAX also allows for greater convergence of diverse applications such as fixed and mobile telephony, apart from entertainment sectors like television.

That said, WiMAX need not come to eliminate wired connectivity altogether. In areas where wired broadband is already established, DSL still reigns supreme. Thus it is more likely that WiMAX will develop as a complementary to wired connectivity.

Secondly, the real potential of WiMAX is in the possibility of bringing diverse services such as telephony, mobile television and broadband internet under its umbrella. This requires that players from these different fields work together to provide single point service to the end user. Consumer billing and mutual settlement systems have to be extremely efficient to handle these requirements. ~2800

**Comments:**

**an interoperability -** возможность взаимодействия

**a lessening –** уменьшение, убывание, понижение; убавление; снижение, сокращение, спад

**an gadget -** приспособление, принадлежность

## SCADA

SCADA is an acronym that stands for Supervisory Control and Data Acquisition. SCADA refers to a system that collects data from various sensors at a factory, plant or in other remote locations and then sends this data to a central computer which then manages and controls the data.

SCADA is a term that is used broadly to portray control and management solutions in a wide range of industries. Some of the industries where SCADA is used are Water Management Systems, Electric Power, Traffic Signals, Mass Transit Systems, Environmental Control Systems, and Manufacturing Systems.

SCADA as a System

There are many parts of a working SCADA system. A SCADA system usually includes signal hardware (input and output), controllers, networks, user interface, communications equipment and software. All together, the term SCADA refers to the entire central system. The central system usually monitors data from various sensors that are either in close proximity or off site (sometimes miles away).

For the most part, the brains of a SCADA system are performed by the Remote Terminal Units (sometimes referred to as the RTU). The Remote Terminal Units consists of a programmable logic converter. The RTU are usually set to specific requirements, however, most RTU allow human intervention, for instance, in a factory setting, the RTU might control the setting of a conveyer belt, and the speed can be changed or overridden at any time by human intervention. In addition, any changes or errors are usually automatically logged for and/or displayed. Most often, a SCADA system will monitor and make slight changes to function optimally; SCADA systems are considered closed loop systems and run with relatively little human intervention.

One of key processes of SCADA is the ability to monitor an entire system in real time. This is facilitated by data acquisitions including meter reading, checking statuses of sensors, etc that are communicated at regular intervals depending on the system. Besides the data being used by the RTU, it is also displayed to a human that is able to interface with the system to override settings or make changes when necessary.

SCADA can be seen as a system with many data elements called points. Usually each point is a monitor or sensor. Usually points can be either hard or soft. A hard data point can be an actual monitor; a soft point can be seen as an application or software calculation. Data elements from hard and soft points are usually always recorded and logged to create a time stamp or history

User Interface (HMI)

A SCADA system includes a user interface, usually called Human Machine Interface (HMI). The HMI of a SCADA system is where data is processed and presented to be viewed and monitored by a human operator. This interface usually includes controls where the individual can interface with the SCADA system.

HMI's are an easy way to standardize the facilitation of monitoring multiple RTU's or PLC's (programmable logic controllers). Usually RTU's or PLC's will run a pre programmed process, but monitoring each of them individually can be difficult, usually because they are spread out over the system. Because RTU's and PLC's historically had no standardized method to display or present data to an operator, the SCADA system communicates with PLC's throughout the system network and processes information that is easily disseminated by the HMI.

HMI's can also be linked to a database, which can use data gathered from PLC's or RTU's to provide graphs on trends, logistic info, schematics for a specific sensor or machine or even make troubleshooting guides accessible. In the last decade, practically all SCADA systems include an integrated HMI and PLC device making it extremely easy to run and monitor a SCADA system.

SCADA Software and Hardware Components

SCADA systems are an extremely advantageous way to run and monitor processes. They are great for small applications such as climate control or can be effectively used in large applications such as monitoring and controlling a nuclear power plant or mass transit system.

SCADA can come in open and non proprietary protocols. Smaller systems are extremely affordable and can either be purchased as a complete system or can be mixed and matched with specific components. Large systems can also be created with off the shelf components. SCADA system software can also be easily configured for almost any application, removing the need for custom made or intensive software development. ~ 3760

**Comments:**

**supervisory -** наблюдательный; надзорный

**an acquisition –** приобретение, обнаружение

**to portray -** представлять графически

**to override -** отвергать, не принимать во внимание, отмахиваться

**a facilitation -** облегчение, помощь

**to disseminate -** распространять

**troubleshooting -** отыскание повреждений; выявление неисправностей, улаживание конфликта

**affordable -** возможный; допустимый; по средствам

## Satellite Services

Communication has come a long way from the time when an Indian beat a drum in the forest to the time when a scientist receives messages from a satellite. In this space age communication has become a highly developed field. The system of communication in large countries is unthinkable today without space satellites. Besides large distances, there is a great time difference: the territories of some countries comprise up to 11 zones. Satellites help to minimize all the difficulties that may appear. They rapidly transmit TV and radio programs to different towns, cities, and distant areas.

