

A glossary of technical jargon

A Quick Guide to Video, Film and Postproduction Jargon

Our industry is no different from others, it is full of ridiculous acronyms that are not industry transferable... but often mean the same thing. So, let's cut through a few of them.

N.B - If you are viewing this to quickly understand a singular term, we highly recommend you search for it.

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CINEMATOGRAPHY

What does that even mean?

I was once at an awards evening and the gentleman next to me lent over and said 'I do apologise, but how do people like Cin-a-ma-tog-raphy pronounced? I'm giving out the first award.' Luckily for him, he had it spot on. It is though, a particularly uncommon word and probably the best chapter title to start a Jargon Buster with.

Cinematography is to motion pictures what photography is to still pictures. Simply the capture of images to make up a picture, or in this case a moving picture.

ISO (International Standards Organisation)

In film-making terms it is how sensitive your piece of film or digital camera sensor is to light.

Low ISO/ASA number i.e between 25-100 = Help bring me a grip truck and a 50,000watt light.

Medium ISO/ASA number 300-800 = set me up a few standard lights and we can make some movie magic.

High ISO/ASA number 32,000 and above = Hey who needs any expensive lights, spark up a candle and we can shoot Avatar III. A lot of modern digital cameras can achieve ISO numbers never before conceived. High ISO is never a substitute for good lighting, but can get you out of sticky situations.

The higher the ISO, the more grain (no we're not about to break out the bread maker) is visible in the picture or in modern digital cameras noise is produced instead of grain.

Grain

Grain, for our business, is all about how clean and beautiful an image we can capture. Before we can debunk grain we'll have to make some noise! (No! sit down and stop waving your hands in the air like you just don't care). We mean noise of the digital kind. Grain and Noise are kind of the same, but different (Oxymoron alert anyone!) Grain is technically a film thing, it's physical. It's what makes film work.

This is an extreme simplification, so don't think it will help get you your Masters degree in photochemical reaction theory, but if you take some celluloid, coat it with some silver halide crystals and expose it to light, you can somehow get an image out, that's as much of this tech rubbish as you need to know (for now). If you put lots of tiny crystals on your celluloid you will have a lovely smooth image with loads of detail, but you will need a ton of light to record that image.

Now, if you load up your celluloid with a ton of silver halide crystals the size of small boulders you'll get a gritty image that shows less detail, but you won't need much light to record that image.

Noise (picture noise)

Is the digital sensor equivalent of film grain. Though it is not as pretty (as it is not organic) and varies depending on the camera sensor and the ISO you are shooting at. Early digital cameras had very visible noise even at low ISO. Digital noise is created in a similar way to grain, in that the noise you see is coming from the reaction of light on the sensor - essentially the noise is directly parallel to the amount of power/heat coming from the digital sensor as it tries to capture an image. The higher the ISO, the more noise as the sensor is working harder (because there is less light) and creating more heat.

ASA (American Standards Association)

See ISO

Sensor

In our world, it is the digital equivalent of the film. A digital block inside the front of the camera which observes changes in light and records them. Sensors are improving at a rate of knots at the moment. Improved ISO sensitivity means you can pretty much film in the dark, resolution increases, higher frame rates are achievable and the colour recreation is simply stunning. Ten years ago, we had dodgy tape cameras producing horrible results for MASSIVE costs. Since then things like the Canon 5Dii have made 'real' film-making accessible to almost anyone and the Arri Alexa has convinced many die-hard film-makers to move to digital. In general terms the most important part of the sensor is the size, the bigger the sensor the more dramatic the visual it produces.

Reel

To keep track of all the footage being shot we use a reel name, traditionally because film came on a reel. The name

'Speed'

You may hear this called out on-set, it is the indication from the camera team that the camera is now recording. Traditionally the word 'speed' related to a film camera motor, which would start slowly and build up to full recording speed. Once recording speed was reached the cameraman would inform the director / assistant director so that filming could commence without the risk of any action being missed, or (if the motor was not at full speed) the action being played back in super fast-forward.

'In the can'

A term used to signify a reel/scene is complete, again harking back to film days when the film-reel was taken off the camera, stored in a physical metal can and taken off for processing.

T-Stop / F-Stop

There's a hole in my camera, or is it an aperture?

Is it an F-Stop, is it a T-Stop, or even an H-Stop (hah! weren't expecting that one were you ?)

We all know what a lens does, right. Focuses the light onto the sensor or piece of film so we have a nice sharp image just where we want it, but the other really important thing we perform on the lens is to set the aperture. An aperture by definition is a hole, an aperture on a lens is just a posh hole that you can change the size of.

A big hole (aperture) will let in a lot of light, handy if your scene is a bit dark (and would give you a low F-stop value, say F2.8)

A small hole (aperture) will let in a small amount of light, handy if your scene is really bright sunlight (a high F-stop value, say F22).

The posh bit comes from the fact that we may like to use more than one lens and we may even want to know or replicate just how much light is getting inside our camera.

Based on this, some kind of standard would come in damned handy... Enter the mighty F-Stop.

High-Speed

High-speed traditionally referred to the speed of the motor turning the film in the camera, the higher speed, the more frames of film were exposed per second. Thus, when played back at a normal base FPS (see Capture Standards) the images would seem slower than real-time. High-speed technically means anything over base FPS - though, it is commonly used to refer to specialist high-speed capture, from cameras like the Phantom (see Kit); footage for example 250fps plus (that's over ten times slower than base FPS). Some high-speed cameras can capture 20,000fps, making a second of footage last for over thirteen minutes when played back.

Of course to achieve such high-speed capture you need huge amounts of light and most of these cameras can only store a few seconds of footage at a time. With high-speed you can get very adventurous and creative, enabling snapshots of time to tell entire stories... it will amaze you just how much happens in a second that the human eye cannot see!

Stop Motion (Stop Frame if you want to annoy the animators)

Take a still image of an object, move it slightly, take another. Play these back and you have created the illusion of life. Labour intensive. Think Wallace & Gromit, Morph, King Kong.

