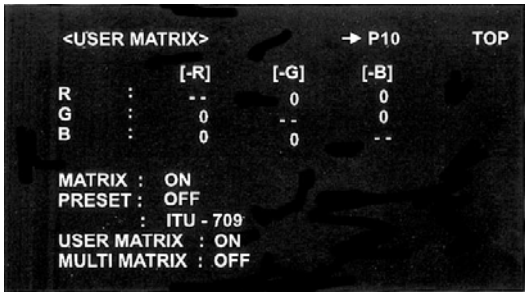
Color modifications in Sony CineAlta cameras (I)

By Alfonso Parra AEC

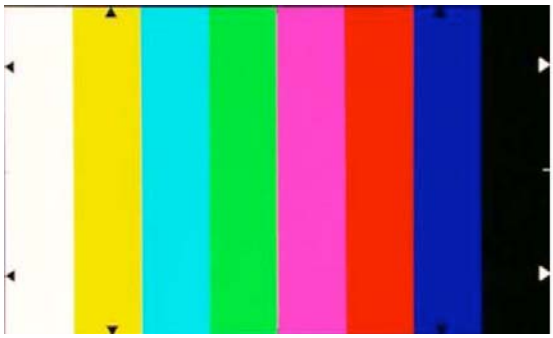
One of the most interesting digital tools for the cinematographer is the one that let's you modify how the camera sees color through the matrix menus. Once the image's visual aspect is designed, the tool allows you to precisely adjust the camera to meet your planning together with post-production. It must be pointed out here that there are many post-production tools for correcting the image, and this is done on the image through the camera. Thus, the image has to be the best possible as far as detail, resolution, noise and color are concerned. That is why any in-camera color modification gives a first approximation to the final result without adding "artifacts" due to compression as said modifications are done before filming. In this case, I've used the F900/3 camera to manually show how you can modify color using two menus: the user matrix and the Multimatrix. The first one modifies RGB color in relation to others, while the second one modifies a specific color. In the next issue I will study the use of the Multimatrix and in this issue, I'll examine the User Matrix.

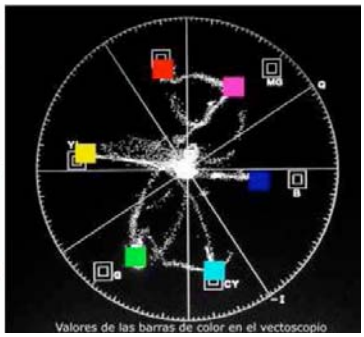


MenúUserMatrixenlaF900/3

As a rule, positive values saturate and negative values desaturate color and not just on the color you're using but also the complementary one. For example, in GR, positive values saturate the green and the magenta and, on the contrary, the negatives desaturate them. The second letter indicates the color being modified and its complementary, but in this case, it not only affects the saturation but also the tone. I've used extreme values for the modifications to see the changes better.

The standard bars:



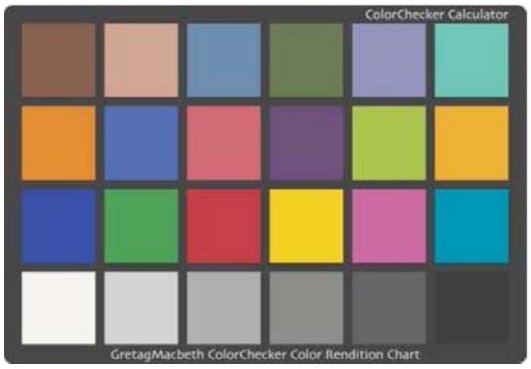


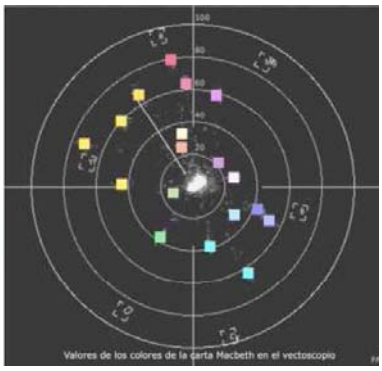
On the right hand side you can see the bar's color values in the vectorscope. I've used these values as a reference to compare the User Matrix's different modifications.

In order to modify the colors, you have to use a vectorscope and I also recommend using a Macbeth chart and an HD monitor with enough quality to see the differences. I usually prepare the modifications according to the type of image I want to build. I first establish the color bases in the User matrix, which I later fine-tune with the Multimatrix.

