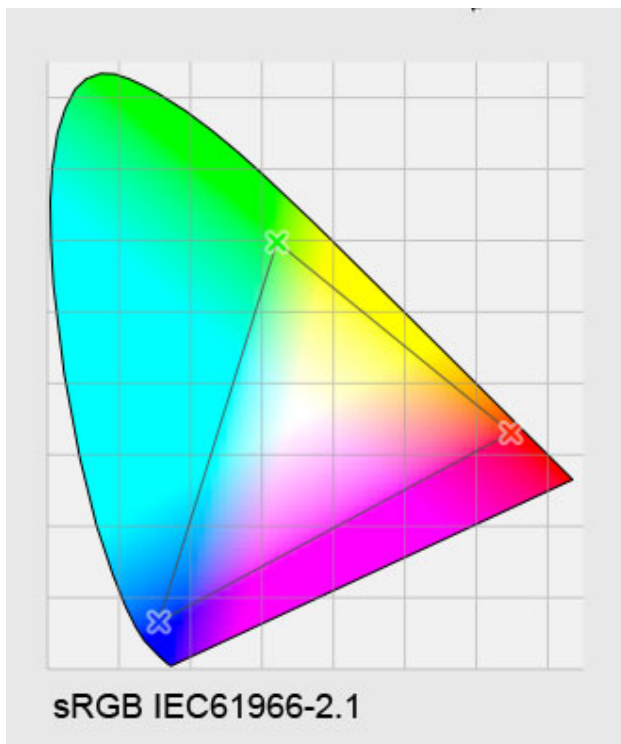


Colour Spaces for Projected Digital Images

The human eye can discern a very wide range of colours. Cameras, whether film or digital, can only discern a much smaller range; and televisions, computer screens, and printers can only display or print a smaller range. To arrive at consistent colour we adopt standard *colour spaces*, which are agreed as international standards. A colour space contains a selection of all the visible colours, chosen so that most devices can handle them.

sRGB Colour space

The colour space sRGB was intended to represent and contain all the colours that could be generated and shown on typical consumer grade displays and devices.



The horseshoe shape in the figure represents the whole range of visible light which can be seen by a typical human eye. The rainbow colours are arranged around the edge of the horseshoe, starting from the bottom right hand corner with red, orange, and green; the top corner is the point where green starts to merge into blue, with indigo and violet along the bottom.

The corners of the superimposed triangle indicate the values of saturated red, green and blue for the sRGB colour space. These are sRGB's three primary colours. The only colours that can be generated or displayed in sRGB are those within the triangle, and are mixtures of various proportions of the three primary colours shown at the corners of the triangle.

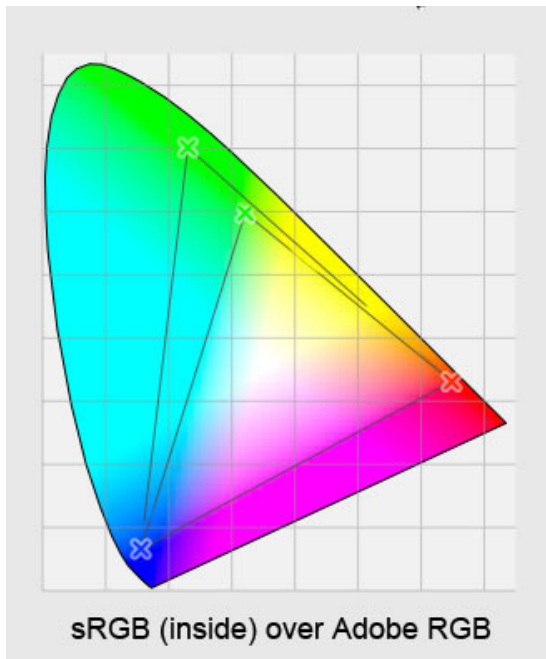
Those colours that lie outside the triangle cannot be shown, because they cannot be obtained by mixing these three primary colours. They are said to be *out of gamut* in sRGB.

