

# Visual Representation of Development Proposals: Glossary and Abbreviations

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Technical Information Note 07/19

17 September 2019

This Technical Information Note comprises the glossary to be read in conjunction with LI TGN 06/19: Visual Representation of Development Proposals

accuracy	<i>Note that the definition of this term varies in common parlance and also in ISO 5725 which invokes the need for both trueness and precision in order to achieve an accurate result.</i>
acetate	Shorthand term for a clear film sheet (typically now made of polyester) which has a photograph of a view printed on it which can be held up to compare the image on the film directly with the same view in the field.
aerial photography	Photography from an airborne camera. To be most useful many transformations have to be correctly applied to the images so derived e.g. in order to correct for lens distortion, elevation of subject or terrain, the curvature of the earth, roll/pitch/yaw of the airborne device, atmospheric conditions, and to allow them to be stitched together and georeferenced. Even so some errors may remain and some surface features remain unhelpfully obscured. Aerial photograph datasets are available commercially and also as open data. See LI TIN: Opendata.
angle	Measured in degrees, minutes and seconds, or degrees and decimal parts of a degree. The amount of turn between two lines rotated from a common point, e.g. the line of sight as one moves from looking in one direction to another (Cf. field of view), where a 360 degree turn on the spot would bring the viewer back 'full circle' to the original direction. The combination of an angle in a horizontal plane (azimuth), with an angle in a vertical plane (elevation) can define all possible directions of view from a point, hence forming the basis for devices such as LiDAR/laser scanners.
aperture	The size of the hole in a solid plane through which light is made to pass within a camera lens assembly. Typically adjustable, it could be likened to the pupil in an eye dilating in lower light levels. It is typically measured as f-numbers (focal ratio numbers) which represent the ratio of the system's focal length to the diameter of the hole. Larger f numbers denote smaller apertures, letting less light through (and therefore requiring a longer exposure time) but are associated with a greater depth of field.
<i>ArcTan</i>	<i>(as per the mathematical function)</i>
augmented reality (AR)	Augmented Reality is an emerging digital technology of which there are various types, but they commonly include a 3D model of a development presented on a digital screen (tablet, laptop, phone or special glasses) georeferenced such that it can be experienced on site from any location in the vicinity of the development. Accuracy depends on several variables including GNSS data, model data, determination of angle and direction of view, screen resolution and proportion. Augmented Reality software normally includes the ability to capture site images. Subsequent off-site editing of the site images with the 3-D model may improve accuracy.
AVR	Accurate Visual Representation. A still image, or animated sequence of images, intended to convey reliable visual information about a proposed development. (See Appendices 06 and 11).
barrel distortion	A form of optical distortion which would have the effect of making a grid of lines (which could be taken as simplification of the components of an image) progressively more curved the further they are from the centre of the view. It is an inevitable product of the optics of all lenses but most noticeable when using wide-angle lenses or when shooting very close to the subject.

