

## **E-Photography - PSSA standards and guidelines**

### **1. Introduction**

With the exponential growth in digital imaging brought about by incremental improvements in the quality and resolution of digital cameras and film scanners, as well as significant reductions in prices, digital photography has now effectively replaced slides as the most popular medium within the various divisions of PSSA. It is the task and commitment of the PSSA that when new technology and ideas come along, every effort should be made to encourage their use and application to enrich and refresh established practices.

The objective of this document is thus to provide technical and practical guidelines for running competitions and exhibitions based on digital images that will either be viewed on a computer monitor or projected electronically with a digital data projector. Though this document will specifically focus on national standards for hosting e-photography salons, it will also be of value to clubs that want to include the digital medium at club level or for regional competitions.

### **2. Definition of a digital image**

A digital image for the purpose of this document is defined as a raster, 2-dimensional, rectangular array of static data elements called pixels, intended for display on a computer monitor or projected with a digital data projector. Reference to a "Digital image" must thus be understood as referring to the end medium and not necessarily how it was captured or produced. Images may be acquired on traditional film and scanned to an electronic file, or more commonly, acquired electronically with a digital camera. The number of pixels along the height and width of a digital image is called the pixel dimensions of an image. The resolution of an image is determined by the number of pixels per inch (ppi) printed on a page.

### **3. Post-capture processing and digital manipulation**

#### ***3.1 Introduction***

In view of the perceived perception by some that digital photography is synonymous to digital manipulation, it is essential to address the ethics and "rules" of post-capture processing of digital images. While the aspect of manipulation or alteration of the "truth" of a photo is by no means unique to a digital image, it is a fact that the digital process allows much greater possibilities with regard to the alteration of the original image. The interpretation of what the

“truth” of an image constitutes and when post-capture processing is considered “manipulation”, is subjective by its very nature and likely to be interpreted differently by different people. While it is clear that there is no clear answer as to what is “right” and what is “wrong”, it is essential that there are some guidelines as to what is considered acceptable post-capture processing as applicable to images intended for entry into specific sections or categories of photography.

### ***3.2 What is digital manipulation?***

Many of the current thoughts on what an unmanipulated image constitutes are based on the norms imposed by the long standing history of film based photography. An image created by a single exposure of a camera on a film emulsion is usually accepted as a truthful representation of the scene, despite the fact that by the very nature of the photographic process such an image captured by a camera will often differ from the way the human eye observed that scene in real life. There are many examples such as an image created by the unique perspective of a wide angle lens in which objects close to the lens appear much bigger in relation to subjects further away. The same applies to the compression effect and shallow depth of field of a fast telephoto lens in which the background is out of focus. Add to this different film emulsions which differ in contrast, colour balance and saturation and the concept of a truthful representation of reality becomes clouded.

It is thus clear that in absolute terms a “truthful” rendition of a scene as captured by the camera is in many ways a myth. However, we accept that as the “truth” within the limitations imposed by the unique characteristics of the photographic process. For the purpose of this document, an *unmanipulated digital image* will be considered one that could be presented in a court of law or printed in a newspaper, without dishonesty or perjury by the photographer, as an accurate record of what the photographer saw within the limitations of the photographic process and equipment used. The image should be the result of a single exposure by the camera. Therefore, multiple exposures or composites of more than one image will be considered manipulated images. The removal, cloning, addition, rearrangement or combining of elements within an image are also considered as digital manipulation.

### ***3.3 Post-capture processing not regarded as manipulation***

It is important to understand and accept one fact about digital photography: to get an image to render the original scene as seen by the human eyes as accurately as possible, it is essential to do a certain amount of post-capture processing. The reason is a simple matter of science. The technical limitations in digital sensors, film scanners, computer monitors and

digital projectors mean that reproduced images cannot equal the range or quality of light that is produced in real life. Therefore, it becomes the task of the photographer to work within technical limitations to render something that *approximates* the real life scene.

There are often misconceptions regarding post-capture processing done on an image versus an image directly from a digital camera. Most digital cameras offer the option of setting the level of sharpening, contrast and saturation in-camera where the software of the camera does these adjustments. However, more advanced photographers prefer to set the camera to do as little processing to the images as possible, since the processing can be done more accurately and with more control on a computer with dedicated software like Adobe Photoshop. Digital SLR cameras in particular are designed to render images that require some post-capture processing for optimum appearance.