The picture below shows a Macbeth chart with its values in the vectorscope.

The chart has to be well lit and have the same color temperature as the one in the camera. After adjusting the user matrix to the chart, film some tests with a model to check the skin tone and some exteriors, with lights, shadows and clouds (very high color temperatures).

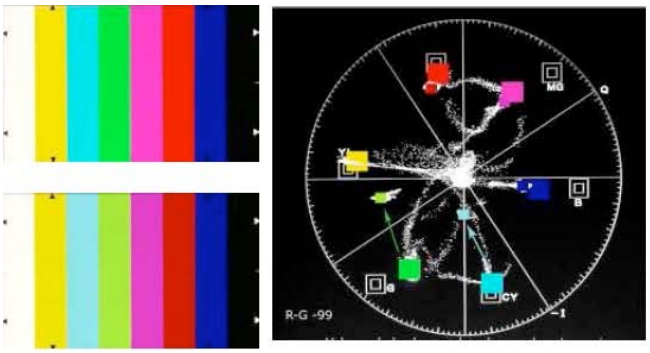




Be careful when changing the color in the camera; with patience and practice, you can get very good results.

Modifications in R:

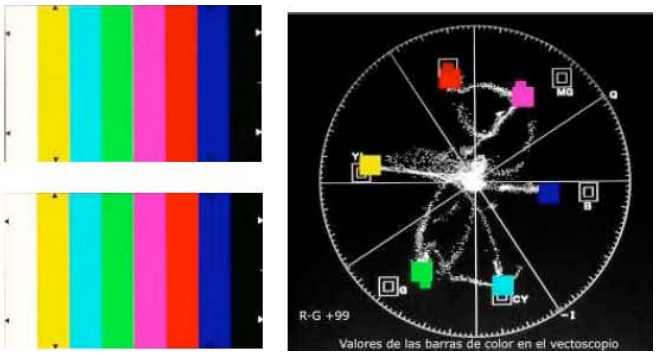
RG –99 RG +99 Standard



Modified RG –99

RG 99: especially affects green, cyan and red somewhat. The green is less saturated and moves towards the yellow. The cyan moves towards a less saturated green. The red is slightly less saturated and somewhat warmer. The blue and the magenta are slightly less saturated.

Standard

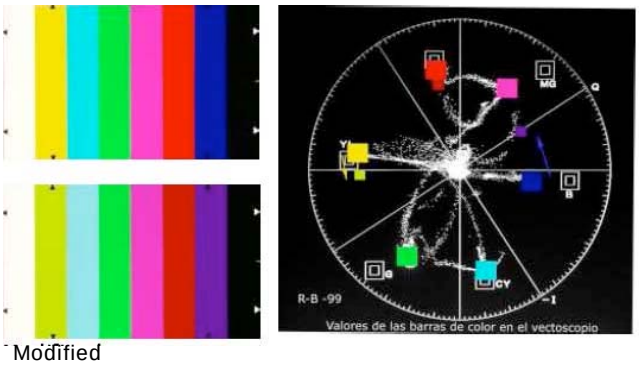


Modified RG +99

RG +99. The red is slightly more saturated, like the green and magenta, which is slightly redder. The rest of the tones remain standard.

RB –99

Standard

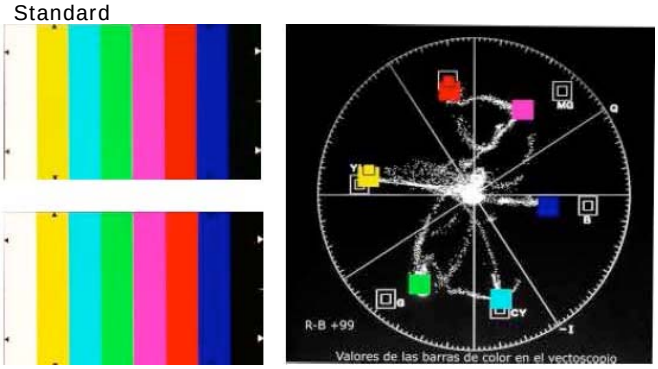


Modified

RB 99. Blue is the most affected color, turning purple, while the yellow turns slightly greener. The red is somewhat less saturated.

