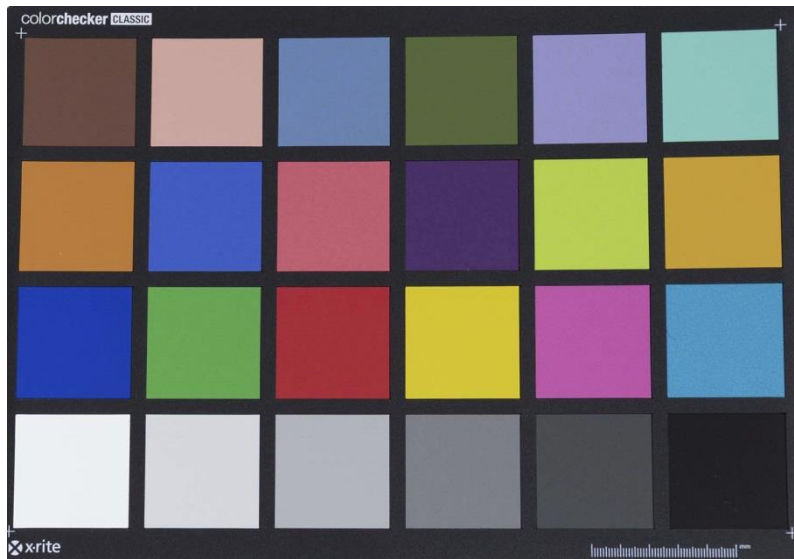


Realities/assumptions

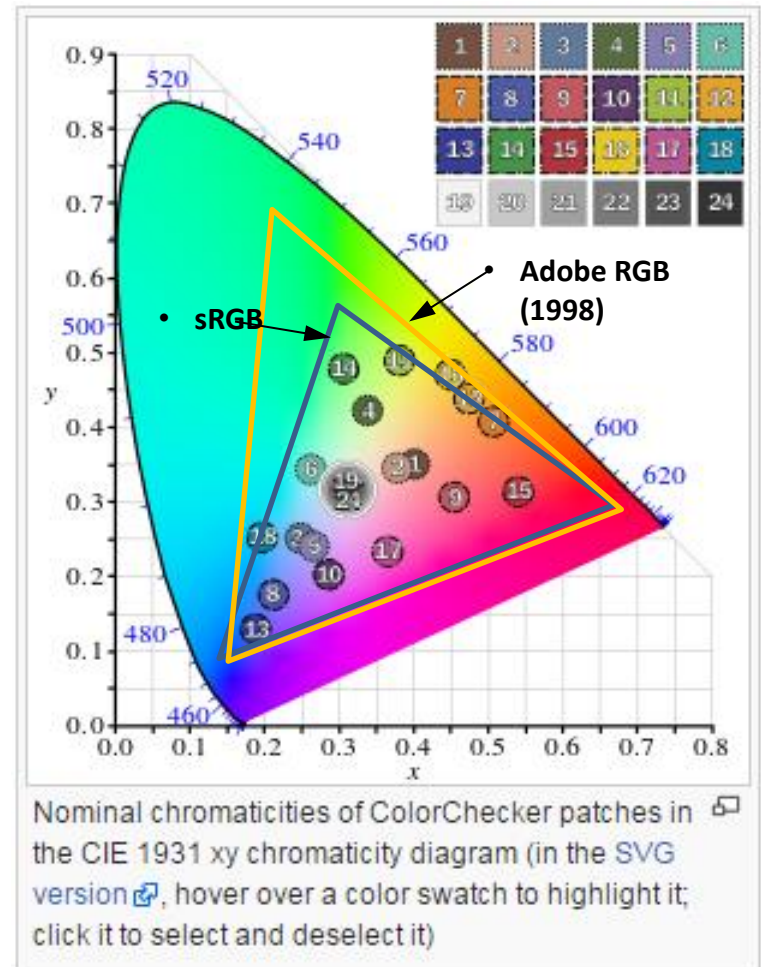
- There are 2 primary color spaces that photographers have to deal with;
 - sRGB - Domain of the internet and its millions of uncalibrated monitors and laptop displays.
 - AdobeRGB - Domain of fine art printers and expensive monitors that can display 100% of the additional colors of the AdobeRGB color space
 - AdobeRGB capable monitors require external calibration hardware and software that interacts directly with the complex internal controls of those precision monitors
- We are limited to working with the projector's sRGB color space, and with the controls the projector has available on its controls menu (external calibration hardware and S/W does not work with the projector)
- The Calibration Challenge
 - 1 – Test the projector's ability to accurately reproduce sRGB colors, and
 - 2 - Use the projector menus to optimize settings for best display of our landscape images with respect to dynamic range, reach into shadows, etc.