Furthermore, with the advance in technology, it is now possible with digital photography to correct several aberrations and imperfections of the photographic process, which were not possible in the case of film based photography. These corrections must be viewed as such and not as manipulations. It is also important that the reasons for imposing limitations on permissible post-capture processing be clearly stated. The motivation should purely be one of ethics and not because of fear that a photographer more skilled at post-capture processing is able to do things that others can't and which will give him/her a competitive advantage. The skill at efficient post-capture processing of digital images is an integral part of digital photography and part of the learning curve.

For the sake of practicality the following post-capture processing procedures performed on a digital image with the aid of a computer and digital image editing software such as Adobe Photoshop, will not be considered as digital manipulation:

- (1) Removal of dust and scratch marks on scanned images or spots from dust particles on the CCD/CMOS sensors of digital cameras. This also includes bright spots caused by so called "hot pixels" on the sensors of digital cameras. Specific lens/sensor aberrations such as chromatic aberrations and purple fringing may also be corrected/removed.
- (2) Adjustment of exposure and contrast, including dodging and burning similar to those techniques that are commonly used in traditional printmaking. However, these should not be so extreme as to render the image an unrealistic representation of what the photographer saw. Features may not be darkened or lightened to such an extent that the effect is the same as if they were removed by a cloning tool.

(3) Adjustment/correction of the colour balance. This can either be done by selecting an appropriate white balance during the conversion of RAW images, or by adding/subtracting colours in the photo editing software. The post-capture application of digital colour correction filters like warming or cooling filters, similar to the 81 and 82 series of filters, is also allowed. The objective of these filters will, however, be limited to improving extreme lighting condition such as those prevalent during overcast days or at high altitude and not to create an unnatural effect.

(4) Application of colour saturation. Non-selective saturation that is applied to the whole image is permissible.

(5) Reduction of digital noise, especially in high ISO images from digital cameras, or film grain in scanned images. Various options of noise reduction are available, varying from in-camera noise reduction (by the camera's software), noise reduction by the RAW conversion software or dedicated noise reductions applications such as Noise Ninja and Neat Image that can operate as stand alone applications or Photoshop plug-ins.

(7) Sharpening of the image. All modern sharpening algorithms and techniques such as edge-sharpening, luminance sharpening and mode sharpening are permissible.

(8) Correction of inherent lens faults like distortion (pincushion and barrel distortions) (e.g. correction of a curved horizon due to lens distortion). The objective here should once again be to render the image a more accurate representation of the original scene and not to create an unnatural effect.

(9) Cropping and resizing are permissible.

### **3.4 When is digital manipulation not permissible?**

It is important to state that "manipulation" and manipulated images *per se* should not be viewed as the ultimate evil of digital photography. One advantage of digital photography is that it offers the creative photographer freedom of expression and the means to display his/her artistic talent. Manipulated images are thus totally acceptable in those divisions such as the open or pictorial sections where few restrictions apply.

Except for the permissible post-capture processing described under 3.3 above, no additional alterations (see also section 3.2) may be done to images intended for entering in the following divisions:

- (1) All nature divisions including zoological and botanical/geological sub-divisions.
- (2) Photo journalism divisions.
- (3) Photo travel divisions.

The Honours and Awards Division allows for manipulation in the nature, photo journalism and photo travel divisions under certain conditions - no panel may include both manipulated and unmanipulated nature, photojournalism or photo travel images. All manipulated nature, photo travel and photo journalism images must be so indicated by the addition of the letter M at the end of the file name.

### **3.5 Verification of the authenticity of unmanipulated digital images**

It is suggested that the above mentioned guidelines regarding permissible post-processing of digital images be made known to all photographers that intends to submit digital images to salons or apply for e-honours. Integrity and honesty of photographers must always be the main element of control, and should be encouraged. However, photographers participating in salons must be aware that they may be asked to verify the authenticity of an image. Verification can be in the form of a RAW images, original slides and/or original jpeg images on both sides of the image. Photographers are thus encouraged to use the RAW option of their digital cameras, especially for images intended for entry in those divisions on which restrictions on post-capture processing apply. In the case of **honours applications in e-photography**, photographers must submit RAW files, original slides or jpeg images on both sides of the entered image with the panel. This will be effective as from January 2007 applications.