HDR

Acronym for 'high dynamic range', when we capture an image with a modern camera (like an Arri Alexa - see Kit) it can capture images in HDR using their RAW function or Log-C formats. This gives us amazing clarity, colours and contrast range. Though, ironically film has captured in HDR for over 50 years, so why is it suddenly trendy? Well because most formats for presenting the work (TV, Youtube etc) are unable to display this information. Presently there is a big push to make TV's more HDR friendly. It's a nice gesture, in reality we have to cater for lowest common denominator in most instances and the most common formats; so TV's adopting 'HDR' is a bit of a gimmick. In reality the essential thing to do is capture with a camera that is HDR capable to give you the maximum flexibility in the grade.

Dynamic Range

In picture this means how much information can we capture. Traditionally only film stock had anything like enough dynamic range to create a really stunning image. This has changed recently, with many cameras (both professional and consumer) becoming able to capture detail across the whole picture. Without dynamic range you get very crushed blacks with no detail and whites that are washed out.

Log-C

A format developed to capture a 'film-like' image in digital Quicktime format. Which gave lots of scope in postproduction to colour grade and manipulate the image. This is a good thing and has made a massive difference to the industry.

S-Log

The Sony version of Log-C which is compatible with their sensors and gives similar results.

RAW

Is a simple term to mean we are capturing an image at the maximum capability of the camera. It gives maximum flexibility in postproduction.

Head Room

The amount of space in a frame over an actor's head in a shot. Luther, Utopia, Mr Robot have lots of it. Most TV / Film doesn't. Used to convey a sense of mood / tone. Mess with the rule of thirds to unsettle the viewer.

The rule of thirds

A set of guidelines for the composition of an image stating where horizons, eyelines vanishing points should sit within a frame.

LIGHTING

Lumen

This is a measure of light, and one that we're going to have to embrace a little more in these days of energy efficient light sources (Fluorescent, LED, HID etc...) because a Lumen is a measure of the quantity of visible light given off by a source and nothing else.

Putting this into perspective a typical tungsten light puts out about 5% of it's energy in actual visible light, the other 95% keeps the studio nice and warm!

Kelvin (K)

'Holy thermodynamic meltdown batman! at the Null point in the Kelvin scale all thermal motion ceases and my black body radiator is reading zero!'

The above is technically correct, but for our purposes the Kelvin scale (Thanks Lord Kelvin 1824-1907) refers to colour temperature recorded on an image.

Lovely warm candlelight about 1800K

Arri 800W Tungsten Light 3200K

Strobe Flash 5500K

Average Daylight 6500K

In a nutshell, the warmer the light looks the lower the number, a struck match is around 1500K, and the cooler or more blue the light looks the higher the number, so if you can make it out to the North pole while we still have some Ozone left and look into a clear blue sky you could max out at a massive 25,000K (grab some of that while you can).

Volumetric Light

Used to create solid shafts of light for a more graphic feel to a shot or to add depth by pushing the background back and muting the colours. This does not make you Ridley Scott or Christopher Nolan

HMI

The biggest problem with HMI lights is pronouncing their full name, Hydrargyrum medium-arc iodide lamp, apart from that they are just tiny arc lamps in a glass case that kick out a lot of well balanced light.

Handy because they are daylight coloured and robust, no fragile bit of Tungsten filament to break, but can be a bit temperamental if you don't show them some love.

Historically they can flicker a bit to the camera, but since the invention of nice modern Electronic ballasts (the bit that controls the light) it's not such a big deal anymore.

Tungsten

Is the Danny Dyer of the periodic table (it's well 'ard) unlike Mr Dyer though, it has the highest melting point of all the elements.

Can you think of a better thing to apply an electric current to and heat up until it glows, putting out loads of light (but not melting, remember), Well good old Thomas Edison thought so as well, the rest is history!

Still very common in the studio, we use them less regularly on location as they use up a lot of power.

Softlight

One of the key characteristics of any light source is how directional (or hard) it is, as opposed to how diffuse (or soft) it is. These qualities are most often defined by the size of the light source in relation to the distance from the subject.

An easy test is to see how hard a shadow is cast.

The ultimate hard light is midday sun, just look at how crispy and sharp that shadow is (OK the sun is technically a bit on the big side, 2.7 million miles circumference) but it does happen to be 93 million miles away, the ultimate point light source... sadly very unreliable in the UK.

Now have a stroll out on a nice flat overcast day (so any day in England really) and check out your.... (hey! where did my shadow go WTF!)

Overcast, horizon to horizon sky, the ultimate soft light.

Fluorescent Light

Is anything more evocative of a 1970's office building than double glazing full of dead bluebottles, a cheese plant in a pot full of cigarette ends and of course the obligatory row of badly flickering fluorescent tubes!

With such bad press it seems so wrong that all fluorescent tubes are filled with a noble gas. However, in their favour they don't consume much power, don't get that hot and in the hand of specialist manufacturers like Kino Flo produce products that are the swiss army knife of small and medium sized shoots.

LED light

Or Light Emitting Diodes. These are the new kids on the block and still a space to watch as their technology gets more refined and comes of age. Back in the day all they could muster was a dull red glow, as "on lights" for your sega megadrive 1, but now they can punch out enough to light a set all for about 3p worth of electricity (alright I made that bit up, but they are very cheap to run). The light quality however, for the money it costs to actually buy them is very poor and has a long way to go.

Strobe

I like to think of these as the bright rapidly flashing lights you get at school disco's or cheap nightclubs that make your drunk friend get disorientated and fall over. In a more sensible environment though, they are the powerful flash units that are used mainly in stills photography and can produce large amounts of light in a fraction of a second for ultra crisp professional looking images.

Diffusion (Lighting)

Remember our little chat about soft and hard light. Well one of the ways that we change our hard light to soft is by using diffusion. Thanks to our good friends at companies like Rosco and Lee filters we have an amazing array of materials to choose from with esoteric names like Hampshire frost, and opal tough frost that modify our raw dollops of light in a myriad subtle and interesting ways.

Gels

Part of my job as a DoP is to never be satisfied, "that light is too soft, that one's too hard, that one's too blue, why isn't my sunshine light orange... (Ooh don't I go on!).

Fortunately there is a whole shelf in the studio of what looks like bits of rolled up cellophane from the Cadbury's factory. These transparent sheets of coloured material are gels, and there is one out there for almost every occasion.

Watching the right of passage of your newest assistant burning his finger as he clips that sheet of orange gel over your window light for the first time is obligatory, although perhaps against the Geneva convention, but we've all done it (I still do!).

