DOWNLOAD PDF HOW DO WE RECORD PICTURES FROM LIGHT?

Chapter 1 : How to Measure a Spectrum

D igital cameras give a whole new meaning to the idea of painting by numbers. Unlike old-style film cameras, they capture and record images of the world around us using digital technology.

Phonograph cylinder recording of Siamese Thai musicians visiting Berlin, Germany in Problems playing this file? On April 30, , French poet, humorous writer and inventor Charles Cros submitted a sealed envelope containing a letter to the Academy of Sciences in Paris fully explaining his proposed method, called the paleophone. Sales of the gramophone record overtook the cylinder ca. Edison, who was the main producer of cylinders, created the Edison Disc Record in an attempt to regain his market. In various permutations, the audio disc format became the primary medium for consumer sound recordings until the end of the 20th century, and the double-sided 78 rpm shellac disc was the standard consumer music format from the early s to the late s. Although there was no universally accepted speed, and various companies offered discs that played at several different speeds, the major recording companies eventually settled on a de facto industry standard of nominally 78 revolutions per minute, though the actual speed differed between America and the rest of the world. The specified speed was The difference in speeds was due to the difference in the cycle frequencies of the AC electricity that powered the stroboscopes used to calibrate recording lathes and turntables. Discs were made of shellac or similar brittle plastic-like materials, played with needles made from a variety of materials including mild steel, thorn, and even sapphire. Discs had a distinctly limited playing life that varied depending on how they were produced. Earlier, purely acoustic methods of recording had limited sensitivity and frequency range. Mid-frequency range notes could be recorded, but very low and very high frequencies could not. Instruments such as the violin were difficult to transfer to disc. One technique to deal with this involved using a Stroh violin to which was fitted a conical horn connected to a diaphragm that vibrated due to the violin bridge. The horn was no longer needed once electrical recording was developed. The short-playing but convenient 7-inch 45 rpm microgroove vinyl single was introduced by RCA Victor in In the US and most developed countries, the two new vinyl formats completely replaced 78 rpm shellac discs by the end of the s, but in some corners of the world, the "78" lingered on far into the s. Vinyl was much more expensive than shellac, one of the several factors that made its use for 78 rpm records very unusual, but with a long-playing disc the added cost was acceptable and the compact "45" format required very little material. Vinyl offered improved performance, both in stamping and in playback. If played with a good diamond stylus mounted in a lightweight pickup on a well-adjusted tonearm, it was long-lasting. If protected from dust, scuffs and scratches there was very little noise. Vinyl records were, over-optimistically, advertised as "unbreakable". They were not, but they were much less fragile than shellac, which had itself once been touted as "unbreakable" compared to wax cylinders. Electrical recording[edit] RCA, a classic ribbon microphone introduced in Similar units were widely used for recording and broadcasting in the s and are occasionally still used today. Between the invention of the phonograph in and the first commercial digital recordings in the early s, arguably the most important milestone in the history of sound recording was the introduction of what was then called electrical recording, in which a microphone was used to convert the sound into an electrical signal that was amplified and used to actuate the recording stylus. This innovation eliminated the "horn sound" resonances characteristic of the acoustical process, produced clearer and more full-bodied recordings by greatly extending the useful range of audio frequencies, and allowed previously unrecordable distant and feeble sounds to be captured. Sound recording began as a purely mechanical process. Except for a few crude telephone-based recording devices with no means of amplification, such as the Telegraphone , [13] it remained so until the s when several radio-related developments in electronics converged to revolutionize the recording process. These included improved microphones and auxiliary devices such as electronic filters, all dependent on electronic amplification to be of practical use in recording. In , Lee De Forest invented the Audion triode vacuum tube, an electronic valve that could amplify weak electrical signals. By , it was in use in long-distance telephone circuits that made conversations between New York and San Francisco practical. Refined versions of this tube were the basis of all electronic sound systems until the commercial introduction of the first transistor -based audio devices in the mids. During World War I, engineers in the United States and Great Britain worked on ways to record and reproduce, among other things, the sound of a German U-boat for training purposes. Acoustical recording methods of the time could not reproduce the sounds accurately. The earliest results were not promising. The first electrical recording issued to the public, with little fanfare, was of November 11, funeral services for The Unknown Warrior in Westminster Abbey , London. The recording engineers used microphones of the type used in contemporary telephones. Four were discreetly set up in the abbey and wired to recording equipment in a vehicle outside. Although electronic amplification was used, the audio was weak and unclear. The procedure did, however, produce a recording that would otherwise not have been possible in those circumstances. For several years, this little-noted disc remained the only issued electrical recording. Several record companies and independent inventors, notably Orlando Marsh , experimented with equipment and techniques for electrical recording in the early s. They had the best microphone, a condenser type developed there in and greatly improved in , [15] and the best amplifiers and test equipment. They had already patented an electromechanical recorder in , and in the early s, they decided to intensively apply their hardware and expertise to developing two state-of-the-art systems for electronically recording and reproducing sound: Their engineers pioneered the use of mechanical analogs of electrical circuits and developed a superior "rubber line" recorder for cutting the groove into the wax master in the disc recording system. Both soon licensed the system and both made their earliest published electrical recordings in February , but neither actually released them until several months later. To avoid making their existing catalogs instantly obsolete, the two long-time archrivals agreed privately not to publicize the new process until November , by which time enough electrically recorded repertory would be available to meet the anticipated demand. During the next few years, the lesser record companies licensed or developed other electrical recording systems. By only the budget label Harmony was still issuing new recordings made by the old acoustical process. Comparison of some surviving Western Electric test recordings with early commercial releases indicates that the record companies "dumbed down" the frequency range of the system so the recordings would not overwhelm non-electronic playback equipment, which reproduced very low frequencies as an unpleasant rattle and rapidly wore out discs with strongly recorded high frequencies. The amplitude variations comprising the signal were used to modulate a light source which was imaged onto the moving film through a narrow slit, allowing the signal to be photographed as variations in the density or width of a "sound track". The projector used a steady light and a photoelectric cell to convert these variations back into an electrical signal, which was amplified and sent to loudspeakers behind the screen. Ironically, the introduction of " talkies " was spearheaded by The Jazz Singer , which used the Vitaphone sound-on-disc system rather than an optical soundtrack. Optical sound became the standard motion picture audio system throughout the world and remains so for theatrical release prints despite attempts in the s to substitute magnetic soundtracks. Currently, all release prints on 35 mm film include an analog optical soundtrack, usually stereo with Dolby SR noise reduction. This period also saw several other historic developments including the introduction of the first practical magnetic sound recording system, the magnetic wire recorder , which was based on the work of Danish inventor Valdemar Poulsen. Magnetic wire recorders were effective, but the sound quality was poor, so between the wars, they were primarily used for voice recording and marketed as business dictating machines. In , a German engineer, Dr. Kurt Stille, developed the Poulsen wire recorder as a dictating machine. The following year, Ludwig Blattner began work that eventually produced the Blattnerphone, [17] enhancing it to use steel tape instead of wire. The BBC started using Blattnerphones in to record radio programmes. Because of the high recording speeds required, they used enormous reels about one metre in diameter, and the thin tape frequently broke, sending jagged lengths of razor steel flying around the studio. Tape recorder Magnetic audio tapes: Magnetic tape recording uses an amplified electrical audio signal to generate analogous variations of the magnetic field produced by a tape head , which impresses corresponding variations of magnetization on the moving tape. In playback mode, the signal path is reversed, the tape head acting as a miniature electric generator as the varyingly magnetized tape passes over it. Acetate has fairly low tensile strength and if very thin it will snap easily, so it was in turn eventually superseded by polyester. This technology, the basis for almost all commercial recording from the s to the s, was developed in the s by