PSSA will have an advisory/appeal panel chaired and compiled by the E-Photography chair person to advise Salon Directors on the authenticity of any image if it falls outside their field of expertise or if they only want conformation.

### **3.6 Regulations applicable to manipulated images**

In the case of manipulated images it is assumed that the digital image will be original and does not incorporate elements produced by anyone else but the photographer. No copying of any kind of somebody else's work is permissible. This includes, but is not restricted to,

images which by any means include painting, tracing and scanning. Furthermore, all actions in reaching the final presentation, except film processing and unmanipulated commercial scanning, must be carried out by the photographer himself. The operation and use of all computer software must be done by the photographer and may not be done by any other person, whether under the photographer's guidance or otherwise.

## **4. Digital image preparation for exhibition/projection**

### ***4.1 Introduction***

Unlike conventional slides projected with a quality analog projector, the number of variables that may have an influence on the way the final projected digital image appears on screen, is numerous and complex. This is a function of the variability that exists in both the hardware and software used to capture, prepare and project the final image. This section is intended to assist authors to prepare their digital images for submission in such a way that they are displayed as accurately as possible, without colour casts or problems with brightness/contrast.

### ***4.2 Colour models and colour spaces***

Colour models are used to describe the colours we see and work with on computer monitors. Each colour model represents a different method for describing and classifying colour. Colour models use numeric values to represent the visible spectrum of colour. The most common colour model is the additive RGB (red-green-blue) colour model, opposed to the less common subtractive CMYK (cyan-magenta-yellow) colour model. Colours inside a particular colour model can be described as (R)ed, (B)lue and (G)reen coordinates. The most saturated (i.e. purest) red in any colour space has an R-value of 255. All digital cameras and most film scanners capture digital data in the RGB colour model, opposed to the CMYK colour model.

A colour space is a variant of a colour model and has a specific gamut (range) of colours. A colour space can be described as the specification of the number of colours that can be contained within a digital image. Within the RGB colour model there are a number of different colour spaces, with the most common the Adobe RGB and sRGB colour spaces. While each of these colour spaces defines colour using the same three axes (R, G, and B), their gamuts are different. Adobe RGB has a larger colour gamut than the smaller sRGB colour space.

To make use of the larger colour gamut of the Adobe RGB colour space, the device used to capture the digital data (digital camera or film scanner) must first of all be able to capture the data in the wider Adobe RGB colour space. Furthermore, the software that are used to view or edit the digital image, must be able to recognize and handle these wide gamut images. Lastly, the device (computer monitor or digital data projector) must be able to display these wide colour gamut images accurately. It is also important to remember that any software application does not automatically know whether an image is in the Adobe RGB or sRGB colour space. For this reason images must be tagged with the appropriate information.

In general, it is beneficial to use a colour space that is as large as possible. The danger, however, of using these wide gamut colour spaces is that the use of these images in applications that are not colour aware, leads to washed-out looking colours. In view of all these considerations the following is suggested:

- (1) That digital images are captured in the highest possible colour space that the particular device is capable of. Not all digital cameras support the Adobe RGB colour space, but those that can must preferably be set to record the data in this colour space.
- (2) Do all the post-capture editing of the images in a colour space aware software application, such as Adobe Photoshop. In this way the highest number of colour is preserved, which can be very useful, especially for printing.
- (3) Convert the final image to the sRGB colour space for screen display or projection with a data projector. This is done to avoid inaccurate display of the image, should software that is not colour aware, be used to display the images. It is also currently the safest option, given the limitations of both hardware and software to display wide colour gamut images accurately. If Adobe Photoshop is being used, this conversion can be done as follows: Select "Image" from the top menu, and under "Mode" select the option "Convert to profile". A window will appear that states the current colour space (source space) of the image and below that a drop down option list with numerous options for the destinations colour space. Select sRGB from the drop-down list and press "OK". Remember to save the file under a separate name to preserve the original image in the wide colour gamut colour space for later use. Once an image is converted to the smaller gamut colour space, information is lost and cannot be recovered by converting the image back to the Adobe RGB colour space.