competent authority	The regulatory or planning authority which is the recipient of visualisations and which will determine or be consulted upon the planning process.
compression	The process of reducing the size of an image file. The process may involve some loss of metadata and/or image detail (such as number of colours).
context	The understanding of the wider view containing the proposed development site, encompassing all relevant landscape/ townscape/ seascape features in the view.
co-ordinates	Co-ordinates are one way to pinpoint where and how far something is from a starting point (origin). Cartesian co-ordinates do this in each of three directions perpendicular to each other (typically represented as x, y and z axes, providing easting, northing and elevation). In situations where the curvature of the earth is a factor, a co-ordinate system needs to be defined. See co-ordinate reference system.
co-ordinate reference system (CRS)	Most x,y,z co-ordinate systems for spatial location are achieved via a process known as projection. This creates a flat or 'planar' surface to represent a small section of the earth's curved surface, albeit only by distortion. Because of the need to keep the difference between the true location on the planet's surface and the equivalent position on its planar representation small, there have developed thousands of co-ordinate systems around the world. It is thus critically important to know which CRS lies behind the position quoted for spatial data. If a point has been identified in reference to the typical international default setting for many devices of WGS84, and mapped as if it were in reference to OSGB36 without transforming the data first, within Great Britain it will be out of place horizontally by between 0 and 70m. GIS software can perform the necessary transformation between CRSs but the most accurate are mathematically complex and slow down processing. See also OSGB36.
cropped-frame sensor	A sensor which is smaller than a Full Frame Sensor. There are many formats, including APS-C, DX, Foveon, Micro Four-thirds, APS-H, Sony RX-10, Sony RX-100, 4.6x.
cropping	Selecting part of an image for further use.
cylindrical projection	A method used to map a panorama onto a curved surface using software. The arc of curvature in degrees is equal to the overall horizontal field of view. See Appendix 8.
datum	This is a physical point, the locational parameters of which define it as a reference point for a co-ordinate system.
depth of field	Distance within which features of the view will be in focus within an image: e.g. if the nearest feature in focus is 3m from lens and most distant feature 5m from lens then depth of field = 2m.
detents	Catches or stops in a device used to mechanically control rotation.

development	Any proposal that results in a change to the landscape and/or visual environment.
DSM	Digital Surface Model. Produced by digitally scanning from an airborne scanning platform (such as a plane or satellite) the DSM is the 3D shape created from the point cloud comprising the first reflective structure picked up by the airborne scanner. This could be a combination of e.g. the tree canopy, the rooftops or just the ground surface. When the DTM is 'subtracted' from the DSM, it reveals the relative height of structures on the surface.
DTM	Digital Terrain Model. Produced in a number of ways, this represents the elevation of the bare-ground terrain of the land, e.g. without trees.
EIA	Environmental Impact Assessment
EFL	Effective Focal Length. In this guidance this refers to the apparent focal length of final presented images. For example an image produced using a 50 mm lens may be carefully enlarged by 150% and printed to give the image that would have been achieved by using a 75mm lens – an EFL of 75mm.
ellipsoid	An ellipsoid is the name given to a flattened sphere, modelled mathematically by rotating an ellipse about a main axis. Planet Earth's true shape (or geoid) is approximated as an oblate ellipsoid (because the Equatorial diameter is larger than the polar diameter) although different ellipsoids have been used over time for this purpose. Currently WGS84 and GRS1980 represent two important standards for ellipsoids but are for most purposes the same. In the UK the geoid is higher than the ellipsoid by over 60 metres.
EXIF [data]	Exchangeable Image File Format. EXIF is a standard that defines the format for images, but tends to be used as shorthand for just the hidden image metadata embodied within each image file, such as author, aperture, shutter speed, tags.
exposure	The amount of light reaching the camera sensor (or film). This is affected by the amount of available ambient light (or artificial illumination), the aperture and shutter speed.
'fast' lens	A colloquial way of describing a lens with a large maximum aperture (permitting faster shutter speeds).
full frame sensor (FFS)	A sensor which is 36mm x 24mm in size. See also cropped frame sensor.
field of view	Measured in degrees, the maximum sector of the horizontal 360 degree viewing circle that can be processed by a viewing device such a camera lens. It is determined by size and optical qualities of the lenses and the distance they are from the sensor. See HFoV and VFoV.
focal length (FL)	The distance between the optical centre (nodal point) of the lens and the focal point, which corresponds with the film/sensor plane when the image is in focus. For example 28mm, 35mm, 50mm.
<i>f-number</i>	<i>See aperture.</i>