German audio engineers who also rediscovered the principle of AC biasing first used in the s for wire recorders , which dramatically improved the frequency response of tape recordings. Mullin with backing from Bing Crosby Enterprises. In the late s, the Ampex company produced the first tape recorders commercially available in the US. A typical Compact Cassette Magnetic tape brought about sweeping changes in both radio and the recording industry. Sound could be recorded, erased and re-recorded on the same tape many times, sounds could be duplicated from tape to tape with only minor loss of quality, and recordings could now be very precisely edited by physically cutting the tape and rejoining it. Within a few years of the introduction of the first commercial tape recorderâ€”the Ampex model, launched in â€"American musician-inventor Les Paul had invented the first multitrack tape recorder , ushering in another technical revolution in the recording industry. Innovations like multitracking and tape echo allowed radio programs and advertisements to be produced to a high level of complexity and sophistication. The combined impact with innovations such as the endless loop broadcast cartridge led to significant changes in the pacing and production style of radio program content and advertising. Stereo and hi-fi[edit] See also: Stereophonic sound and High fidelity In , it was noted during experiments in transmitting sound from the Paris Opera that it was possible to follow the movement of singers on the stage if earpieces connected to different microphones were held to the two ears. In , Alan Blumlein , a British electronics engineer working for EMI , designed a way to make the sound of an actor in a film follow his movement across the screen. In December , he submitted a patent including the idea, and in this became UK patent number , In the s, experiments with magnetic tape enabled the development of the first practical commercial sound systems that could record and reproduce high-fidelity stereophonic sound. The experiments with stereo during the s and s were hampered by problems with synchronization. A major breakthrough in practical stereo sound was made by Bell Laboratories , who in demonstrated a practical system of two-channel stereo, using dual optical sound tracks on film. Major movie studios quickly developed three-track and four-track sound systems, and the first stereo sound recording for a commercial film was made by Judy Garland for the MGM movie Listen, Darling in The release of Fantasia used the " Fantasound " sound system. This system used a separate film for the sound, synchronized with the film carrying the picture. The sound film had four double-width optical soundtracks, three for left, center, and right audioâ€"and a fourth as a "control" track with three recorded tones that controlled the playback volume of the three audio channels. Because of the complex equipment this system required, Disney exhibited the movie as a roadshow, and only in the United States. German audio engineers working on magnetic tape developed stereo recording by , even though a 2-track push-pull monaural technique existed in Of stereophonic recordings made during WW2, only three survive: Other early German stereophonic tapes are believed to have been destroyed in bombings. Not until Ampex introduced the first commercial two-track tape recorders in the late s did stereo tape recording become commercially feasible. However, despite the availability of multitrack tape, stereo did not become the standard system for commercial music recording for some years, and remained a specialist market during the s. EMI UK was the first company to release commercial stereophonic tapes. They issued their first Stereosonic tape in Two-track stereophonic tapes were more successful in America during the second half of the s. They were duplicated at real time 1: Early American 2-track stereophonic tapes were very expensive. The history of stereo recording changed after the late introduction of the Westrex stereo phonograph disc, which used the groove format developed earlier by Blumlein.