Mattebox & Filters

Remember your first car and how good it would look with that massive spoiler on the back, oh and maybe 20inch alloy rims and.. Well nothing pimps a camera like a great big box on the front, the only difference being, a Matte box does actually improve the performance of your camera.

A professional Matte box will probably have more knobs & buttons than the camera itself and does two main jobs. Firstly it keeps any stray light from shining in the lens and making our pictures all milky and full of lens flares (ironically us arty types often want this to happen)

Secondly, it's there to hold filters, these are similar to gels but are made of high quality materials and sit in special frames that drop into the Matte box immediately in front of the lens. From diopters (that magnify an image) to ND (which reduces the light that comes into the lens), like gels, there is a filter for all occasions.

SOUND

LEQm

A system for reading the power output of sound, regularly used in the cinema world a little like dB but LEQm, like Loudness reads sound over a period of time rather than just at the peaks.

dB

A decibel is a way of reading the power output of a sound. Normally with 0dB being the maximum level we can hit when recording or mixing sound. In the real world 0dB is almost impossible to achieve, a normal room can be 70dB when 'nothing' is happening! Using acoustic treatment you can reduce the dB level.

Surround Sound

A term for when sound is not coming from a single point (like a television screen). For example 5.1 or 7.1 or Atmos. Why do you need it? It creates a more believable and immersive experience when the technology is there to play it back.

Dynamic Range (Audio)

The volume levels that sound is permitted for transmission. There is a minimum and maximum level to reduce 'shock' factor when listening and keep unity within all advertising. Loudness however changes this slightly.

Loudness

The value of sound averaged out; a loudness meter pre-reads the sound and does not react like a PPM instead working out the actual way the human ear hears sound.

PPM

Peak Programme Meter - reads an electronic audio level in volts. It reacts incredibly quickly and allows excellent technical measurement of sound. 4PPM is exactly -18dB which is the UK tone standard.

5.1

A technology for sound which has three channels at the front (left, centre and right) to allow the sound to pan across the screen. Two at the rear (so that is the 5 of 5.1); Ls (Left surround) and Rs (Right surround) to create space and shape within the sound and finally LFE (low frequency effects) where explosions and impact are created in the sub-bass low frequencies (that is denoted by the 1 in 5.1).

7.1

As 5.1 but with two additional channels at the back of the room create even more dimension in the sonics. Allowing for more accurate sound positioning in the room.

Atmos (Dolby)

A new 3D sound technology for cinema and home-cinema that goes well beyond the 7.1 system (in fact some Atmos systems have 128 loudspeakers in the cinema - attached to the walls, on the ceiling and behind the screen) to allow pin-point accuracy of sound within the room. It is complex and quite expensive to truly utilise at present, but is phenomenal in the right instance.

Dolby Sound

Dolby are a name synonymous with cinema and sound quality, they are a business not a governing body and they set many of the standards in sound production and reproduction for film and more.

Sample Rate: 48Khz

48,000 samples, amount of sound information captured per second in hertz. The broadcast standard (music is regularly distributed at 44Khz, this comes from the era of CD's)

Compression (audio)

Is a method used to take 'spikes' out of sound. In modern pop music compression is used to make the sound as loud as possible. In film, it is regularly used on dialogue to keep the volume across the dialogue consistent.

Noise gate (audio)

A device (software or hardware) which only allows sound through over a specific threshold. For example, if the dialogue is above -10dB you could set the noise gate at -10dB and when there was no dialogue the sound would be completely silenced.

VO

Voice over, the essential staple of most of the films we make. A voice over artist and voice over studio can take a very mediocre film and transform it into something that feels more professional and thought out. Humans are very sensitive to sound and a badly recorded VO (say in an echoey room, or recorded by an amateur) can really harm the impact a film makes.

Foley

Common in film-making to this day, it is the re-recording of the sounds your brain expects to hear from a scene - but recorded in a studio in postproduction. This could be walking through mud, typing, a phone ringing - many of these are added at the foley stage. It gives much greater control of the sounds and allows us to shape the soundbed of the film.

ADR. Automatic Dialogue Replacement.

Often when shooting it is difficult to control the environment. The audio captured live "Sync Sound" is often a mess with traffic, pedestrians, wind, and wildlife contributing to unusable dialogue. This is where ADR comes in. If you've planned and budgeted for it, you can bring your actors in to re record their dialogue replacing the original audio for a fuller sound.

You can also, if you have bottomless pockets, do this purely to capture alternate takes of the dialogue to enhance performance.

NB: This isn't as seamless as you think.

Wild Track / Atmos

The sound of a room / location when no-one's talking. Nowhere, apart from space, is silent. Everywhere has a sound. Recorded to lay under a scene so that the audience feels like they're in the space. If it's not there, they'll miss it. Shut up while it's being recorded.

POSTPRODUCTION

Offline Edit

The first edit, where you create the story in postproduction. At this stage the focus really is on the shots and their order to make sure you have a film that makes sense. A good offline editor is a good story-teller. It is often overlooked now, but can make a film. At this stage, usually the sound and image are quite rough and CGI, VFX etc will not be included.

Traditionally an offline suite used very low quality images (as hard drives were very small, but lots of footage needed to be stored), today this is not such an issue - which is why there is a blurred line between offline and online now.

Online Edit

Once the offline is complete we move into online. Traditionally that meant replacing the low quality footage in the approved film with the high-quality version, but only the signed off footage (let's say a minute of finished film from the eight hours that were filmed) in order to complete the film by improving colour, laying down music and adding titles. Today the offline is often undertaken using high-quality footage, but the online process is still relevant. Without the finishing you don't have a film. Online is commonly a more technical and less creative process than offline or grading.

Grade

The grade is one of the most underrated parts of the process. This is where we tell the story in the mood of the visual (colour, tone, sharpness), shape the image, create focal points, bringing out certain details or colours and providing the final look of a film or still image. It is a wonderful art that should never be overlooked.

Telecine

The traditional process to take film into the post-production world. Original telecine would have transferred film to a tape format in order to be edited. Today it is commonly taken into a digital 4K space. Telecine machines themselves are becoming uncommon as they are very large, expensive to maintain and film acquisition is not as popular now as it was ten years ago.

You may still hear people referring to 'telecine' for the footage even if it was captured digitally. They are simply referring to the process of ingesting it into post. Also sometimes referred to as DIT'ing.