Using A Color Reference Target

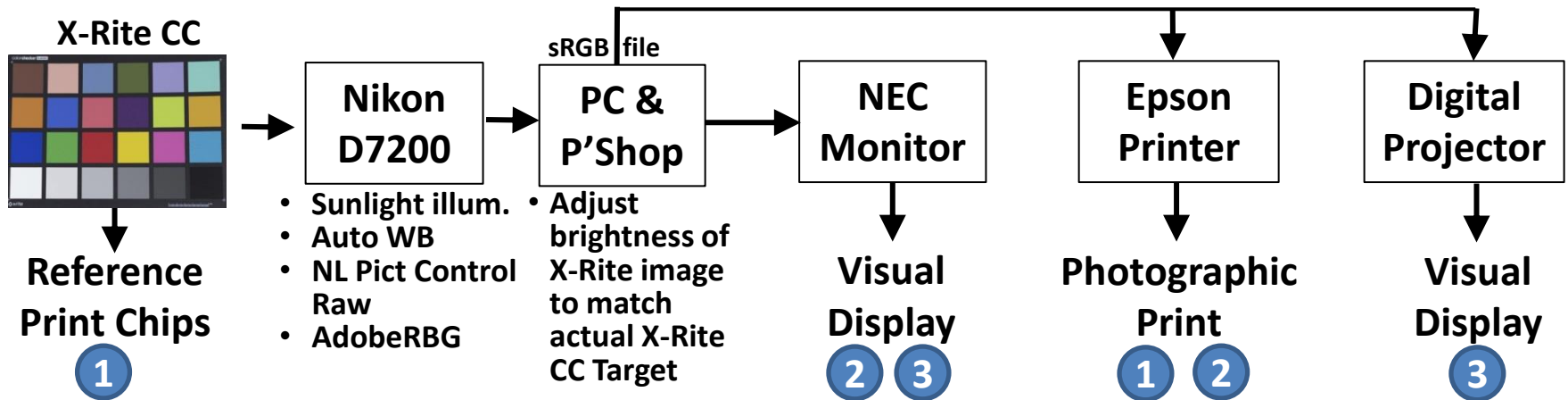
- How well does projector reproduce sRGB color space colors?
- Answer; use an X-Rite Color Checker reference target of precisely made sRGB color chips to use as standard



- Colors 1-18 are all sRGB colors
- Squares 19-24 are greys, which are critical for understanding dynamic range capabilities



Checking Ability to Reproduce and Project sRGB Colors



Results :

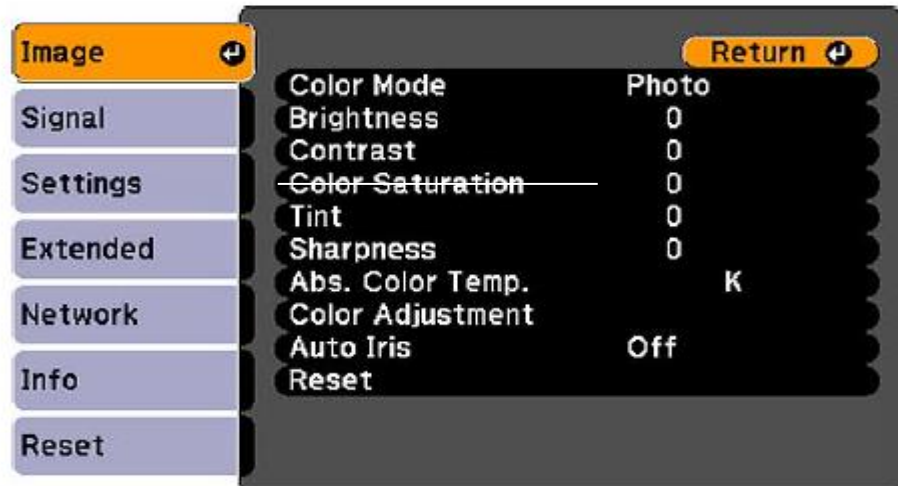
- 1 – Epson print is visually very close to original X_Rite Color Checker Target
- 2 – Epson print was visually very similar to NEC monitor display (about as close as you can expect when comparing emissive and reflective images)
- 3 – Projector projected image on screen visually looked very similar to NEC monitor display

Preliminary conclusion :

- Projector does very good job of reproducing sRGB colors
- Now look into optimizing the settings of the projector

Projector Adjustment Menus

- Projector has pretty good selection of controls
- Key control is selection of Color Mode
- Some color modes are not designed for imagery