Chapter 2 : How To Obtain Red Light Accident Video

Unfortunately, each photosite is colorblind. It only keeps track of the total intensity of the light that strikes its surface. In order to get a full color image, most sensors use filtering to look at the light in its three primary colors. Once the camera records all three colors, it combines them.

TruthFinder cannot be used for employment or tenant screening. Please note that this is a subscription-based service. Have You Received a Traffic Ticket? Make sure you respond to your traffic ticket by the due date listed. You have the options to either pay or fight the charge. Visit our Traffic Tickets page for information specific to your state. You open your mail to discover a photo of you behind the wheel of the car. Who took this unflattering picture? What is a Photo Radar Ticket? States that issue photo traffic tickets also known as red light camera tickets station cameras at key traffic areas in their cities. Then, when you break the rules of the road, these cameras trigger to automatically snap a picture of you in the act. Photo radar tickets commonly capture these types of traffic citations: Running a red light. Stopping in a crosswalk. After the camera takes your photo, the state mails you a copy of the photo, along with an explanation of your citation and a fine amount. What to do if You Receive a Photo Traffic Ticket When you receive your traffic citation in the mail, the ticket will provide information on how to pay the fine or fight your traffic ticket. These camera traffic tickets will also provide information on how to proceed if the person pictured in the photograph is not you. In most states, you have three options on how you can plead when ticketed for moving violations: Guilty No contest nolo contendre Not guilty Often, if you plead guilty or no contest, you can simply pay your fine and move on. If you plead not guilty, you will likely need to appear in court. Check on your citation for information on your options. Some people argue that states cannot enforce photo traffic tickets and that tickets are only valid when issued in person. Typically, red light camera tickets are totally valid. Others could go so far as to issue a warrant. Consider consulting a traffic attorney before deciding how to gamble. How to Pay a Red Light Camera Ticket If you choose to pay a photo radar ticket, read your citation and follow the payment instructions. Most likely, your traffic ticket will offer several payment methods: If you have any questions, call the number listed on your speeding ticket for more information. Many photo radar traffic tickets include payment deadlines. Review your ticket carefully to ensure that you pay on time. If you miss your payment deadline, your fine might increase or even double. Have you ever received a photo traffic ticket? Did you pay it? Why or why not? Tell us about your experience in the comments section below. Subscribe to the DMV. Make sure our Newsletter makes it to your inbox by adding email dmv.