RB +99

Standard

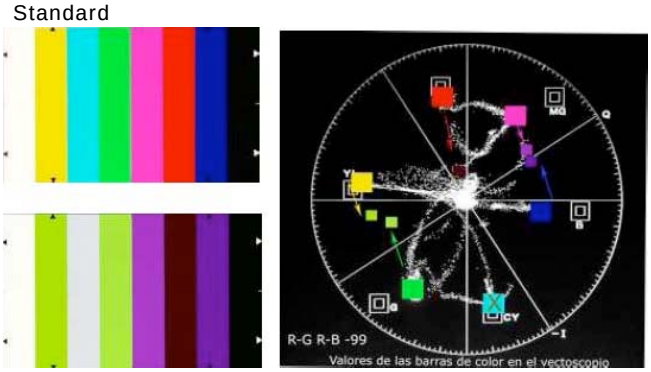


Modified

RB +99: The red is very slightly saturated and the yellow is somewhat more orange. The rest of the colors are not affected.

RG RB –99

Standard

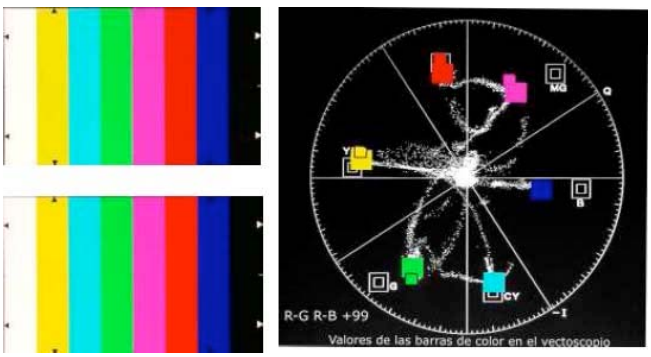


Modified

RG RB 99. The blue and the magenta turn purple. The very desaturated red looks like dark blood. The yellow is very green. The cyan has disappeared.

RG RB +99

Standard

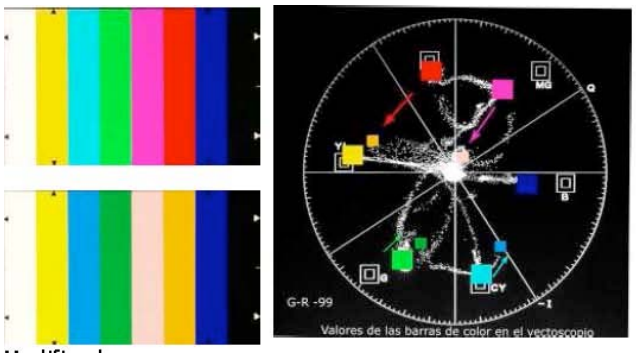


Modified

RG RB +99. The red is slightly more saturated; the magenta somewhat redder and more saturated. The yellow is more orange and the green somewhat more saturated. The blue and the cyan remain as standard values.

GR –99 GR +99

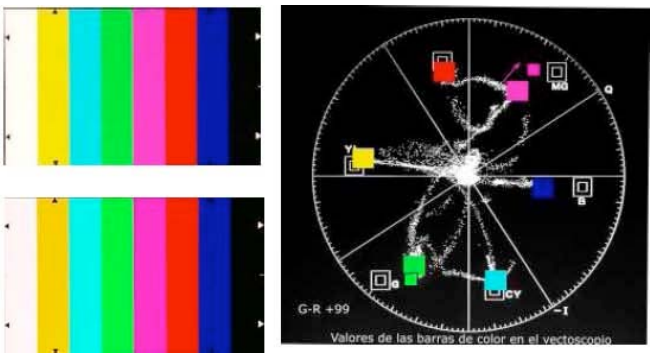
Standard



Modified

GR 99. The green and the magenta become desaturated, while the latter becomes a pale pink. The red turns into orange and the cyan becomes bluer.

Standard

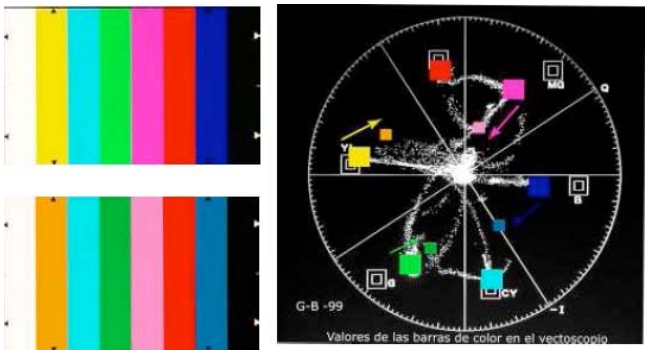


Modified

GR +99. The green and the magenta become saturated, especially the magenta. The rest of the colors are practically unaltered.