Our world has become an increasingly complex place in which, as individuals, we are very dependent on other people and on organizations. An event in some distant part of the globe can rapidly and significantly affect the quality of life in our home country.

This increasing dependence on both a national and international scale, has led us to create systems that can respond immediately to dangers, enabling appropriate defensive or offensive actions to be taken. These systems are operating all around us in military, civil, commercial and industrial fields. A worldwide system of satellites has been created, and it is possible to transmit signals around the globe by bouncing them from one satellite to an earth station and thence to another satellite.

Originally designed to carry voice traffic, they are able to carry hundreds of thousands of separate simultaneous calls. These systems are being increasingly adopted to provide for business communications, including the transmission of traffic for voice, facsimile, data and vision.

It is probable that future satellite services will enable a great variety of information services to transmit impact into the home, possibly including personalized electronic mail. The electronic computer is at the heart of many such systems, but the role of telecommunications is not less important. There will be a further convergence between the technologies of computing and telecommunications. The change will be dramatic: the database culture, the cashless society, the office at home, the gigabit-per-second data network.

We cannot doubt that the economic and social impact of these concepts will be very significant. Already, advanced systems of communication are affecting both the layman and the technician. Complex functions are being performed by people using advanced terminals which are intended to be as easy to use as the conventional telephone.

The new global satellite-communications systems will offer three kinds of service, which may overlap in many different kinds of receivers:

Voice, Satellite telephones will be able to make calls from anywhere on earth to anywhere else. That could make them especially useful to remote, third-world villages (some of which already use stationary satellite telephones), explorers and disaster-relief teams. Today's mobile phones depend on earth-bound transmitters, whose technical standards vary from country to country. So business travellers cannot use their mobile phones on international trips. Satellite telephones would make that possible.

Messaging. Satellite messagers have the same global coverage as satellite telephones, but carry text alone, which could be useful for those with **l**aptopcomputers. Equipped with a small screen like today's pagers, satellite messagers will also receive short messages.

Tracking Voice and messaging systems will also tell their users where they are to within a few hundred meters. Combined with the messaging service, the location service could help rescue teams to find stranded adventurers, the police to find stolen cars, exporters to follow the progress of cargoes, and haulage companies to check that drivers are not detouring to the pub. Satellite systems will provide better positioning information to anyone who has a receiver for their signals. ~ 3293

**Comments:**

**to bounce -** ударять

**an layman -** непрофессионал; дилетант, любитель, неспециалист

**a laptopcomputer -** ноутбук

**stranded -** без средств

**a haulage -** буксировка; перевозка; транспортировка; доставка

**to detour –** объезжать

## GLONASS

The Global Navigation Satellite System (GLONASS) is based on a constellation of active satellites which continuously transmit coded signals in two frequency bands, which can be received by users anywhere on the Earth's surface to identify their position and velocity in real time based on ranging measurements

The system is a counterpart to the United States Global Positioning System (GPS) and both systems share the same principles in the data transmission and positioning methods. GLONASS is managed for the Russian Federation Government by the Russian Space Forces and the system is operated by the Coordination Scientific Information Center (KNITs) of the Ministry of Defense of the Russian Federation.

The operational space segment of GLONASS consists of 21 satellites in 3 orbital planes, with 3 on-orbit spares. The three orbital planes are separated 120 degrees, and the satellites within the same orbit plane by 45 degrees. Each satellite operates in circular 19,100 km orbits at an inclination angle of 64.8 degrees and each satellite completes an orbit in approximately 11 hours 15 minutes.

The ground control segment of GLONASS is entirely located within former Soviet Union territory. The Ground Control Center and Time Standards is located in Moscow and the telemetry and tracking stations are in St. Petersburg, Ternopol, Eniseisk, Komsomolsk-na-Amure.

The first GLONASS satellites were launched into orbit in 1982. Two Etalon geodetic satellites were also flown in the 19,100 km GLONASS orbit to fully characterise the gravitational field at the planned altitude and inclination. The original plans called for a complete operational system by 1991, but the deployment of the full constellation of satellites was not completed until late 1995 / early 1996. GLONASS was officially declared operational on September 24, 1993 by a decree of the President of the Russian Federation.