### ***4.3 ICC profiles and monitor calibration***

More advanced software such as Adobe Photoshop follows a colour management workflow based on conventions developed by the International Colour Consortium (ICC). ICC profiles

are simply look-up tables that describe the properties of a particular colour space. They define the most saturated colours available in that colour space; i.e. the bluest blue or deepest red that the particular monitor can display. If there is no profile the red, green, and blue values that make up a colour have no particular meaning - you can say something is blue, but not exactly which shade of blue. This implies is that if a computer monitor is not properly calibrated and profiled there is very little control over the accuracy of the colours that is displayed on that monitor. Subsequently, if the same image is viewed on another monitor the colours may look quite different from the previous monitor. If an image was prepared on a computer with a properly calibrated and profiled monitor the image will look exactly the same on another monitor, which was also properly calibrated and profiled. Adobe Photoshop versions 6.0 and later, automatically display everything using the set monitor profile.

There are different kinds of ICC color profiles: device dependant and device independent profiles. When a monitor is profiled, the software that is being used creates an ICC profile for the monitor. The profile describes the colour behaviour of the monitor - what colours can or cannot be displayed on the monitor and how the numeric colour values in an image must be converted so that colours are displayed accurately. That is a device dependant profile. When an image is displayed on the monitor, the colour management software translates the RGB values from the standard colour space (Adobe RGB or sRGB) into the colour space of the monitor. In addition to describing the monitor's behaviour, a monitor profile also contains calibration information, which changes the behaviour of the monitor.

The implication of all these technical aspects is that it will be essential for photographers to prepare their images on a properly calibrated and profiled computer and monitor. This will ensure that when the images are submitted to a salon for judging, they have the best chance to look the way they are intended to be. If not, the projected image may be too dark, too light or show colour casts or incorrect colours.

The type and quality of the monitor is also important. It is recommended that a quality CRT (cathode-ray tube) monitor or LCD (liquid crystal display) monitor, be used. The CRT monitor should have a Refresh Rate (the number of times that a screen can be redrawn per second) of at least 70Hz and a Dot Pitch (the distance between two similarly coloured phosphors) of 0.28 or less.

Lighting in the room in which the computer and monitor are placed is also important. For example, fluorescent lights may cast a greenish glare across the front of the monitor. Where the monitor is near a window, daylight glare will also affects the screen. For the best results the monitor must be set up in a room with minimal ambient light. Any lights must be moved to the side of the monitor, not directly in front or behind it. A monitor hood helps block glare,

creating a significant viewing improvement. Without the glare, colour observations will be easier and eye strain will also be reduced. Flat screen CRT monitors also help to reduce glare and reflections.

A monitor can be calibrated and profiled with software only, such as the Adobe Gamma tool that comes with Photoshop (also with PS Elements), but it is strongly recommended that a hardware device such as a Spyder is used. A Spyder is a device that is attached to the screen and which contains a photo spectrometer. It is connected to the computer via a USB connection and in combination with the installed software, it measures the colour response of the monitor. In this way an accurate ICC profile of the specific monitor is created, which is then stored as the default monitor profile. Clear instructions come with the various spyders, but it is recommended that for a PC a Gamma value of 2.2 is set (1.8 in the case of MAC) with the White Point at 6500°. Monitor calibration should always be done in a darkened room since ambient light that reflects off the monitor may influence the calibration. It is also important to remember that CRT monitors may go out of calibration with time and need to be recalibrated on a regular basis. This is not a problem in the case of LCD monitors.

#### ***4.4 Image resolution and file format***

Images intended for submission to a salon or competition must be resized to fit the maximum display resolution of a XGA digital data projector, with a true resolution of 1024 x 768 pixels (see also section 5.4.1: Digital projection). Horizontal images must be resized to 1024 pixels on the horizontal axis and 768 pixels or less on the vertical side. Vertical images must be resized to 768 pixels on the vertical axis and less than that on the horizontal axis. There are two reasons for this – firstly large files slow down the processing and secondly in software such as Irfanview where the software does not resize the images smoothly, the images have jagged edges (worse on the diagonals) – thus obviously reducing the quality of the image.