Flat look

Is a term to describe when a RAW or LOG image comes into postproduction, a flat look often sends clients into a panic. They will not have seen this look on-set and will often assume the footage is damaged. On the contrary when it is flat it is in a great state for us to work with.

Once it is graded the colour and life of the image returns, the client stops panicking and everyone is happy. Top tip, don't show the client the flat look.

Grain (postproduction grain)

We will regularly add grain to a picture in post, this recreates the look of film, is more natural to the eye, breaks up and digital artifacts or other unpleasant visuals and makes for a more enjoyable final experience... even if you can't tell that we did it.

Denoiser (picture)

The polar opposite of adding grain, sometimes we want to create a uniform look so will denoise the picture to remove digital artifacts and picture noise. This creates a very smooth looking picture. Ironically we often then add grain afterward, but in a uniform way so all the shots match.

VFX (aka Flame)

The process of manipulating an image, for example painting out a sign, removing stunt wires from a shot - or, adding CGI or additional visuals to a shot.

This is a hugely complex world and most film relies heavily on VFX now.

After Effects

Is software created by adobe, it can be used for 2D animation and VFX. A very handy and common tool which many post-production operators can use.

Maya

Is software for creating CGI. It has become so commonly used in the industry that many people refer to Maya when they actually just mean CGI. Often worth noting the difference as there are many other products that can create CGI.

CGI (Computer Graphic Imagery)

In our world is normally where you are manipulating an image, for example to put someone into a room that doesn't exist you would create the room in CGI and green-screen them in. In modern film making good CGI is essential for storytelling and making the impossible, possible.

DIGITAL CHANNELS / PLATFORMS

For me (Tom Ward), the funniest thing about platforms is just how much they dictate how a film or image is shot. This might seem obvious, but in a world where new formats creep up every day it is surprising just how frequently we are asked to change the way we shoot our work.

So if you feel a little out of touch with your delivery platforms, don't worry, the whole world is on the back foot.

YouTube

First and foremost a Video Sharing platform with everything from cats to Russian Dashcams to Let's Plays (Gamers Gaming and talking) to Makeup fashion tips/tutorials, Unboxings, Reviews and conspiracy docs. Allows users to livestream (You have to have generated a certain amount of content first) Also serves paid premium content such as films and is the internet's favourite music streaming service, but is also possibly the world's largest learning platform. And like any public platform, is a fantastic archive of the arcane and forgotten. And it pays.

Vimeo

YouTube for Pixel Peepers. *see Pixel Peepers

A much friendlier platform for content creators and hosts, it also offers more control of the presentation of your content and in general, a friendlier user base. It's technologically a bit creaky but offers a VOD service, Tip Jar and the ability to take back your mistakes without starting from scratch.

Twitch

Gamer focused video streaming platform. (Now owned by Amazon)

Used to be just gamers streaming Let's Plays. Some run entertainment channels due to its instant tip jar service.

Vine

A short video clips that loop, they have given a new creative outlet for communication. Especially effective when trying to tease people into 'learning more'

Instagram

Is a photo sharing system, a bit like a YouTube for pictures. It operates the hashtag search system synonymous with Twitter for searching. It's a mangled world of questionable and pointless images if you don't know what you're looking for.

VR / Virtual Reality

The user interacts via a headset and a variety of controllers via Graphics which are generated by a PC / Console / Phone This offers a high level of immersive interactivity and often needs more space for the user to operate in.

360° Video / Walkthrough

Again the user interacts via a headset but this is a more passive experience where the user is viewing pre recorded content often from a fixed viewpoint. See YouTube 360 and Google maps.

Augmented Reality

Digital elements are overlaid on live action feeds from the users device for the viewer to interact with. The most popular recent example being Pokemon Go, although the technology has been around since the mid 2000s

KIT & CAMERA

Zeiss - lens manufacturer

Established in 1884 by a German optician, Mr Zeiss (or Carl to his friends) basically set in motion the development of modern optics as we know them today. You can quite simply think of Mr Zeiss as the Don Corleone of quality glass and Zeiss as the Mafia of anything with a lovely lens' in it, be it microscopes, binoculars, medical kit, lens' etc...

Cooke - lens manufacturer

Hot on the tails of Mr Zeiss, was T. Cooke & Sons of York est.1890. Originally a maker of telescopes, they branched out into lens manufacture and found favour amongst such photographic giants as landscape photography pioneer Ansel Adams.

Hasselblad - camera manufacturer

If Rolls Royce is synonymous with the thought of quality cars, then the products of Victor Hasselblad are the same for stills cameras, in fact for much of the modern moving picture industry. Established in Sweden in 1841 they rapidly became the benchmark for quality and engineering... I wonder which German would make the lens' they chose to use?

PS: If you want a free Hasselblad there are twelve just laying about ready to pick up if you happen to be on the surface of the moon anytime soon!

Arri - manufacturer

Founded in Germany in 1917, they create cameras, lenses (normally in association with Zeiss) and lights. A very innovative business who create no nonsense products that last and are also quite expensive.

Arri Alexa - Digital cinematography camera

The game-changing digital camera from the German wizards. Before the Arri Alexa was released film was still king and digital cameras had a pretty bad name. In effect, digital meant cheap. That all changed when the Alexa was released in 2010 - it recreated an image so similar to film that even the greatest skeptics applauded. The camera is continually updated and remains the camera of choice across cinema and advertising.

Phantom - High-speed digital cinematography camera

A camera system which allows you to capture extremely high-speed images. Their current cameras (like the Phantom Flex 4K) can capture 4K resolution footage at almost 1000fps in quite low light. The recent release of their Onyx camera allows for capture of images up to 12,000fps at HD. This is a superb move forward in technology, though at that fps pretty much every artificial light source will flicker. Depending on the type of footage you capture will determine the fps you shoot at. At Sandstorm we like the sweet-spot of 2000fps as a standard which comes from the Phantom Flex camera.

Prime lens

A prime lens is a fixed length lens (for example a wide lens or a close up lens). In order to 'punch in' or zoom in you have to physically remove the lens and put a new one on, or move the camera closer. This sounds like a nightmare you say! Well it is. HOWEVER, a good prime lens lets in light accurately and is more detailed than a zoom. If you're shooting a beauty image of a person a 50mm or longer prime is essential, for a nice wide shot an 18mm prime will create a straighter more pleasant image than a zoom equivalent. If you have the time always shoot on primes! There are also many many different types to choose from that give different results. The coating of the lens and the manufacture style can change the look entirely. It's a whole subject in itself.