GB –99

Standard

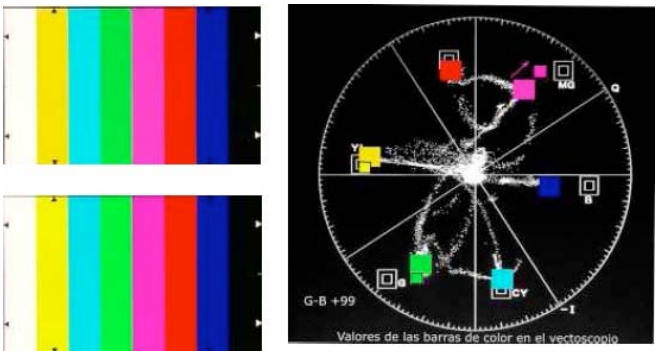


Modified

GB 99. The green and the magenta desaturate. The blue desaturates and approaches cyan. The yellow turns orange. The red and the cyan are not altered.

GB +99

Standard

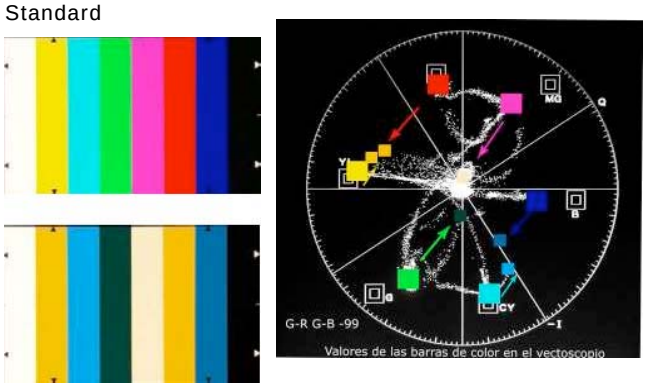


Modified

GB +99. The green and the magenta desaturate slightly. The yellow is slightly greener and the blue remains standard. The red, blue and the cyan are not modified.

GR GB 99

Standard

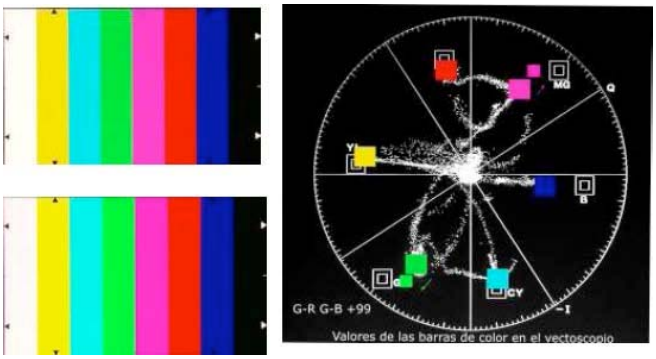


Modified

GR GB 99. The green and the magenta desaturate to the point where the magenta almost disappears. The red becomes orange and the yellow turns somewhat redder. The cyan turns bluer and this in turn becomes more cyan.

GR GB +99

Standard

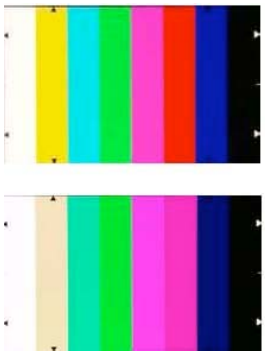


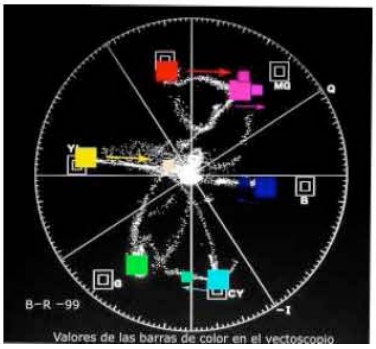
Modified

GR GB +99. Slightly saturates the green and the magenta. The rest of the colors are barely modified.