Because of file size considerations the JPEG file format is recommended for salon entries. The JPEG (Joint Photographic Experts Group) file format retains all colour information in an RGB image but compresses file size by selectively discarding data. A higher level of compression results in lower image quality, and a lower level of compression results in better image quality. In most cases, the maximum quality option (compression setting of 12 in Adobe Photoshop) should produce an image indistinguishable from the original. For salon entries, individual JPEG images should not exceed 500Kb. An appropriate JPEG compression value (preferably not less than a value of 10 in Photoshop) must be selected in the photo editing software to ensure that the image size does not exceed 500Kb.

In the case of honours application in the e-section, which must be submitted on CD-ROM, file size is of less importance. In order to retain maximum image quality an uncompressed file format may be used. For this purpose the Tagged-Image File Format (TIFF) in its uncompressed format is recommended.

#### ***4.5 Inclusion of wording and frames/borders***

For images intended for individual judging no text or wording will be permissible on such images. Exceptions are title slides of AV series where wording will be acceptable and also in the case of entries into special divisions such as visual art sections where few restrictions apply. In the latter case the only requirement will be that the photographic image as captured by the camera must still comprise the most important part of the final image. Frames or borders are acceptable in all cases and may be included or omitted based on the preferences of the author.

### **5. Hosting a digital salon**

#### ***5.1 Introduction***

The advantages of hosting and participating in salons based on the digital medium are numerous. Some of the most obvious advantages include significant cost savings, e.g. the high cost of postage to return entries will be reduced or even totally eliminated. This is because no original images that need to be returned to the author are submitted. Electronic catalogues can be compiled and the task of compiling AV's for purposes of salon exhibition will be simplified. Logistical and practical problems regarding the opening of entries and storing the packaging material and slide/print boxes for return to the entrants will also be eliminated. This will result in substantial savings in terms of time and manpower. It is foreseen that this saving in cost and time will enable a larger number of member clubs, specifically the smaller clubs, to host a national salon.

#### ***5.2 Format***

In view of the well known and established format of the current salon system involving traditional film-based images it is suggested that the same guidelines be applied to the e-photography section. For a national salon a total of six images may thus be entered in each of the stipulated sections as determined by the relevant salon committee.

#### ***5.3 Submission of digital images***

Images should preferably be submitted on CD-ROM since it is inexpensive, have a large capacity and is small enough to be fitted in a small padded envelope. Where the facilities exist, entries may also be submitted by e-mail. The organizers of the various salons will determine their own requirements regarding this aspect. Salon organizers may also decide themselves whether they will return the submitted CD-ROM or other media to the author, possibly as an additional cost item to the entry fee to those authors that prefer to have their media returned. The arrangement regarding the return of the submitted media must be clearly indicated on the entry form.

#### ***5.4 File naming and preparation for judging***

File naming is relevant both to the photographer at the time of submission and by the salon organizers upon receipt of the entry.

The following naming system by the photographer is suggested for images that are being submitted to a digital salon:

The file name must be in 3 groups, each separated by a semi-colon. The first group will represent the division entered (e.g. a, b, c, etc.), followed by the numerical number of the picture in that division (e.g. 1, 2, 3 ... 6). The second group must include the author's name truncated to a maximum of 16 characters (e.g. johan botha). The third group must include the title truncated to a maximum of 24 characters (e.g. blue heron at dawn). Only figures and letters, and eventually the semi-colon (;) that separates the various groups may be used. The letters must be in lower case.

Format: [Division + numerical number] [author] [title]

Example: a1;johan botha;blue heron at dawn.jpg

It is recommended that the "Photography Salon" software packages developed by Attie van Staden be used for the orderly display and scoring of the images. In order to accommodate this an additional naming parenthesis will have to be added to the existing file name. This addition will simply depict a particular "tray" (e.g. A, B, C...) followed by the "position" in the "tray" (e.g. 01, 02, 03, 04, ....50). These numbers will be allocated by the salon program as the details are being computerized. In the end all the images are simply copied into a directory where the sort option in, for example InfanView, will ensure that the images will be displayed in the same order as on the generated score sheet of the salon program.

Example: C50-a1;johan botha;blue heron at dawn.jpg

In this example the addition of “C50” will determine where the file will be placed. It will follow on “C49” and will be followed by “D01”.