Chapter 3 : How to Measure Light Intensity (with Pictures) - wikiHow

We speed from time to time, we roll stop signs, we don't use our turn signals, and once in a great while, we run a light. If you were at fault and you just so happened to get caught this time, make sure you really want to fight this thing.

Dispersion and Diffraction Just about every astronomy textbook you will ever pick up will contain a phrase to the effect that the process of breaking light up into a spectrum is "like passing white light through a prism. Hence, a narrow beam of "white" light will get spread out into a rainbow. The colors of the familiar "rainbow" of visible light correspond to differing wavelengths of the light, here shown on a nanometer scale. The wavelengths get successively larger as one moves from left to right. But such a spectrum, although very pretty, is of very little use to astronomers. This kind of spectrum does not convey the detailed physical information that we require to do science. And as a practical matter, some kinds of light such as ultraviolet light for example do not pass through a glass prism but rather are absorbed! It is tough to measure a spectrum when the light gets absorbed! In practice, most spectrographs in astronomy, including those that operate in the optical part of the spectrum, use a totally different method for creating a spectrum out of the incoming light from the telescope--the process of diffraction. This process depends on the wave-like properties of the light, and uses a component called a diffraction grating to actually separate the light into its component wavelengths. A diffraction grating consists of a substrate often made of glass, but stainless steel, plastic, or other materials are sometimes used onto which are etched very narrowly-spaced lines. Well, a typical diffraction grating used in optical astronomy may have anywhere from several hundred to over one thousand lines etched per millimeter! Rowland, was the first person to make high quality diffraction gratings for use in scinece. How does such a grating break a beam of light into its component wavelengths? Hope to add this soon! But most Intro Physics text books give a description of this process. So until I get around to it, use the Library! The grating must be built into a device called a spectroscope or spectrograph for this to be done. These are effectively the same thing except that a spectroscope is simply used for visual inspection that is, your eye is the detector , while a spectrograph includes some means photographic film or an electronic detector for recording the spectrum for analysis. In professional astronomy these days there is very little need for a spectroscope just as there is very little other observational work actually done with the naked eye, with the possible exception of staring at a computer monitor all day! Ok, so what is a spectrograph? In its simplest form, it is a light-tight box with a small often narrow rectangular or adjustable opening to let light in, a grating to break the light into its components, and a "detector" of some kind placed at the proper angle and distance from the grating to record the spectrum of the wavelength range of interest. Telescopes are used to gather the faint light from distant objects, and the spectrographs are placed at the focus of the telescope to analyze the light. Detecting and Recording Spectra A detector is simply a device that senses and measures the incoming light. In a spectrograph, the detector has to perform this task across a range of wavelengths, measuring the amount of light as it changes from wavelength to wavelength. In an optical spectroscope, the detector is your eye, which senses the different colors and the presence of dark absorption lines or bright emission lines in the spectrum of the source being viewed. In a spectrograph, some other device is used to sense the light. For many years the primary detector used in spectrographs was the photographic plate basically film, although special astronomical emulsions placed on glass plates were used for greater sensitivity and stability. Often spectra recorded this way were then traced with a device called a are you ready for this? This device would shine a steady, narrow beam of light through the photographic plate to a light sensitive photomultiplier tube. As the plate was stepped along the length of the spectrum, the photomultiplier tube would measure and record the amount of light at each wavelength. The resulting tracing would essentially be a graph of the intensity of light as a function of the position on the photographic plate or as a function of wavelength in the case of a spectrum. This graphical representation of a spectrum is what astronomers find most useful in doing their work. This picture shows an electronic detector called a charge-coupled device, or CCD. The small central rectangle contains a closely packed array of by light sensing diodes, each of which individually record the brightness of light and send the information to a computer. Imagine placing this device at the focus of a large telescope! It allows astronomers to "see" objects millions of times fainter than the unaided eye! Click on the picture to see a larger version. Photo courtesy of the Smithsonian Astrophysical Observatory. Over the last 20 years or so even photographic recording of spectra has nearly become a thing of the past. Electronic recording of spectra is the most sensitive, quantitative, way of detecting the light, and it gets the spectrum directly into a digital form that can be handled on a computer where the real work gets done. The detector used most often in astronomy these days is called a charge coupled device, or CCD. This device is basically an array of tiny, light-sensitive diodes and is also now commonly used in video cameras and digital still cameras. Astronomical CCDs, however, are often tweaked up to provide the best performance at faint light levels, in many cases recording the arrival of individual photons of light from distant sources in the Universe! For instance, one has to know exactly what spectral lines need to be observed, and hence, how much spectral coverage is necessary. Are all of the lines of interest in the red part of the spectrum, or is full spectral coverage from the blue through the red needed? The other basic question is how much resolving power is needed basically, how much does the light need to be spread out to show the details in the spectrum? This last question involves several considerations. Are there spectral lines of interest that are close together in wavelength? If so, one must use sufficiently high dispersion to allow the lines to be separated; otherwise the lines will be blended together such that they cannot be measured individually. Another consideration may be whether one is making velocity measurements. If so, what precision is needed for measuring the redshifts or blueshifts of the lines in the spectrum? The equation for Doppler shifts says you would want to make sure your spectrograph can make measurements to an accuracy of at least 0. A difficulty sometimes arises when a project desires both high spectral dispersion and broad wavelength coverage. For a detector of fixed size, the more one spreads the light out higher dispersion the less the range of wavelengths that will fall on the detector smaller spectral coverage. In cases where both spectral coverage and high spectral dispersion are needed, a special spectrograph called an echelle spectrograph can be used. This device contains two diffration gratings instead of one, a high dispersion grating to provide the desired spectral resolution, and a lower dispersion grating that spreads the overall spectrum out into an array of miniature spectra, each covering only a portion of the desired spectral range. While these spectrographs are not suitable for every observation, they make it possible in certain instances for a single observation to do the job of 50 or more observations with a regular spectrograph! Click here to go to next section.