Zoom lens

A zoom lens provides a big advantage over a prime lens, you can change framing in seconds, so when you're up against it for time, you often have no choice but to use a zoom. Though there are many disadvantages, the first is light, as there are more glass elements inside the zoom lens it lets less light in. Secondly, the picture shape, it is almost impossible to make a zoom lens which can produce the same shaped images when zoomed out and zoomed in, all those bits of glass moving about inside disrupt the light and can produce very interesting inaccurate results. It is why zoom lenses are not popular in the cinema world, especially when filming people.

Drone

When you're sitting in the park this summer with your first ice cream of the year, and you hear that high pitched whine of the inevitable wasp attack, "Fear Not" because the chances are that it will be a drone.

Drones are flying cameras usually in the form of a small helicopter'esque machine. Once the domain of ex-pilots and highly specialised geeks these oversized remote controlled machines were expensive and needed a high skill level to fly.

Enter technology! Or put another way, you can now pop down to Maplins and buy a drone the size of a wasp that you can crash from the comfort of your own i-phone. For us camera folk though it does mean that a good drone with GPS is now an option and within reach of even the most modest production for those amazing sunset fly-away shots.

Mattebox & Filters

Remember your first car and how good it would look with that massive spoiler on the back, oh and maybe 20inch alloy rims and... Well nothing pimps a camera like a great big box on the front, the only difference being, a Matte box does actually improve the performance of your camera.

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Sticks

Another name for a camera tripod or support system.

Track

Not just a term for music, the track is an essential bit of filmmaking kit. It allows a camera dolly to move smoothly around the set.

Gimbal

Pioneered by Freefly systems, the Gimbal has become a staple in many filmmakers arsenal. It works via a 3 Axis micro controller based counterbalance system to remove shake and wobble from the camera, giving smoother motion when moving a camera around by hand or on a vehicle or helicopter.

Steadicam

A body mounted camera system which removes shake and wobble from the camera and is more portable than a dolly and track. A great solution, but requires a focus puller remotely attached to keep the camera in focus and it is impossible to truly recreate a camera move again and again. Great for action sequences.

CREW & PERSONNEL

DIT (Digital Intermediate Technician)

A person who is on-set while filming and will take the digital rushes, copy them, test them and make sure they get through to post smoothly. Ideally with clones incase any hard drives get damaged.

Grip

The grips are there to lift and construct support systems and stands for lighting and, occasionally assist the camera department setting up tracks, platforms etc.

Key Grip

The key grip heads up the rigging team. They will oversee the construction of all support systems required for the lighting of a movie, also occasionally they rig for the camera team. On larger scale films these are two separate departments and do NOT share roles.

Gaffer

Heads up the electrical and lighting teams, in essence he takes instruction from the DOP and makes sure all the correct lights, cables are in place, in good time, safely so the visual can truly represent the creative vision.

Spark

Trade name for an electrician. Often a team of sparks will work under the instruction of the gaffer to safely provide electrical supply to the lighting, sound, camera and other departments.

Dolly Grip

Contrary to popular belief, this is not someone who carries around stunt dolls on a film set. The dolly grip is in charge of the camera dolly which allows the camera to move around smoothly (normally on metal tracks) to glide and provide motion in the scene.

There are other ways to provide camera motion, like gimbal rigs and steadicam. But the dolly and dolly grip are often the best solution for well rehearsed and repeatable moves on a film set.

Best Boy

A term used for the next in command in a rigging or electrical team. They sit one below the Gaffer or Key grip in the hierarchy

DOP

Director of Photography - the person who works alongside the director to create the vision on screen. They choose the style and tone of the visuals in order to tell the story. Until recently a term only heard in the film industry, it has spilt out into any type of digital video. But there is a marked difference between a feature film DOP, a commercials DOP and your mate

round the corner who says he's a DOP but has only shot a couple of talking head interviews... though often you'll pay the same amount of money.

Focus Puller

The person in charge of the lens on the camera, they keep the camera in focus either by the camera or remotely. A tricky job where they must judge the distance a subject is from the camera using intuition, experience and practice... and lots of marks and notes. You will regularly see the focus puller dragging a tape measure from the camera or putting bits of tape on the floor with notes on them (to mark distances).

PA

Not just a set of loud speakers or a personal assistant, but also a production assistant... basically an AP but often a little more junior and also often a little more multi-skilled - on smaller projects they may be involved in the camera team or assembling edits

AD

Assistant director

EP

Executive producer - basically the person who controls the money and keeps the client or financier happy

AP

Assistant producer - on larger productions there are often many assistant producers helping to coordinate a production.

CAPTURE STANDARDS

Frame Rate / FPS - or Frames Per Second

When filming we need to decide how many frames (images) will be captured and played back in a second. Until very recently there were (roughly) three standards. 24FPS for film/cinema 25FPS for PAL television and 30FPS for NTSC television.

The 24fps standard came into use a very long time ago and was determined by the fastest speed at which a film camera motor could safely feed film through the camera without the human eye noticing that the picture was skipping. As time has gone along we have warmed to this frame-rate and viewers feel very at home with the 24fps experience, which Peter Jackson found to his detriment when he shot *The Hobbit* at 48fps - because viewers complained it looked odd (in reality, a little too realistic for the brain to enjoy processing). People are watching a film to escape and 24fps seems to be comfortable for the present generation - whether we'll still think this in 50 years time is to be seen!?

Anyone shooting international / global film campaigns would normally opt for 24FPS, as it is the most common global standard and also can be easily translated / standards converted into PAL or NTSC.

Playback / base FPS

Is the amount of frames per second that will be played back once the image is captured. Normally this would be 24, 25 or 30.

Capture frame rate

Most cameras can now film in variable frame rates, this allows for slow motion (high-speed) or fast motion to be captured when played back at a normal base FPS.