BR –99

Standard



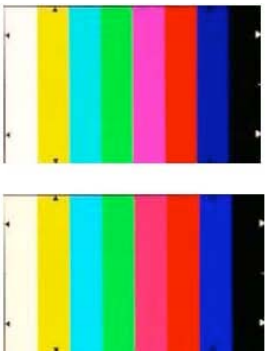


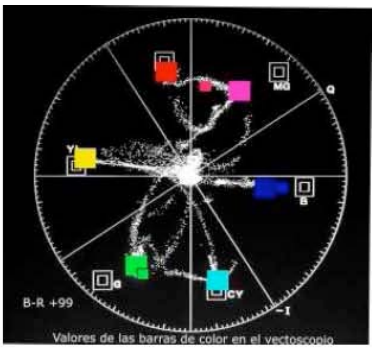
Modified

BR 99. The red turns into magenta, while the magenta becomes slightly colder. The yellow greatly desaturates; the blue desaturates less. The cyan turns more turquoise, towards green.

BR +99

Standard



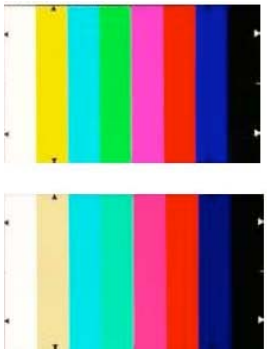


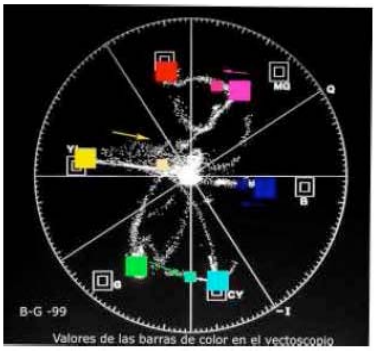
Modified

BR +99. The blue is slightly saturated. The magenta goes to red and the green is somewhat more saturated and bluer.

BG –99

Standard

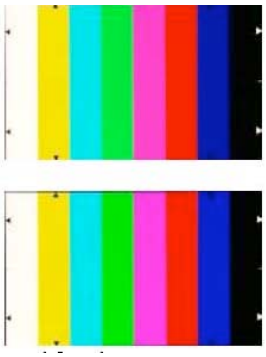


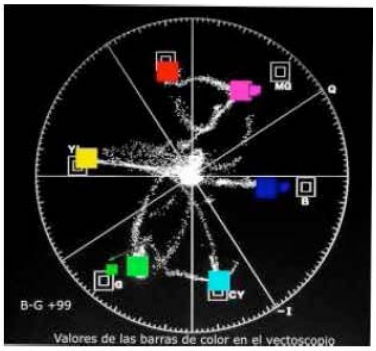


Modified

BG 99. The magenta becomes redder. The yellow loses a lot of saturation and the green becomes turquoise, close to cyan. The blue slightly desaturates. The red and the cyan remain standard.

BG +99 Standard



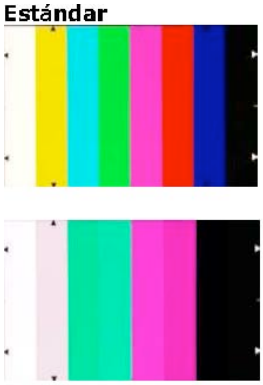


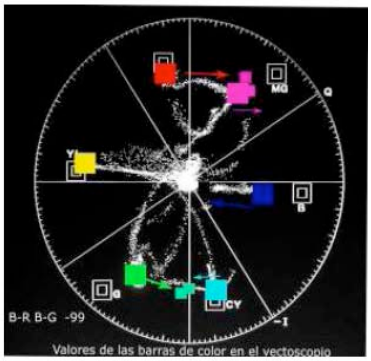
Modified

BG +99. The blue, green and the magenta saturate, leaving the magenta somewhat less red compared to the standard. The green is somewhat more yellow. The red, yellow and cyan are not altered.

BR BG –99

Estándar



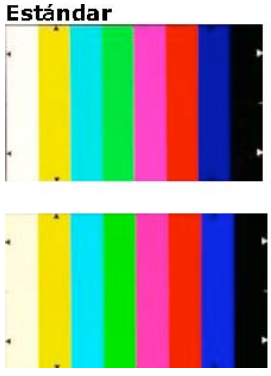


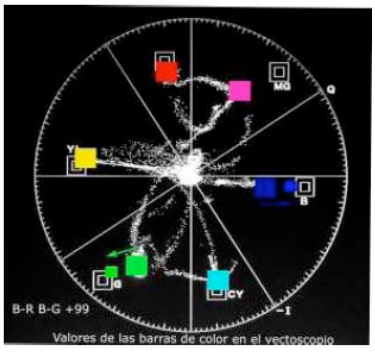
Modificado

BR BG 99. The red and green are heavily modified. The red becomes magenta and the green cyan. The cyan becomes turquoise and the magenta somewhat colder. The blue desaturates almost completely and the yellow disappears.