DOWNLOAD PDF HOW DO WE RECORD PICTURES FROM LIGHT?

Chapter 4 : How to Record a CD: 12 Steps (with Pictures) - wikiHow

Articles like this typically open by noting that the word photography comes from two Greek words, photos (light) and graphos (writing)â€”so photography effectively means "writing with light." But that's just a metaphor.

Our videos will show you how to use them. March 9, 8: There are some hidden features and extra tricks buried under that glossy screen. Here are some of our favorite Galaxy S7 tips and tricks with video. Press the MicroSD card in, and slide the card back into the phone. Tap on the app you want to move, tap Storage, and tap Change. That will let you move the app onto the SD card. So record as much 4K video as you want. The S7 can take it. If you spill something on your S7, the best idea is to wash off your phone and then dry it with a paper towel or soft cloth. To turn on motion photos, go into the camera mode and touch the settings wheel. Turn motion photos to on. Its real purpose is in case you missed the photo you intended to take. You can scrub through the motion photo, hit Capture, and get a clip of what you missed. So far, there are no other way to share Motion Photos. When you share out the image, all you get is the original JPEG. For one thing, the front-facing camera is brighter than it used to be. That will help some in low-light situations. To turn on the selfie flash, just hit the flash icon on the left. The spotlight tool is the most useful, as it brightens up your own face in a crowd. It can do a little more, though. Ther are several clock styles, a clock with a calendar, or a few custom image designs. How do you get more? When you apply the theme, it will have more selections for background images. Here are some of the things it can do. Swipe to the right for the Tasks Edge. This one has macros, like starting a text message to one of your favorite people. The next one is the People Edge, which has five of your favorite contacts. Now you get to the customizable edges. You can install a news panel, a compass and a ruler, weather If your battery is running low, first turn down the screen brightness. Then try power saving mode. It saves a lot of battery, but you have to remember that.