image format	Digital images can be stored in different file formats, typically engineered to optimise the quality of the image and metadata retained with file size, but also sometimes because equipment may create or require proprietary formats. Examples are JPG and RAW (See JPG and RAW).
frame	Single photographic shot composed to include elements of a view.
georeferenced	Geo-referenced data is spatial data (points, lines or areas) that is referenced to a location on the earth's surface, typically using a defined x,y,z (Cartesian) co-ordinate system, such as OSGB36 (in the UK). The term geo-referencing often refers to the process of taking an image, identifying on it an array of points whose spatial position within an existing projection system is agreed as known ('control points') and then moving the image ('rubbersheeting') so that the whole image can be mapped into the system. GIS software is often used to assist this process.
GIMP	GIMP is a free and open-source raster graphics editor used for image retouching and editing, free-form drawing, converting between different image formats, and more specialized tasks (N.B. Other editors are available).
GIS	Geographic Information System. Computer software which enables the user to undertake a range of processes on spatial data such as rendering, symbolising, visualising, georeferencing, transforming, analysing, and converting (to other formats).
GLVIA	Guidance for Landscape and Visual Impact Assessment published by the LI in conjunction with IEMA. The current edition (2013) is the 3rd, hence referred to as GLVIA3.
GNSS	<p>GNSS stands for Global Navigation Satellite System, and is an umbrella term that encompasses all global satellite positioning systems. This includes constellations of satellites orbiting above the earth's surface and continuously transmitting signals that enable users to determine their position. Besides GPS, the GNSS currently includes other satellite navigation systems, such as the Russian GLONASS, and the European Union's Galileo and China's Beidou.</p> <p>GNSS is used in collaboration with GPS systems to provide precise location positioning anywhere on earth. GNSS and GPS work together, but the main difference between GPS and GNSS is that GNSS-compatible equipment can use navigational satellites from other networks beyond the GPS system, and more satellites means increased receiver accuracy and reliability. All GNSS receivers are compatible with GPS, but GPS receivers are not necessarily compatible with GNSS.</p> <p>Both GPS and GNSS consist of three major segments: the space segment (satellites), the ground segment (ground control stations), and the user segment (GNSS or GPS receivers). For GNSS / RTK, see RTK.</p>

GPS	Global Positioning System. GPS is one component of the GNSS. Specifically, it refers to the NAVSTAR Global Positioning System, a constellation of satellites developed by the United States Department of Defence (DoD). Originally, GPS was developed for military use, but was later made accessible to civilians as well. GPS is now the most widely used GNSS in the world, and provides continuous positioning and timing information globally, under any weather conditions (see GNSS).
HDR	High Dynamic Range. HDR images are created (typically by a balanced combination of differently exposed but otherwise identical photographs) to show the fullest possible range of detail in light and dark areas of a view. This can compensate for the limitations of photography in comparison with the human eye or simply help secure a better-looking image.
HFoV	Horizontal Field of View. The difference (typically measured in degrees and parts of a degree) between the lines defining the extent of view in the horizontal plane. See also VFoV.
ISO	Originally, a measure of how sensitive photographic film is to light. Typically ISO 100 or 200 were the standard sensitivities used for film photography, with 'faster' film such as 400 or even 1600 being used in low light levels, but at the expense of image quality. Digital cameras are able to be set at different sensitivities providing an additional means of controlling exposure.
JPG	An image format suited to photographs, which can have a range of 'lossy' compression applied. Higher levels of compression result in smaller file sizes but poorer image quality, as data is lost and compression artefacts become visible within the image.
landscape-oriented	Where the horizontal dimension is larger than the vertical (Cf. descriptions of paper layout).
leveller (or levelling base)	A physical device that sits with the camera to ensure that it is perfectly level and necessary to obviate subsequent cropping of panoramas.
LiDAR	Light Detection And Ranging. A technology for accurate spatial surveying involving sending and receiving back of pulses of laser light from a known location and in known directions. The fineness of detail that can be determined is limited by the smallest increment of change in direction that can be achieved and inevitably decreases with distance from the LiDAR device. The 'known location' can be land-based or airborne.
Locational accuracy	Knowing how close you really are to a location you identify.
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment (usually part of an EIA). A tool used to identify and assess the likely significance of the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity.
LVA	Landscape and Visual Appraisal (non-EIA) - essentially the same as LVIA, but not required to satisfy the formal requirements of EIA.