Notice how much of the horseshoe area, representing visible light, lies outside the sRGB triangle. sRGB is quite a small colour space, and many colours simply cannot be represented.

There are many other colour spaces; each can be represented by a similar triangle, but with different dimensions and placed differently on the overall figure.

Adobe RGB (1998)

Another frequently used colour space is Adobe RGB (1998). It is represented by the larger triangle below, with the smaller sRGB triangle inside it.



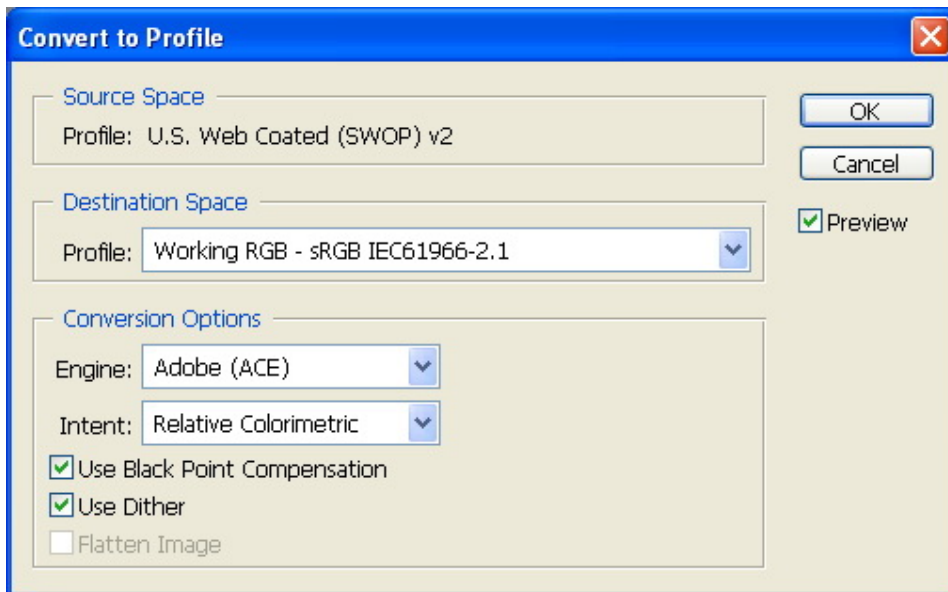
Notice that in Adobe RGB (1998) the green point at the top of the triangle lies much further up the visible space than in sRGB. This illustrates that Adobe RGB can show many more shades of pale blues and greens, but only the same shades of indigo, violet and red.

Colour Spaces for PDI.

Most projectors, including ours, can be set up to accept images in the sRGB colour space. This is why we ask that competition images should be submitted in this colour space. (Our projector does not offer Adobe RGB, in case you wondered.)

If your image is not in the sRGB colour space, the software that we use for running competitions will automatically convert your image to the sRGB colour space. In doing this it may change the colours somewhat, and the colours in the projected image may not look as you remember seeing them on your computer screen. It is safer to convert your image to the sRGB colour space in Photoshop, and then make any colour corrections that you want.

To do this, choose 'Convert to profile' on the Edit menu. A dialog box like this will appear:



If the box called 'Destination Space' displays 'Working RGB - sRGB IEC61966-2.1', your image is already in the right colour space, and you can press 'Cancel'. If it is in some other colour space, click on the drop down arrow to the right of the Destination Space box, and select sRGB IEC61966-2.1 - it is probably near the top of a long list.

More about colour management.

There are many reasons why the colours in your printed or projected image don't look like the colours that you saw when you took the photograph. There are lots of articles and books describing the problems and solutions; and there are hardware and software products to help you get colour management right. Here are links to some reasonably good articles:

<http://www.tasi.ac.uk/advice/creating/colour2.html#cm1>

www.photoshopforphotographers.com/pics2/download/PSCS2_colmanage.pdf

http://designer-info.com/Writing/colour_management_tutorial.htm

Produced by Anthony Macdonald Smith, based by kind permission of Michael Wood on his notes for Wilmslow Guild Photographic Society. Feb 2009