

Research upon:

**Black & White in digital**

**Black & White in digital originating from infrared**

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Member of the French CST (Technical Superior Commission)

Includes presentations given at:

**CAMERIMAGE 2016**

As part of the AFC - PANASONIC workshop

And at:

**MICRO SALON 2017**

With the short film 'ESCAPADE'

Complemented in March 2017 by a sum-up of previous research

Special thanks to:

**THE TEAM OF THE FIRST TESTS**

**THE TEAM of "Escapade"** (see page 90)

**Nela PERTL** Marketing Manager - PANASONIC Europe

**Luc BARA** Technical Product Manager - PANASONIC Europe

**Olivier CARTIER** Product manager - VISUAL IMPACT

**Denis GRANAI** Marketing director - CINEMAGE

**Jerôme VALIDIRE** Colourist – CINEMAGE

**THE PARTNERS** (see page 91 & 92)

**THIS PRESENTATION DOES NOT DISCUSS THE MATTER OF INFRARED IN DIGITAL,  
RATHER THE USE OF INFRARED TO PERFORM BLACK & WHITE IMAGES**

This presentation aims to share my research on Black & White, a work I have carried out with the help of numerous friends and partners along the past years.

These are not 'digital cooking tips' that I'm giving out, but the results of many attempts in order to open a discussion upon Black & White research.

Far from being scientific, those tests have been carried out in several phases according to the availability in terms of equipment and human resources.

Some people remain much more experienced than myself on this infrared matter. May this work prove useful to them, so that we all progress together on that question.

That is my wish.

Philippe Ros April 2017

# Reminder on Black and White in film

As soon as we moved from orthochromatic films (sensitive only to red and blue) to panchromatic films (sensitive to any colour), we could see the difference in grey values on faces.

With orthochromatic, a very pale foundation application was used by the make-up artist, along with purple and rose for the lips and the eyelids.

(Right: Theda Bera portrait).



# Reminder on Black and White in film

The grey values for each colour has always been subject to manipulation, in particular through the temperature and speed of development process or, for instance, through a filter device when shooting.

Here is a famous example of 'dramatized skies' through red filters.

On the right: red filter applied on the sky.

Photography: **Nigel Roberson**



Black & White film stocks with, among others:

Kodak

Fuji

Ilford

Gevaert

Dupont de Nemours

Orwo



'The Hustler' Director: **Robert Rossen** - Cinematographer: **Eugen Schüfftan**

As any other DP, I thoroughly studied the differences of grey values and contrast according to each film stock. For some of them I have analysed the Gamma curves and tried to reproduce this effect in digital... with varying degrees of success.

But, in the process I have crossed some other interesting paths. This is what I'd like to share with you in this presentation.



'The Spiral Staircase' Director: **Robert Siodmak** - Cinematographer: **Nicholas Musuraca** (ASC)





'Out of the Past' Director: **Jacques Tourneur** - Cinematographer: **Nicholas Musuraca** (ASC)



'Cat People' Director: **Jacques Tourneur** - Cinematographer: **Nicholas Musuraca** (ASC)

Research upon

Digital image in Black & White originating from infrared.

# Black & White in digital - Why using the infrared?

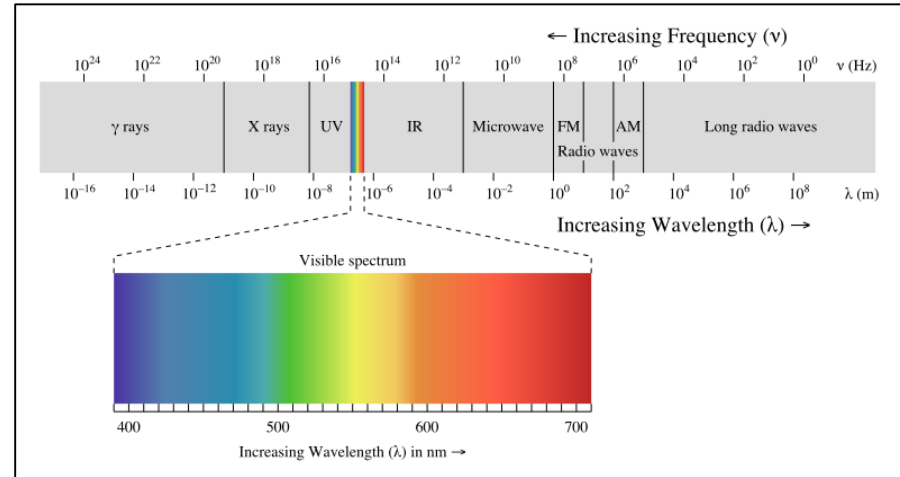
Unfortunately, the Black & White digital image remains scarcely used in motion pictures.