mAOD	metres Above Ordnance Datum (a UK-wide basis for 'sea-level' or zero elevation).
massing	The general 3-dimensional size and shape of one or more elements in a view.
megapixel	One million pixels, calculated by multiplying the horizontal pixel count by the vertical pixel count. Camera resolution is typically quoted in terms of the number of theoretically achievable megapixels in an image.
metadata	Metadata is the term for descriptive data contained within the EXIF (Exchangeable Image File Format) data that is embedded within a digital image files such as JPG, TIFF & RAW. Includes details such as aperture, shutters speeds, lens specifications, plus time and date and may include geographical coordinates.
nodal point	Crossover point of light within lens.
OSGB 36	This is the co-ordinate reference system used by the Ordnance Survey for the OS British grid. It uses a 6 digit coordinate system for eastings and northings, together with metres Above Ordnance Datum (mAOD).
overlay	Additional information or imagery which is lain over an existing image. In real-world environments typically involves use of clear film (acetate) or translucent paper. In software may be achieved by adding a layer and adjusting its transparency.
panorama	An image covering a horizontal field of view wider than a single photographic image frame. Panoramic photography is a technique of photography, using specialised equipment and software, that captures images with horizontally elongated fields of view. It is sometimes known as wide format photography. Wirelines and photomontages may also be produced as panoramas. The process of producing a photographic panorama requires technical competence to avoid issues of incorrect geometry, level and distorted horizons.
Pano head / panoramic head	A panoramic (Pano) head is a piece of photographic equipment, mounted to a tripod, which allows photographers to shoot a sequence of images with precise overlaps around the entrance pupil of a lens to produce a panorama. The primary function of a Pano head is to precisely set the axis of rotation about the entrance pupil for a given lens or focal length, eliminating parallax error.
parallax error	This is where foreground objects appear to move relative to background objects as the camera is rotated. A simple way to demonstrate parallax is to hold a single finger up in front of your eye and look at a view, then rotate your head from side to side. The position of the background, relative to the finger, will move. Within the context of panoramic photography parallax errors can be introduced if the camera is rotated around its mount to take a panorama, rather than the camera being rotated to keep the camera iris in the same position. This can result in serious geometry issues, particularly with foreground elements of the view. It can be resolved with the correct use of a Pano head.
PDF	Portable Document Format: a cross-platform digital file type widely used to display formatted text and graphics.

perspective	In drawing and photography this is the way that 2D images represent 3D reality, through a combination of relative size, convergence of parallel lines, and the blocking of more distant elements by intervening nearer ones.
pixel	The smallest controllable element of a raster image, typically square in shape. It has no particular dimensions.
PPI	Pixels Per Inch. Measurements of pixel density (resolution) of an electronic image. The industry standard for high quality printed images is usually 300 pixels per inch. However, PPI for large format prints used for exhibitions and billboards may differ. PPI should not be confused with DPI (Dots Per Inch) which is a measure of printing density.
photomontage	A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs. (GLVIA3 glossary) A photomontage is likely to be based on a matched wireline to correctly locate the development within the photograph, but may be constructed in other ways. A photomontage should enable form, scale, location, materials and colours to be communicated.
photowire	A photowire is a 3D wireline model of the development correctly placed in its photographic context. Views of the model from the 'virtual' viewpoint within the 3D model are generated to show how the development would look from the viewpoint. The difference between a photomontage and a photowire is that the wireline is still visible in the latter, but not in the former.
planar projection	A method used to map a panorama onto a flat surface using computer software. The result is the same as the way in which a camera lens creates an image on the flat film or sensor. See Appendix 8.
precision	The closeness of agreement between instances. For instance three darts thrown at a dartboard would have been thrown with precision if they all landed inside the bullseye, whether or not that was the intended target.
principal distance	The perpendicular distance from a printed image at which the exact perspective 'as seen by the camera' is reconstructed.
projection	Although the processes in each case are related, two different applications of projection are particularly relevant: <ul style="list-style-type: none"> <li>• As a typical method of creating a flat map from the earth's curved surface;</li> <li>• The transforming of an image created by a lens or other sensor into a more appropriate form for viewing (see cylindrical / planar projection).</li> </ul>
proportionate approach	An approach which is commensurate with the situation it is being applied to in terms of inputs of time, methodological sophistication, resources and costs.
RAW	Photographic images, captured within the camera, to which no processing is applied. They can be modified after capture using data associated with the image. See Appendix 2.
receptors	Individuals and/or defined groups of people who have the potential to be affected by a proposal. (GLVIA3)