### ***5.5 Viewing of images for judging***

Salon organizers have the choice of either projecting the digital images with a calibrated digital data projector or displaying them on a calibrated computer monitor. Digital projection is preferred, but clubs that don't have access to a quality data projector yet, may as an interim measure use a calibrated monitor. The specific approach that will be used must be clearly stated on the entry form. When judging from a computer monitor the image may be simultaneously projected for the audience attending the judging.

The software used for displaying the images is also important and must also be stated on the entry form. A highly recommended software package is *IrfanView*, which is freeware and may be downloaded from the internet (<http://www.irfanview.com>). The advantage of freeware is that every author has free access to it in order for them to view their prepared images in the particular software application before submitting the images.

#### ***5.5.1 Using a computer monitor***

If concerns regarding the proper calibration of the data projector exist or a quality data projector is not available a calibrated 19” or 21” computer monitor can be used for judging instead. It is recommended that a quality CRT monitor, rather than a LCD monitor, be used. The monitor should be properly calibrated as described under section 4.3.

The placing of the monitor should be such that all three judges have a clear view of the monitor screen, positioned at a comfortable viewing distance. For a 19” monitor the viewing distance should not be closer than 70cm and not further than 100cm. For a 21” monitor the viewing distance should be not closer than 80cm and not further than 120cm. All three judges should be positioned in front of the monitor at an angle not exceeding 30° from the central axis of the monitor. Windows should be covered and care should be taken that the ambient light source in the room does not cast any reflection on the computer monitor. Though a 19” or 21” computer monitor is capable of resolutions much higher than 1024 x 768 pixels it is recommended that the prescribed resolution of 1024 x 768 pixels for the images be retained for the sake of standardization and also for projection of the digital images during the exhibition.

With simultaneous projection it is mandatory that the computer monitor and judges be positioned in such a way that the projected images are not visible to the judges and also that the monitor screen is not visible to the audience. This must be done to avoid any influence that the (possibly non-calibrated) projected images and comments from the audience may have on the decision of the judges.

### *5.5.2 Digital projection*

Equipment required for projection will be a desktop or notebook computer to which a digital data projector is connected. For purposes of digital projection either a Liquid Crystal Display (LCD), Liquid Crystal on Silica (LCOS) or Digital Light Processing (DLP) projector may be used. A quality, current model XGA projector with a true resolution of 1024 x 768 pixels is recommended over a SVGA projector with a true resolution of 800 x 600 pixels. Furthermore, the data projector should preferably have a brightness rating of at least 2000 ansi lumens with a contrast ratio of at least 300 : 1 for a LCD projector or 800 : 1 for a DLP projector. The projector that will be used must clearly be stated on the entry form.

Calibration of the data projector is essential and the use of a non-calibrated projector for judging entries during a salon is not permissible. It is recommended by PSSA that all projectors used for judging be calibrated with the aid of the Colorvision Spyder 2 Pro (exact procedures and settings are available on request). A monitor/projector test utility from Nokia, in combination with an official set of PSSA test images (available on request) can be used to verify the calibration. The Nokia monitor test utility is available as a free download on dozens of web sites. To find it go to <http://www.google.com> and type in "Nokia monitor test".

The calibrated setting should be saved on the computer and data projector since no further adjustment to the projector will be allowed once judging started. In all other regards the norms and recommendations regarding the screen and presence of stray light during projection as set out in the PSSA Standards Handbook will apply.

## **5.6 Code of conduct**

All e-photography salons should be conducted with an official declaration by the salon director to the effect that all possible care will be taken to avoid the misuse of the images or the unauthorized distribution of the submitted images. The use of the images shall be restricted to judging and subsequent display/exhibition of the accepted images. They may also be used in an electronic catalogue, but then in such a way that the images are contained in an executable file format from which individual images in their original file format cannot be extracted. Under no circumstances must submitted images be distributed in their original

form as submitted by the photographer. It is the responsibility of the salon director to ensure that all images are deleted and media such as CD-ROM's not returned to the authors be destroyed after completion of the salon. Copies of the AV's that were compiled for exhibition, may be kept for later use by the particular club. It may also be made available to the AV library of PSSA from where other clubs affiliated to PSSA may request a copy for non-commercial exhibition to their members.