GLOSSARY OF TECHNICAL TERMS

2K – Two thousand pixels or 2K (where K stands for one thousand) is a high resolution format that defines the resolution of a film frame in terms of the number of pixels in the width (horizontal lines in the frame). The exact resolution of a 2K image is 2048 pixels in width x 1556 pixels in height.

4K – 4K is considered a high resolution format. A 4K image contains approximately 4,000 pixels in the width. The exact resolution of a 4K image is 4096 pixels in width x 3112 pixels in height. The resolution of the 4K standard is approximately four times that of the 2K standard.

Aspect Ratio – The size of a projected film image, defined by the ratio between its width and its height. Whereas in television two main aspect ratios are applied as standards (i.e. 4/3 and 16/9), many different standards are applied in film. Today’s most common aspect ratios for film are 2.39:1 and 1.85:1, both wide screen formats. Two of the most common aspect ratios for archival films are 1.37:1 (also known as Academy ratio) and 1.33:1 (typical of silent films).

Bit Depth – Also referred to as color depth, bit depth defines the capacity of a pixel to describe tones. A bit (i.e. binary digit) is the smallest available data package (it consists of either 0 or 1). A pixel instructed to depict only black and white (2 tones) has a bit depth equal to 1. A pixel instructed to describe also grey tones (typically, 256 tones) has a bit depth of 8. A pixel instructed to describe tones for the independent colors (red, green and blue, typically 16,777,216 color tones) has a bit depth of 24. In film, though, 24 bit depth corresponds to 8 bit depth, since the convention in film refers to one single independent color. Bit depth can be quantified by means of both a linear and a logarithmic scale.
BLACK-AND-WHITE SEPARATION MASTERS – Black-and-white film records of the so-called additive color primaries (red, green and blue) composing a colored film image. Separation masters are produced by copying the film three times through cyan, magenta and yellow filters (the so-called subtractive color primaries). The reverse operation is carried out to print the three black-and-white separation masters back onto a single color film.

BLUESCREEN – Also known as CHROMA KEY, Bluescreen is a technique typical of analog television by which a color (usually green or blue), typically used to define a specific area of the image, e.g. part of the background, is modified in post-production by replacing it with a different image. A very typical example is the weatherman’s map, where this process occurs in real time via digital imaging.

CARRIER – Media artifact whose function is that of supporting information (images and sound). Examples of carriers are film (of cellulose nitrate, acetate and polyester), photograph, video tapes, and digital tapes and disks.

CEL ANIMATION – Traditional film animation technique that makes use of transparent cels, each portraying different hand-drawn elements of the image. By overlapping different cels a composite image is created that is photographed onto a film frame. Different combinations of cels allow the creation of (moving) images.

CHROMA KEY – see BLUESCREEN.

CGA – see COMPUTER-GENERATED ANIMATION.

CGI – see COMPUTER-GENERATED IMAGERY.

CINEON – Uncompressed file format developed to best represent film-born scanned photographic frames. The name Cineon derives from a workstation (which included a scanner, a digital compositing software, and a film recorder) developed and introduced in 1993 by Kodak for processing film digitally. While the production of the workstation was discontinued in 1997, the Cineon format is still in use.

COLOR DEPTH – see BIT DEPTH.

COMPOSITING – The process of combining different images into a new one. In analog film compositing is obtained by superimposing different source images onto the same film using a so-called optical printer. In digital film the assembly is carried out in the digital environment with compositing software. In this case the source images can be both photographically filmed and digitally generated.
**COMPUTER-GENERATED ANIMATION (CGA)** – Animation created with 2D or 3D computer graphics. CGA is considered the digital successor of the analog **STOP MOTION** technique for creating film animation.

**COMPUTER-GENERATED IMAGERY (CGI)** – The process by which film scenes are partially or entirely generated in the digital domain with 3D computer graphics.

**DCDM** – **SEE** **DIGITAL CINEMA DISTRIBUTION MASTER**.

**DCI** – **SEE** **DIGITAL CINEMA INITIATIVES**.

**DCP** – **SEE** **DIGITAL CINEMA PACKAGE**.

**DEBRIE TAI PRINTER** – Optical step printer produced by the French company Debrie that can handle shrunken archival film and can be equipped with a full immersion **WET GATE**. Many archives and film laboratories use the TAI printer for duplicating shrunken and fragile nitrate films.

**DI** – **SEE** **DIGITAL INTERMEDIATE**.

**DIGITAL ARTIFACT** – Visible defect produced during digital processing of images. Typical examples of digital artifacts in images are the aberration of colors (e.g. purple fringing) or the distortion of motion (e.g. jerky motion resulting from digital compression). Also digital restoration software can cause undesired artifacts, especially when applied in automatic mode. Extrapolating image information from adjacent frames sometimes results in the disappearance or the displacement of (part of) the original image information.