BR BG +99

Estándar





Modified

BR BG +99. The blue and the green saturate. The latter is slightly more yellow. The rest of the colors remain practically the same as the standard.

USER MATRIX	Average Film
Matrix table:	A
Matrix RG:	66
Matrix RB:	25
Matrix GR:	6
Matrix GB:	46
Matrix BR:	14
Matrix BG:	3

The table on the left shows the User matrix's proposed modifications to imitate photographic emulsions. Although there are many more elements that intervene in the simulation process, I want to use the table as an example and starting point in color changes. Notice how the majority of the values are negative; therefore, in general, the colors will be less saturated than normal ones in video.

Review of the modifications:

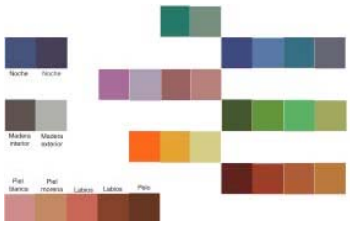
In the R channel the RG value is at –66, which, as pointed out, strongly desaturates the cyan and the green becomes more yellow. This means that if we film a landscape, the sky will not have intense colors, leaving it paler and the greens warmer. In RB, the red slightly desaturates and the blue becomes purpler. In short, in R we would have less saturated reds, blues and magentas somewhat more purple; greens and yellows tend to look alike and the cyan very desaturated. In G, the GR value saturates the green and the magenta slightly. GB desaturates the green and the magenta and modifies the green, making it more cyan and countering the RG effect. The yellow becomes more orange and the blue more cyan. The yellow returns to its initial situation since the effect also counters the RG RB. Lastly, the blue (B). In BR, the blue and the yellow desaturate and the red becomes more magenta, and the cyan is more turquoise. In BG, the magenta becomes redder (although slightly in the –3 value).





*Imágenes de la serie documental **Nuestros caminos a Santiago** con las modificaciones en el user matrix, partiendo de la tabla arriba indicada.*

In sum, the aim is to achieve a balance between the different values to obtain the desired color. As a result of applying this table, the original camera image is desaturated with slightly purple blues and cyans somewhat turquoise and a general magenta/pink deviation to be corrected in post-production. Once graded, the images give a very natural appearance. It is true, however, that I later make specific modifications in the multimatrix for some colors; for example, I saturate the cyan somewhat and desaturate the red. In general, you can work with the matrix until you achieve the adequate colorimetry.



The image on the left shows the color palette used in the movie Plauto, created to simulate some of the Technicolor colors and tones used by the painter George Grosz. Below are some modified images.

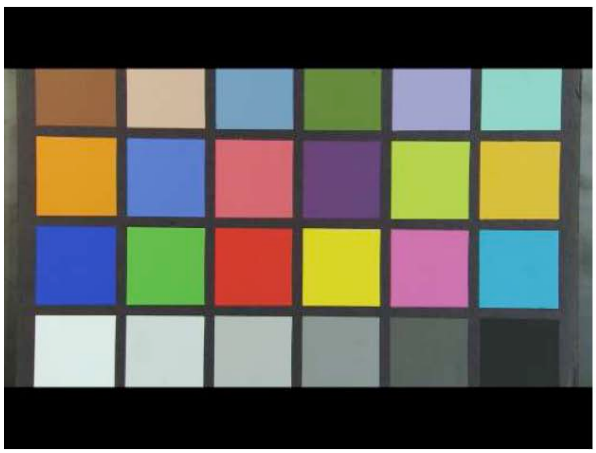




Chart photographed with color standard ITU709 in the Sony F900/3 camera



First camera modifications with the User Matrix. From this color base we modified the saturation and some color tones in the Multimatrix and then finished it in Post-production.

Technical aspects: Sony F900/3 camera; Les: Zoom Cooke S4 HD; Cinetal Monitor (capturing frames and visualization) Macbook Pro with Final Cut; Esser Test Chart TE 106 with back-lit sphere LV5

References:
www.alfonsoparra.com
Digital Cinematography, by Paul Wheeler. Ed. Focal Press
High Definition and 24P cinematography, by Paul Wheeler. Ed. Focal Press
www.cinematography.net/

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