Interlacing vs. Progressive

Interlaced footage (i) records two images to each frame (aka fields), then the scanner reads one field first (on lines 1,3,5,7) and then reads the second field (2,4,6,8). Progressive (P) reads line by line top to bottom and stores one image per frame. 1,2,3,4... Progressive images often look sharper (as more pixels are being used for a single image) but they judder slightly on some fast movements (modern TV's and laptops try to compensate for this), where an interlaced picture moves smoothly but looks slightly softer. Interlaced images also have issues with flicker (where a horizontal line on screen is recorded on both fields) and the TV struggles to define exactly where the line is (field 1 or field 2).

Anamorphic

A technique used to store (or capture) a widescreen image onto a traditional 4:3 or 16:9 frame. It has been used commercially since the 50's and was often referred to as 'Cinemascope'

The anamorphic camera lens squashes the picture as it comes into the camera allowing for a 2.35:1 image to spread across the entire 4:3 film frame. Which

is where FHA (full height anamorphic) originates from. Why? Because cinematographers are artists and widescreen looks beautiful. Also anamorphic lenses create very interesting results on the picture. To then display the anamorphic image you have many options - for cinemas they often use an anamorphic lens on the projector, some TV's can now read the format and automatically adjust the aspect ratio and YouTube and other sites will accept 2.35:1 material.

CODECS & FORMATS

SMPTE

Society of Motion Picture and Television Engineers - recognise standards in television and broadcasting.

e.g. - SMPTE 372M: is HD/SDI (single BNC type cable for transferring HD video signals), SMPTE 259M: SDI (single BNC cable for transferring SD video signals)

MPEG

The acronym for the Motion Picture Expert Group. Also, regularly used to refer to online content, low resolution video clips or small video files to be distributed on a business intranet. The word 'MPEG' was commonly used for all low resolution digital video format until recently where other words like 'YouTube res' or 'H264' or 'MP4' have taken favour.

MP4

One of the modern file extensions used for transmitting video for steaming. A great format allowing for high flexibility when encoding (creating) to allow maximum quality with minimum datarate.

H264 codec

Is a fantastic codec which changed the game of internet streaming. It uses wide keyframe distances and high compression to achieve very small files which 'seem' to look good to the eye. Sadly once a film is in H264 it will never go back to its best. H264 uses lots of very clever algorithms to remove any unneeded data in the sound and picture. Once it's gone, it's gone.

Keyframe

Is the name used when encoding video for the images we will store at high-resolution. In order to stream videos efficiently not all frames can be a keyframe.

Keyframe distance

When encoding video, it is important to understand the output. For internet streaming (keeping the data rate down) you spread the keyframes out (say 75) which means you store 1 keyframes every 3 (ish) seconds of video. Problem with this? All the other frames are very low quality, so if there is a lot of action, the picture can be seen to degrade. The more keyframes the higher the quality, but the bigger the datarate.

.MXF

A file format commonly used in camera acquisition and some editing suites. Not a great format (truth be told) and quite difficult to work with. I'm looking forward to a time when it gets dropped completely.

.MOV

The Quicktime video file extension. Owned by Apple, it is a great 'wrapper' to deliver video files in, however, as it is owned by Apple some people will

choose not to use it. File types like the ultra common H264 and the broadcast format ProRes are normally wrapped in a .mov file.

.WMV

Windows Media Video - a wrapper, similar to Quicktime, but made by Microsoft. Luckily it is becoming more and more uncommon - we still have a lot of clients who like this format as it is Powerpoint friendly and gets through some of the more restrictive corporate firewalls.

Apple Pro Res (HQ) 4:2:2

Compressed (but visually lossless codec) reduces file size to around 3rd of uncompressed

8 bit (video)

24bit RGB colour space (8 bits per colour, RGB) approximately 16.7 million colour results available. Some 8 bit formats struggle to reproduce intricate colours and patterns. However, this is the most common bit depth in the world.

10 bit uncompressed (video)

10 bit contains extra colour information than 8bit, no compression added to the image (this is the ultimate compatible Quicktime for broadcast) but heavy on data.

Uncompressed

This means that no visual or data compression has been applied to the picture, by not compressing the images use up large amounts of space (6MB per frame for HD, 24 frames in a second that is 144MB a second, that is 8.3GB a minute. You get the maths, it is a lot)

There are some 'technically' uncompressed formats which are visually lossless but save data by taking out colours which are not being shown in the picture. This is great for broadcast, but not great in post, what happens if you need to try and get that colour back once it has gone!

625/50

Technical representation for the old PAL format in its component form (before it is turned into transmission PAL). 625 active video lines, 50 interlaced images per second.

4:4:4 vs. 4:2:2

4:4:4 RGB is a pure digital picture with full chroma and luma information. It is brilliant in post-production, however it is data heavy so 4:2:2 was created to allow reduced bandwidth without any noticeable difference (to the human eye). 4:2:2 utilises clever signal carriage where Green (Y) carries the luma and chroma at 4 bits, the Red and Blue channels only carry 2 bits of chroma and use the Green channels luma to work out exactly which Red or Blue is required to be displayed.

RAW

Is a simple term to mean we are capturing an image at the maximum capability of the camera. It gives maximum flexibility in postproduction.

MPEG-2 Program Stream

Motion Picture Expert Group, version 2 used for Program Streams final mixed streams into one file and Transport Streams for DVB, digital video broadcast - allows errors without noticeable problems.

I frame only

Intra code frame aka non compressible frame, MPEG streams can have I, B, P frames, but only I frames are full quality, B, P are highly compressed for use in web and TX applications. B and P frames are super low resolution and are made up by reading the I frames and working out from these how they should look.

4:2:2

Colour sampling for video. 4 samples of Luma (brightness) in the colour green, 2 of red, 2 of blue. A great way to transmit signals, as the red and blue are not as critical as the green in a picture.

4:2:0

4:2:0 = no blue as this is the easiest colour to hide from the human eye. The reduced bandwidth reduces colour quality and is not acceptable in broadcast. Some video cameras MiniDV, HDV etc capture using 4:2:0 in order to fit video down in small bandwidth.

720 x 576

D1 PAL -720pxls wide x 576 pxls high, active picture

FHA

Full height anamorphic, where a 16x9 picture (1024x576 pixels) is stored on a 4x3 originated format (720x576 pixels) or 2.35:1 on 16:9, creating a non square pixel aspect ratio. It is 'un-squashed' at the end user TV. True HD (1920x1080 and 1280x720) does not use anamorphic; all pixels are 1:1.