**DIGITAL CINEMA** – Also known as D-Cinema, Digital Cinema indicates the distribution and the projection of digital films produced for cinemas.

**DIGITAL CINEMA INITIATIVES (DCI)** – Panel created in 2002 by Disney, Twentieth Century Fox, Paramount, Sony Pictures Entertainment, Universal and Warner Bros. Studios for defining specifications for **DIGITAL CINEMA**.

**DIGITAL CINEMA PACKAGE (DCP)** – The compressed and encrypted digital file package, defined in the **DIGITAL CINEMA INITIATIVES** specifications, that is sent to cinemas by way of media **CARRIERS**, virtual private networks or satellite communications.

**DIGITAL CINEMA DISTRIBUTION MASTER (DCDM)** – The requirements for uncompressed and unencrypted digital image, audio and subtitles, as specified by the **DIGITAL CINEMA INITIATIVES**.
**DIGITAL EDITING** – The process of editing a film by means of a computer. Some examples of the most popular digital editing software are Apple Final Cut, Avid Media Composer and Adobe Premiere.

**DIGITAL INTERMEDIATE (DI)** – The process of digitizing film rushes or a film to be restored, or ingesting digital-born rushes, before post-production is carried out (from editing to final grading). DI can also be used to refer to the final result of such a process, which is the digital master used to create distribution copies (on film or digital).

**DIGITAL VIDEO (DV)** – The general term for video made by means of a digital camera. It is also used to indicate home movies, typically shot with digital consumers’ cameras.

**DPX (DIGITAL PICTURE EXCHANGE)** – Uncompressed file format typically used for digitized film frames and, in particular, in the digital intermediate process. DPX files derive from the earlier CINEON format.

**DV** – see **DIGITAL VIDEO**.

**DYNAMIC RANGE** – The range of tonal difference between the brightest light and the darkest dark of a film image. The dynamic range depends on many factors including the bit depth chosen for digitizing a film and the overall performance of the scanner used for the digitization.

**FINE GRAIN** – Black-and-white duplication film used for making positive copies from camera negatives. The creation of a fine grain film is as an intermediate step towards the creation of a new duplicate negative, and from there, of projection prints. A fine grain positive has a very low contrast and a very high resolution, and reproduces very well fine details both in the dark and light tones (and corresponding areas) of the image. A fine grain film is not meant for projection.

**GRADING (ALSO KNOWN AS COLOR TIMING)** – The process of modifying the colors of a film or video according to the wishes of the filmmaker or the cinematographer. Digital grading allows a much greater flexibility in altering the colors than analog grading.

**HD** – see **HIGH DEFINITION**.

**HIGH DEFINITION (HD)** – HD indicates today a standard with a resolution of 1920 horizontal x 1080 vertical pixels and finds its origin in television. HD is also often used to indicate films shot with professional digital camera opposed to film or video shot in **DV**.
**JPEG 2000** – File format for image compression introduced in the year 2000. JPEG 2000 has been adopted by DCI in their specifications for creating a DCP for digital distribution and projection of films.

**Look Up Table (LUT)** – Conversion table that serves as a reference to transfer information between two related systems. In film post-production a LUT converts the color values of a grading system (both analog and digital) into the corresponding values for the film stock used to print and project the film. In this way the final colors on the film will be the same as the ones defined on a video or digital monitor during grading.

**LUT** – see **Look Up Table**.

**Migration** – Cyclical transfer of data, usually onto a new carrier, to cope with the problem of changing standards and of obsolescence of both carriers, hardware, and software. Migration is carried out typically once every two to five years.

**MXF (Material Exchange Format)** – Open file format to relate and interlink audiovisual metadata with corresponding metadata. MXF has been adopted by DCI in their specifications for creating a DCP for digital distribution and projection of films. With MXF different file formats (containing for instance images, audio and subtitles) can be wrapped up and synchronized.

**Resolution** – The capacity of a means of reproduction to describe detail, which can be quantified by defining the smallest distinguishable elements in the image. These elements are grain in photography and film, and pixels in digital imagery. The higher the number of grains or pixels per frame, the better is the capacity to describe detail and, therefore, the resolution.

**Stop Motion** – Animation technique in which objects (or drawings depicting objects) are slowly moved in front of a camera and photographed frame by frame. This process results in a moving image when the film frames are shown in sequence.

**Wet Gate** – Technique applied during the duplication of a film via a customized printer to eliminate superficial scratches. Such scratches would otherwise deflect light during duplication and would cause black lines to appear on the new film copy. In the wet gate process the film is immersed in a solution that fills up the scratches while each frame is duplicated onto a new film.