<i>rectilinear projection</i>	<i>See planar projection</i>
refraction	The process in which the direction of light is diverted as it passes through a transparent material such as the atmosphere, water or glass.
render	To make appear by the application of a graphical process, such as the automated operation of computer-based algorithms to add texture and colour
resolution	The fineness of detail achievable. In terms of 2D-printing or flatbed scanning typically defined as Dots Per Inch (DPI). In terms of digital images defined as how many dots (pixels) available in total from the sensor to record the scene.
RTK	Real Time Kinematic (Real Time 'Korrection'). The process by which satellite signals received by a GNSS receiver are corrected by referring them to a base station with a known position.
scale	The relative size or extent of built form
sensitivity	A term applied to specific receptors, combining judgments of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor. (GLVIA3)
sensor	An electronic device that is intended to faithfully convert received light into code that can be stored and retrieved, e.g. as an image for viewing or printing.
shutter speed	The length of time that a camera's sensor (traditionally the photographic film) is exposed to light.
SNH	Scottish Natural Heritage
TGN	Technical Guidance Note (as produced by the LI)
TIN	Technical Information Note (as produced by the LI)
THC	The Highland Council
transverse	Instead of being mounted directly above the centre of the tripod the camera fixing point is mounted on an adjustable side bar to instead enable the iris of the camera to be located above the tripod centre.
tribrach	An attachment plate used to attach a camera to a tripod, to achieve a level plane for photography.

TVIA	Townscape Visual Impact Assessment - essentially the same as an LVIA/LVA, but focussed upon Townscape, which is "the landscape within the built-up area, including the buildings, the relationship between them, the different types of urban open spaces, including green spaces and the relationship between buildings and open spaces." (GLVIA3)
<i>verified photomontage</i>	<i>See Appendix on Verified Photomontages.</i>
verified	Subjected to a quality assurance process to confirm that what is being presented is an accurate reflection of the true situation.
VFoV	Vertical Field of View. The difference (typically measured in degrees and parts of a degree) between the lines defining the extent of view in the vertical plane. See also HFoV.
viewpoint	These can be actual or virtual. They are points in space from where the view is obtained.
visualisation	Computer simulation, photomontage or other technique to illustrate the predicted appearance of a development.
visuals	Generic term for material produced to demonstrate existing, hypothetical or proposed views to others.
white balance	The eyes adjust to light from different sources and in different lighting conditions in the sky to balance how colour is perceived. However, photographic sensors do not always behave in the same way. Depending on their capabilities and settings photography could achieve a result between failing to correct at all for differences in ambient light (resulting in a colour cast) or else removing any 'atmosphere' from a photograph altogether. White balance is the relevant camera setting to influence this.
<i>wireframe</i>	<i>See wireline</i>
wireline	A simplified representation of a three-dimensional object using lines. These are also known as wireframes and computer generated line drawings. They may be presented as a 'matched wireline', where the photograph from the viewpoint and the wireline are matched in size and position, and displayed one above the other on the page so that they can be compared. See also 'photowire'.
ZTV	Zone of Theoretical Visibility: A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

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