Anamorphic

A technique used to store (or capture) a widescreen image onto a traditional 4:3 or 16:9 frame. It has been used commercially since the 50's and was often referred to as 'Cinemascope'

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automatically adjust the aspect ratio and YouTube and other sites will accept 2.35:1 material.

Upper field first - odd

First interlaced image on the odd lines 1,3,5.

(lower field first - even means the first image is on lines 2,4,6)

Fields were introduced to smooth picture motion out, giving you 50 images in each 25frames.

RESOLUTIONS & TRANSMISSION

PAL

The original colour television format used in much of Europe and Asia, invented by the Germans and a very stable and effective standard. Slightly higher resolution than SD NTSC and much more balanced colours, running at 25fps

NTSC

The original 30fps colour television format used in the US predominantly - in analogue terms it was a very poor format but 30fps television / media is still very common. Most mobile phones shoot natively in 30fps based on the heritage of NTSC.

HD

High definition... well it was when they came up with the idea back in the analogue SD days before the digital revolution. It basically meant anything that looked good and had a bigger pixel count than SD. Overtime the standards (albeit far too many of them) became set at 1080 and 720 pixels in height.

1080P

Firstly, the P, it stands for 'progressive' (see progressive), then the number 1080 stands for the amount of lines of resolution in height. In the most common format this is 1920x1080 pixels. Which is the higher resolution HD format. Four times larger than SD.

1080i

Just like 1080P, but with interlaced frames instead of progressive.

720

The lower resolution HD format at 1280x720 pixels, rolled out for things like SkyHD when it launched. Being smaller than 1080 it needed less data bandwidth to transmit, but was higher resolution than SD broadcast, so viewers could appreciate the difference. It is still a very common format on Youtube etc

UHD (Ultra High Definition)

Is the term used for the television 4K and 8K standards. The main reason for the name came about because it isn't technically 4K or 8k, it is exactly a multiple of four times the size of HD (1920x1080) at 3840x2160 and sixteen times at 7680x4320, so slightly smaller than real 4k or 8k used in cinema. UHD is a subject of much debate, principally because on almost any TV you cannot see the difference between UHD and HD... so why have they done it? The official line is resolution on big screens which are 'coming in the future' (not sure houses are suddenly getting bigger to accommodate this) and more importantly colour space, there is a wider colour range in UHD in comparison.

IMAX

IMAX is the acronym for 'Image Maximum', designed in Canada for cinematographers to be able to capture much bigger images than 35mm film (the standard film size for motion picture), although they were not the first company to invent such a system, they are the most successful. IMAX was initially displayed in specially built cinemas where the screen covered your entire field of vision and was also the format of choice for OMNIMAX - which was that weird format used to project into a dome back in the 70's - neither really took off, the domes made people feel sick and the IMAX reels couldn't fit most films on them... 'taxi for IMAX please'? Maybe not!

Today IMAX (which you'll see brandished on most multiplex cinemas at the moment) simply means they are using a high resolution digital projectors in the cinema.

4K

Is an acronym used in the cinema world for the capture resolution used by many post production houses to ingest (bring in) film into the digital world ready to be edited and processed. It gave superior results to 2K and HD, well obviously, as it had more resolution, but with resolution comes increased file size. The images are huge and very modern file management systems are needed to handle the media efficiently at this size.

8K

So, we thought 4K was a pain, 8K takes it to a whole new level. Huge frames and no screens that can actually display it. So, why are they doing it? Futureproofing my darling... oh and a chance to upsell you in a few years. Me, a pessimist, no! When they finally make a commercially available cinema projector in 8K you should appreciate the difference. It's a way off, most cinemas are still 2K (lower res than most TV's).

16K

You get the idea, even bigger than 8K, a lot of high-end broadcast kit has already been made capable of processing this level of footage. There aren't any cameras yet that capture at this resolution and there are definitely no TV's which can display it. Even if you could display it, you would need to be on a screen the size of a small town to really make the most of this.

Aspect Ratio

Quite simply the measurement of height vs width of an image. Older television was 4:3, then anamorphic widescreen 16:9, now HD in native 16:9 with many films shot and projected in a variety of other aspects.

Letterbox

Simply a term for displaying a native aspect ratio in another format without cropping into an image. For instance if showing widescreen on a traditional 4:3 television. When doing this black bars are visible at the top and bottom of the picture... hence the letterboxing.

Still very common today, especially when showing 2.35:1 theatrical work on a HD 1080 16:9 frame.

FHA

Full height anamorphic, where a 16x9 picture (1024x576 pixels) is stored on a 4x3 originated format (720x576 pixels) or 2.35:1 on 16:9, creating a non square pixel aspect ratio. It is 'un-squashed' at the end user TV. True HD (1920x1080 and 1280x720) does not use anamorphic; all pixels are 1:1.

Safe area

Some TV's slightly crop the outer edges of the picture; safe areas give guidance to guaranteed viewable picture. This is also important with 16:9 content, where some viewers may be watching the picture centre cropped.

Drop-Frame Timecode (29.97fps or 23.96fps)

When NTSC was invented it was black and white. To make it carry colour they had to change the sync pulse that keeps the picture on the screen stable, this meant at 30fps over time the picture would lose sync. So a Drop-Frame timecode was invented, which does not drop any actual picture frames instead it misses a frame of sync pulse a minute to keep the picture and timecode in sync.

4:3

The traditional (squarish) television format. Not at all common now. Originally designed to replicate the view of the human eye.

16:9

The aspect ratio of modern flat screens. Also the standard aspect for digital content on the web.

2.35:1

The cinematic aspect ratio, providing a thin, super wide visual that allows for a natural and dramatic visual to be displayed as it was originally shot. Traditionally referred to as Cinemascope... because it sounds more exciting.

1:1

In video terms this is a relatively new aspect ratio, born of the Instagram generation. A format which is easily digested in both landscape and portrait without leaving too much 'empty space' (aka the letterbox). Although significantly less dramatic than, say, 2.35:1, it is a format that in 2018 is very popular for brands to utilise.

9:16

Imagine the portrait equivalent of 16:9, or (in 2018) the portrait equivalent of your TV... or the native portrait aspect ratio of your smartphone. It is not uncommon to now have to film in this portrait aspect, something we have been doing at Sandstorm for almost ten years now.

The tricky part of 9:16 shooting is that a lot of clients are now asking for a 'one size fits all' production. A film or still image that is suitable for landscape and portrait.