The Russian military identified, in the late 1960s a need for a Satellite Radio Navigation System (SRNS) for use in precision guidance of new generation of ballistic missiles in planning. The existing Tsiklon satellite navigation system required several minutes of observation by the receiving station to fix a position making them unusable for navigation positioning purposes. In 1968 to 1969 research institutes of the Ministry of Defence, Academy of Sciences, and Soviet Navy joined together to establish a single solution for air, land, sea, and space forces. This resulted in a 1970 requirements document that established the requirements for such a system. After further basic research in 1976 a decree was issued by the Soviet Union establishing the Global'naya Navigatsionnaya Sputnikovaya Sistema (GLONASS, Global Navigation Satellite System).

The constellation is currently operating in a degraded mode with only eight fully operational satellites. A program for the gradual enhancement of the GLONASS constellation is being developed. That plan calls for 12 functioning satellites in 2001.

Work is underway to modernize the system. The Russian Space Forces plan to start flight tests of a new GLONASS-M program. The new GLONASS-M satellite will have better signal characteristics as well as a longer design life (7-8 years instead of the current 3 years). In the future, plans are being developed to transition to a low mass third generation GLONASS-K satellites with a guaranteed lifespan of 10 years. ~ 2883

**Comments:**

**a constellation** - совокупность, группа (одинаковых элементов, образующих микроэлемент)

**a velocity -** скорость

**a spare -** запасная часть (машины)

**degraded** - ухудшенный, с ухудшенными характеристиками

## GPS

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS.

* The first GPS satellite was launched in 1978.
* A full constellation of 24 satellites was achieved in 1994.
* Each satellite is built to last about 10 years. Replacements are constantly being built and launched into orbit.
* A GPS satellite weighs approximately 2,000 pounds and is about 17 feet across with the solar panels extended.
* Transmitter power is only 50 watts or less.

GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.

GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

Today's GPS receivers are extremely accurate, thanks to their parallel multi-channel design. Garmin's 12 parallel channel receivers are quick to lock onto satellites when first turned on and they maintain strong locks, even in dense foliage or urban settings with tall buildings. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. Garmin® GPS receivers are accurate to within 15 meters on average.

Newer Garmin GPS receivers with [WAAS](http://www8.garmin.com/aboutGPS/waas.html) (Wide Area Augmentation System) capability can improve accuracy to less than three meters on average. No additional equipment or fees are required to take advantage of WAAS. Users can also get better accuracy with Differential GPS (DGPS), which corrects GPS signals to within an average of three to five meters. The U.S. Coast Guard operates the most common DGPS correction service. This system consists of a network of towers that receive GPS signals and transmit a corrected signal by beacon transmitters. In order to get the corrected signal, users must have a differential beacon receiver and beacon antenna in addition to their GPS.

The 24 satellites that make up the GPS space segment are orbiting the earth about 12,000 miles above us. They are constantly moving, making two complete orbits in less than 24 hours. These satellites are travelling at speeds of roughly 7,000 miles an hour.

GPS satellites are powered by solar energy. They have backup batteries onboard to keep them running in the event of a solar eclipse, when there's no solar power. Small rocket boosters on each satellite keep them flying in the correct path.

GPS satellites transmit two low power radio signals, designated L1 and L2. Civilian GPS uses the L1 frequency of 1575.42 MHz in the UHF band. The signals travel by line of sight, meaning they will pass through clouds, glass and plastic but will not go through most solid objects such as buildings and mountains.

A GPS signal contains three different bits of information — a pseudorandom code, ephemeris data and almanac data. The pseudorandom code is simply an I.D. code that identifies which satellite is transmitting information. You can view this number on your Garmin GPS unit's satellite page, as it identifies which satellites it's receiving.

Ephemeris data tells the GPS receiver where each GPS satellite should be at any time throughout the day. Each satellite transmits ephemeris data showing the orbital information for that satellite and for every other satellite in the system.

Almanac data, which is constantly transmitted by each satellite, contains important information about the status of the satellite (healthy or unhealthy), current date and time. This part of the signal is essential for determining a position. ~3840

**Comments:**

**a triangulation -** клеточное разбиение, триангуляция

**a latitude -** широта

**a longitude -** долгота

**an altitude -** высота

**® -** зарегистрировано (о торговом названии: условное обозначение, которое ставится после названия продукта и указывает на то, что данное название является собственностью фирмы)

**an augmentation -** подъем, приращение, прирост, увеличение

**a beacon –** маяк, сигнальный огонь, навигационный знак; бакен

**an eclipse -** затмение

**a booster -** стартовый ускоритель, добавочный агрегат; вспомогательное средств

**pseudorandom -** псевдослучайный

**ephemeris -** эфемеридный, относящийся к эфемеридам

**an almanac -** календарь; альманах, сборник

**Для заметок**

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