Chapter 5 : 7 Samsung Galaxy S7 Tips and Tricks | www.nxgvision.com

To measure light intensity, use a handheld digital photometer, or download an app on your smartphone. Hold the photometer in the area that you want to measure the intensity of the light. Remember that most office spaces are comfortably lit around lux, and supermarkets or work spaces that require detailed work are lit around , lux.

Share on Facebook Lots of states allow automated cameras at intersections to catch red light violators. If you have red light cameras in your area, you might wonder how you would know if you got a ticket. Also, read about fighting a red light camera ticket. Knowing which intersections have cameras. Most states that permit red light cameras require that signs be posted informing drivers if cameras are in use at an intersection. Also, the cameras themselves are usually fairly conspicuous: How cameras catch violators. Automated intersection cameras generally involve three components working in sync: Each red light camera is aimed at traffic going in one direction. If the light is red and these sensors estimate a vehicle is going too fast to stop, the camera is triggered. The camera usually takes still shots and a video of the driver going through the light. How Accurate are Red Light Cameras? Red light cameras are fairly accurate but not perfect. So, even if you see the flash of the camera going off, you might not get a ticket. Before a ticket goes out, someone usually a technician or officer will review what the camera captured. The person checking the footage has the last word on whether to issue a citation. How will You Know About the Ticket? Red light camera tickets are typically mailed to the registered owner of the vehicle. Most states require violation notices to be mailed within a certain number of days of when the violation occurred. So, it might take anywhere from about 30 to 60 days to get the ticket in the mail. Generally, the violation notice will include: Some states have a day grace period that applies when red light cameras are first installed. During the grace period, no tickets are issued but warning notices are sent to drivers who are photographed running the signal.

Chapter 6 : How Traffic Cameras Work

Light then passes onto the back of the camera where it hits photographic film and starts a chemical reaction. When you click the button, you instantaneously record the reflected light off objects in the camera's field of view.

Listen Sometimes it seems like pure magic to capture a moment in time in a still photograph. Exactly how does a camera preserve that split-second moment for eternity? A camera basically consists of a lightproof box that lets in a bit of light at just the right moment. Once the light enters the camera, it creates an image by causing a chemical reaction on photo film. Of course, SLR cameras can also create purely digital images without using photo film at all, but we will concentrate on the traditional use of film today. As you see your dog running toward you, you lift the camera to your eye. Outdoor light reflects off your dog, bouncing into the camera, through the lens and onto a mirror. Finally, the light passes through the eyepiece and into your eye. This allows you to see the image exactly as it will appear on film. As you hold the camera to your eye, you wait for just the right moment. Your dog stops for just a moment and snap! When you press the button on a camera, the mirror flips out of the way. Light then passes onto the back of the camera where it hits photographic film and starts a chemical reaction. The crystals react to light that passes through the camera and onto the film. The development process involves dipping the film in several chemicals. If you have ever held developed film up to the light, you may notice that something looks strange. Developed film gives you a negative image! This means dark objects will look light and light objects will look dark. This creates a shadow on special photosensitive paper, leaving an image that is the opposite of the negative â€" a positive print! At last you have your photograph.

Chapter 7 : Sound recording and reproduction - Wikipedia

Sound recording and reproduction is an electrical, mechanical, electronic, or digital inscription and re-creation of sound waves, such as spoken voice, singing, instrumental music, or sound effects.