Our tip here is be very wary, in essence the results will not really be suitable for either aspect and come at the detriment of the framing of the images you are capturing.

Resolution

Technically it should be 'display resolution' and is the terms used for the amount of pixels (height and width) used to capture or display an image. The higher the resolution, the crisper the picture looks.

Don't be fooled by resolution though, a badly shot film at any resolution is a bad film. You need to be much more concerned about Dynamic range, the type of camera used, the lenses rather than the pixel count.

Mega pixel

The term used for the total amount of pixels used by the sensor in a camera. It is a very misleading term, because again, like resolution, it ignores the quality of the sensor, the physical size of the sensor or what you put in front of the sensor (the lens, lights etc). Therefore, when you see that your phone is 400 mega-pixels don't instantly assume that it will give you the same results as a cinema camera or a large format Hasselblad. The sensor in the camera may have the pixel count, but it is a tiny and probably handles exposure and colour very poorly - sometimes bigger is better.

3D

The term used for capturing and displaying depth in images. When 3D cinema relaunched a few years ago without the red and blue glasses, almost every film was shot with two cameras side by side... what a pain in the bum, one camera was difficult enough! These days people shoot with one camera and the processing is done in postproduction using algorithms and exceptionally patient, very large groups of people who manually cut around each object in the scene (digitally) to create the depth.

3D is a pretty dead format already, only kept alive because Cinemas have invested a lot of money in the technology. At present all TV manufacturers are looking to ditch the technology in favour of HDR and UHD.

Out of Gamut

Colours that can be created in RGB at 4:4:4 but when sub sampled to 4:2:2 for broadcast fall outside of the colours that 4:2:2 can create (due to the restriction on the Chroma).

Standards conversion

Terminology for taking 30fps to 25fps etc. Technically all that happens is that each second image (normally shown twice) is shown three times (and blended with the next image) in order to fit 30 images onto 25 images. It is much more complicated than that in reality, but in essence that is what happens. Why is it needed? Well, if you originate your material in the US,

many of the companies you work with will shoot in 30fps. Luckily now, the international 23.96 standard is quickly over-coming this!

Down conversion

Conversion of HD or UHD material downward to HD to SD. There are many ways of doing this, from Alchemist (hardware converter) to software conversion. Depending on the original footage, different methods work better for different instances. The ability to down-convert is regularly improving.

Progressive

Progressive scan format is the opposite of interlaced and is commonly represented by a 'P' at the end of the file name. E.G 1080P (to denote 1080 HD progressive scan image) or 24P (to denote an image that should be played back at 24fps in progressive scan). Progressive scanning stores a single, entire image on each frame across every active pixel line (1.2.3 etc) it creates very sharp detailed images but is very prone to jitter when the camera pans quickly or an object moves through the picture very quickly because the human eye 'refreshes' faster than 24/25 or 30fps so we see the gaps.

Modern tv's have special filters to compensate for this... and they're different on every TV, just to make our lives as film makers even more simple.

Interlaced / Fields

A clever idea to print two images on each frame of video. Thus a 25fps base rate would show you 50 images per second. Why? Well because your eye can easily see judder at 25fps but 50 looks pretty smooth. 24/25 and 30fps standards were invented a very long time ago, before tv signals could transmit 50 frames a second and, for film, before camera motors could turn quickly enough to achieve 48fps, without making a small fire on set and creating a lot of deaf cameraman from all the noise.

So, why is interlaced not the global standard now? Two reasons, first interlacing two images onto one frame means only half the picture space is utilised for each image, equalling two lower resolution pictures. Secondly, because humans have adapted to accepting 24/25/30 and instinctively see it as 'film' rather than reality.

DATA & CONNECTIVITY

HDMI

A consume interface / cable used to transmit high-definition media to your TV from a set-top box or camera. It is a poorly thought out solution, prone to damage, loss of quality over distance any many other problems - but it is cheap.

HDSDI

The professional version of HDMI, using more rugged cabling. It can normally transmit over longer distances at higher resolutions and with less issues than HDMI. Commonly the interface is a BNC connector.

SDI

A serial digital format which combines high quality video and audio signal and other metadata (subtitles, timecode). and is embedded at source and decoded at destination. A truly solid 4:2:2 and 4:4:4 data cable, commonly with a BNC connection.

3G

Does not refer to the phone signal, instead it represent the amount of data in Gigabits that can be transmitted by a device or through a device.

Data-rate

The amount of Kb/Mb/Tb that is being used when playing back a video or audio. For example a low resolution H264 only needs a small data-rate to play (say 5Mbps), where a big broadcast video uses up a massive amount of data-rate (maybe 2000Mbps). If the hard drive, or internet connection, or computer is not fast enough to cope your media won't play so constant consideration has to be taken when deciding what data-rate is required.

PRODUCTION CONSIDERATIONS

Watt (W) & Kilowatt (KW)

Power is knowledge, but for most DOP's power is "Watts". We all know roughly how bright we expect an old fashioned 100w bulb to be in our houses, so keeping that as a reference point you'll have an inkling of how bright a 800w light might be, or even a 10,000w, let alone the heat and physical size. But of course being camera people "size matters". Next time you hear a DOP asking his gaffer to throw up a 20K you'll know that some poor bugger (usually three) have got to lift a 20,000Watt light onto a stand somewhere.

For the geeks out there, the smallest measure of a Watt is a Femtowatt (one quadrillionth of a Watt).

And the biggest, is a Petawatt, roughly equal to my last electricity bill!

Soundstage

Quite simply a studio stage (room) that has been acoustically treated to give good audio performance when recording dialogue etc.

Carnet

A lovely little form we regularly have to fill in when moving equipment from country to country. It is a bit of a pain and encourages us to hire equipment when we're there... easier said than done when you're in a rain-forest.

Also recent rules about the amount of batteries we can take on a plane make this subject even more complicated.

Buyout

Basically the amount of money you need to pay an artist (voice or actors for example) to feature them in your work - not to be confused with BSF (their Basic Stage Fee which is the cost for them to come and record with you). The buyout is a fee you should be paying if your work will be shown in the public domain. Why? Well an actor has to pay the bills too. By appearing in your film they are representing you and there is a reward for that. It is essential to think about this early in any production so you have funds available and have considered just how long this work will live online.