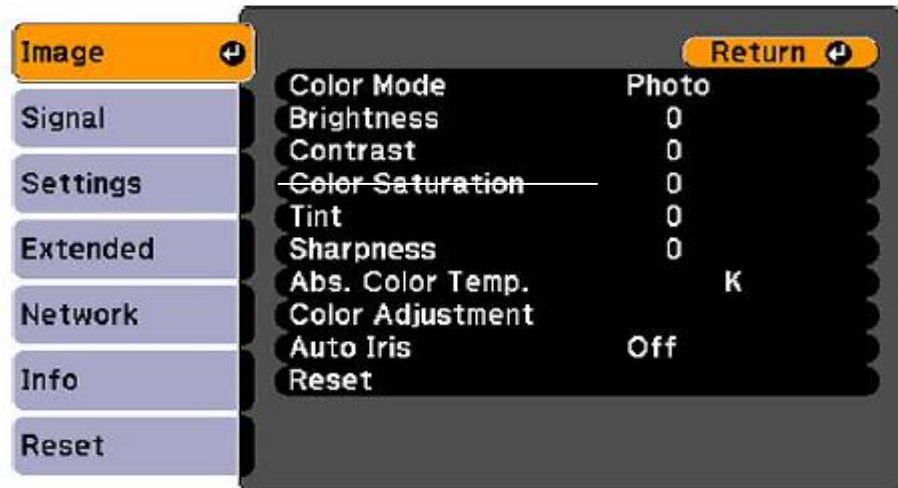


Color Mode	Description
Dynamic	Best for video games in a bright room
Presentation	Best for color presentations in a bright room
Theatre	Best for movies projected in a dark room
Photo	Best for still images projected in a bright room
Sports	Best for television images in a bright room (video or composite video input only)
sRGB	Best for standard sRGB computer displays
Blackboard	Best for presentations onto a green chalkboard (adjusts the colors accordingly)
Whiteboard	Best for presentations onto a whiteboard (adjusts the colors accordingly)
Customized	Best for customizing a color mode using manual Color Adjustment settings in the Image menu
DICOM SIM	Best for projecting X-ray photographs and other medical images. This mode produces image quality that approaches the DICOM standard.*

* The projector is not a medical device and cannot be used for medical diagnosis.

Projector Adjustment Menus

- Green indicates modes that are found to be best from color accuracy, rendering of shadow areas, and overall contrast points of view for landscape images



Color Mode	Description
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Customized	Best for customizing a color mode using manual Color Adjustment settings in the Image menu
DICOM SIM	Standard format for medical imaging – appears to be “HDR”-like when used for landscape images, yielding lower contrast images while preserving the shadow areas

* The projector is not a medical device and cannot be used for medical diagnosis.

Key Driver for Optimizing Projector Settings

- Being able to see into shadow areas of high DR landscape images



J.Barra Jan 2016 FHPC meeting

- Grey patches (row 4) on X-Rite Color Checker



Set Contrast and Brightness to assure visibility of this 5th square

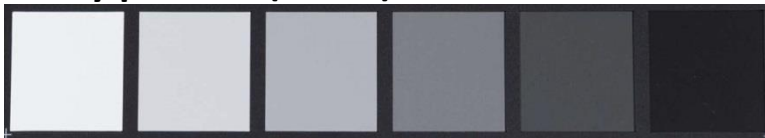
Key Driver for Optimizing Projector Settings

- Being able to see into shadow areas of high DR landscape images



S.Fairbanks Mar 2016 FHPC meeting

- Grey patches (row 4) on X-Rite Color Checker



Set Contrast and Brightness to assure visibility of this 5th square

Suggested Projector Setup Sequence

1. **Select Photo Color Mode (sRGB or Customized Modes appear to work about as well; note that Photo is intended for use in a bright room)**
2. **Set Brightness and Contrast to zero**
3. **Project image of X-Rite Color Checker using projector in room where it will be viewed**
4. **Check visibility of block 5 of grey row of Color Checker, adjust Brightness to bring its visibility up if required (if you increase brightness, be sure the first 2 or 3 grey squares are still differentiable to avoid blowing out highlights)**
5. **Set Sharpness to 5**
6. **Set Color Temp to 6500K**
7. **Leave individual Color Adjustments for R, G, B at zero (charts 2 and 3 proved projector does a good job of reproducing sRGB colors as is)**
8. **Last step – Look at a large number of typical landscape sRGB images to see if any tweaking is required, especially the Brightness setting (which should be used to maximize the projectable dynamic range of all of the images). No single image should be used as a “standard”, other than the X-Rite Color Checker image.**