A fully manual single-lens-reflex camera. See more pictures of cool camera stuff. Now we can "see" all sorts of things that are actually many miles -- and years -- away from us. Photography lets us capture moments in time and preserve them for years to come. The basic technology that makes all of this possible is fairly simple. A still film camera is made of three basic elements: There are many different ways of bringing everything together. This is a camera where the photographer sees exactly the same image that is exposed to the film and can adjust everything by turning dials and clicking buttons. The optical component of the camera is the lens. At its simplest, a lens is just a curved piece of glass or plastic. Its job is to take the beams of light bouncing off of an object and redirect them so they come together to form a real image -- an image that looks just like the scene in front of the lens. But how can a piece of glass do this? The process is actually very simple. As light travels from one medium to another, it changes speed. Light travels more quickly through air than it does through glass, so a lens slows it down. When light waves enter a piece of glass at an angle, one part of the wave will reach the glass before another and so will start slowing down first. This is something like pushing a shopping cart from pavement to grass, at an angle. The right wheel hits the grass first and so slows down while the left wheel is still on the pavement. Because the left wheel is briefly moving more quickly than the right wheel, the shopping cart turns to the right as it moves onto the grass. The effect on light is the same -- as it enters the glass at an angle, it bends in one direction. It bends again when it exits the glass because parts of the light wave enter the air and speed up before other parts of the wave. In a standard converging, or convex lens, one or both sides of the glass curves out. This means rays of light passing through will bend toward the center of the lens on entry. In a double convex lens, such as a magnifying glass, the light will bend when it exits as well as when it enters. This effectively reverses the path of light from an object. A light source -- say a candle -- emits light in all directions. A converging lens takes those rays and redirects them so they are all converging back to one point. At the point where the rays converge, you get a real image of the candle.

Chapter 8 : Red-light speed camera FAQs - Speed cameras - Speeding - NSW Centre for Road Safety

Running a red light. Stopping in a crosswalk. After the camera takes your photo, the state mails you a copy of the photo, along with an explanation of your citation and a fine amount.

The camera is mounted on the passenger side dash, whilst the black box on the front is the radar unit. Bus lane enforcement[edit] Some bus lane enforcement cameras use a sensor in the road, which triggers a number plate recognition camera which compares the vehicle registration plate with a list of approved vehicles and records images of other vehicles. Entry and Exit cameras determine the length of stay and provide alerts for unregistered or vehicles of concern via onscreen, email or SMS based alerts. A red light camera is a traffic camera that takes an image of a vehicle that goes through an intersection where the light is red. The system continuously monitors the traffic signal and the camera is triggered by any vehicle entering the intersection above a preset minimum speed and following a specified time after the signal has turned red. In many municipalities an officer is monitoring the cameras in a live command center and records all violations, including texting at a red light. Speed limit enforcement Speed enforcement cameras are used to monitor compliance with speed limits , which may use Doppler radar , LIDAR or automatic number plate recognition. Other speed enforcement systems are also used which are not camera based. Fixed or mobile speed camera systems that measure the time taken by a vehicle to travel between two or more fairly distant sites from several hundred metres to several hundred kilometres apart are called automatic number plate recognition ANPR cameras. The operator, Redflex Traffic Systems Inc. Automatic number plate recognition Automatic number plate recognition can be used for purposes unrelated to enforcement of traffic rules. In principle any agency or person with access to data either from traffic cameras or cameras installed for other purposes can track the movement of vehicles for any purpose. They had their vehicle searched under section 44 of the Terrorism Act and were threatened with arrest if they refused to answer questions. This type of camera is mostly used in cities or heavy populated areas. Automatic number plate recognition systems can be used for multiple purposes, including identifying untaxed and uninsured vehicles, stolen cars and potentially mass surveillance of motorists. These may be mounted on buses themselves as well as by the roadside. Cameras can be concealed, for example in garbage bins. In vehicle-mounted systems, detection equipment and cameras can be mounted to the vehicle itself, or simply tripod mounted inside the vehicle and deployed out a window or door. If the camera is fixed to the vehicle, the enforcement vehicle does not necessarily have to be stationary, and can be moved either with or against the flow of traffic. The speedometer of the camera vehicle needs to be accurately calibrated. Some number plate recognition systems can also be used from vehicles. What it has done is to show that at camera sites, speeds have been reduced, and that as a result, collisions resulting in injuries have fallen. The government has said that a decision on whether speed cameras should be funded must be taken at a local level. With the current pressure on public funds, there will be â€" indeed there already are â€" those who say that what little money there is can be better spent. This report begs to differ. The devices are already there; they demonstrate value for money, yet are not significant revenue raisers for the Treasury; they are shown to save lives; and despite the headlines, most people accept the need for them. Speed cameras should never be the only weapon in the road safety armoury, but neither should they be absent from the battle. All 28 studies found a lower number of crashes in the speed camera areas after implementation of the program. The studies of longer duration showed that these positive trends were either maintained or improved with time. Nevertheless, the authors conceded that the magnitude of the benefit from speed cameras "is currently not deducible" due to limitations in the methodological rigor of many of the 28 studies cited, and recommended that "more studies of a scientifically rigorous and homogenous nature are necessary, to provide the answer to the magnitude of effect. They are also broadly consistent with the findings of a meta-analysis reported in the respected Handbook of Road Safety Measures, of 16 studies, not including the four-year evaluation report, of the effects of fixed cameras on numbers of collisions and casualties. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. May Legal issues[edit] Various legal issues arise from such cameras and the laws involved in how cameras can be placed and what evidence is necessary to prosecute a driver varies considerably in different legal systems. Pictures from the San Diego red light camera systems were ruled inadmissible as court evidence in September The judge said that the "total lack of oversight" and "method of compensation" made evidence from the cameras "so untrustworthy and unreliable that it should not be admitted". In California, that need to identify the actual violator has led to the creation of a unique investigatory tool, the fake "ticket". However, acknowledging receipt of such ticket makes it valid and thus enforceable. In the European Court of Human Rights found there was no breach of article 6 in requiring the keepers of cars caught speeding on camera to provide the name of the driver. The errors were due to what was described as an "electromagnetic anomaly". This may be accomplished by means of a second, appropriately delayed image showing the target vehicle crossing a specified reference line.

Chapter 9 : How Does a Camera Work? | Wonderopolis

If an insurance provider claims that the other driver was travelling below the speed limit, and you disagree, it may be possible to determine the vehicle's actual speed using the red light camera's time-stamped photos -- by comparing the vehicle's position with stationary landmarks, for example.

He was neither the first nor the only person trying to invent an incandescent light bulb. However, Edison is often credited with the invention because his version was able to outstrip the earlier versions because of a combination of three factors: He experimented with electricity and invented an electric battery. When he connected wires to his battery and a piece of carbon, the carbon glowed, producing light. His invention was known as the Electric Arc lamp. More notably, in , British scientist Warren de la Rue enclosed a coiled platinum filament in a vacuum tube and passed an electric current through it. The design was based on the concept that the high melting point of platinum would allow it to operate at high temperatures and that the evacuated chamber would contain fewer gas molecules to react with the platinum, improving its longevity. Although an efficient design, the cost of the platinum made it impractical for commercial production. And by he had a working prototype, but the lack of a good vacuum and an adequate supply of electricity resulted in a bulb whose lifetime was much too short to be considered an effective prodcer of light. In , Swan developed a longer lasting light bulb using a treated cotton thread that also removed the problem of early bulb blackening. They built their lamps with different sizes and shapes of carbon rods held between electrodes in glass cylinders filled with nitrogen. Woodward and Evans attempted to commercialize their lamp, but were unsuccessful. They eventually sold their patent to Edison in However, he continued to test several types of material for metal filaments to improve upon his original design and by Nov 4, , he filed another U. Original carbon-filament bulb from Thomas Edison. Other Notable Dates - The General Electric Company were the first to patent a method of making tungsten filaments for use in incandescent lightbulbs. Edison himself had known tungsten would eventually prove to be the best choice for filaments in incandescent light bulbs, but in his day, the machinery needed to produce the wire in such a fine form was not available. The remaining energy is lost as heat. However these inefficient light bulbs are still widely used today due to many advantages such as: There has been much resistance, however, to these policies owing to the low cost of incandescent bulbs, the instant availability of light and concerns of mercury contamination with CFLs. The many benefits of LED technology are summed up in this video.