When working on a Black & White material, matching colours and grey values obeys the same codes as in film photography. Except that, unlike emulsions with classic colour films, most digital cameras sensors react from 300 to 1200 nm, therefore to infrared also.

To obtain a 'realistic' image, conventional digital cameras use a filter in order to neutralize the infrared. In French this filter is (incorrectly) named: infrared filter (IR), when we should say: 'anti-IR filter'.

In English, the designation is correct: IR cut filter.

The interest of removing this filter when working in Black & White is that it enables to log more wavelength. Despite the 'pollution' of the red on the image, in doing so we record a range of unseen colours otherwise. Once transformed into Black & White, this broad spectrum will become valuable.



# Digital Black & White - Colour matrix

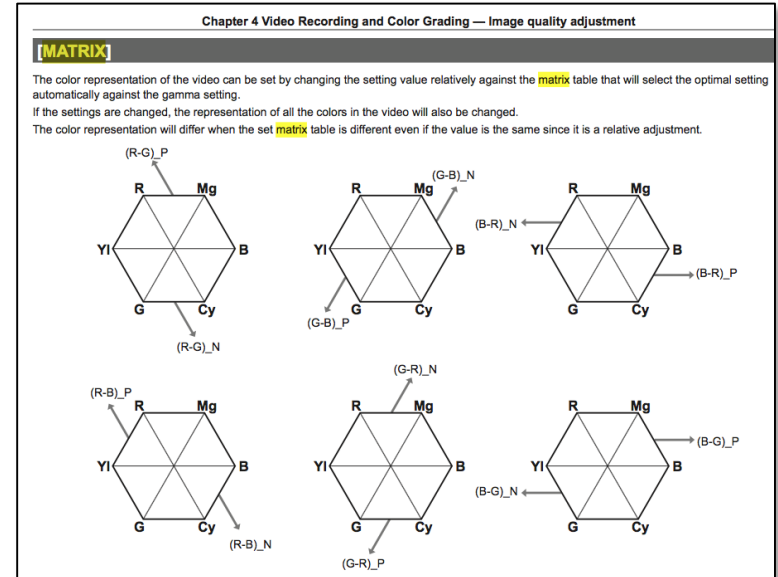
The first digital cameras used to offer - beyond an automatic desaturation - the possibility of converting a Black & White image via the Matrix (a colour conversion that any camera performs), a parameter rarely accessible nowadays, sometimes blocked by the manufacturer to protect their 'secret formulas'.

With the help of Matrix we could create a special Black & White rendition, with different grey values than the ones obtained through an automatic desaturation.

A tedious method\* we used with the help of a vectorscope but with some worthy results: a dramatization of the image, different from classical templates (see pages 97 - 98).

\* 'Adjustment of matrix (....) It's a little like oil-wrestling with a 20-foot-long anaconda!'

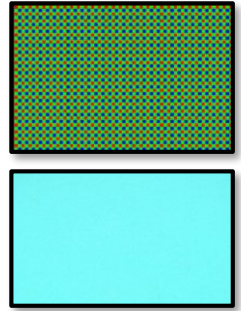
Dave Stump in 'Digital Cinematography' (Page 289) Focal Press



## Reminder: filters in front of sensors

A standard digital camera has in front of the sensor:

- An Infra-Red (IR) cut filter
- An Optical Low Pass Filter (OLPF)
- A Bayer pattern



In this research the OLPF is not of direct interest.

## Several paths - Different results

OPTION 1 - Shooting with a B&W digital camera without Bayer pattern

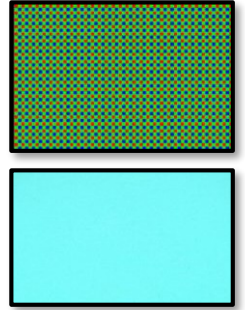
OPTION 2 - Shooting colour, creating B&W in post during grading

OPTION 3 - Shooting colour without infra-red cut filter, creating B&W in post during grading

## Several paths - Different results

### **OPTION 1 - Shooting with a B&W digital camera (without Bayer colour pattern)**

- Without IR cut filter



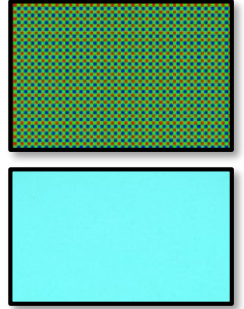
Arri & Red cameras with “monochrome sensor” ,



Several paths - Different results

## OPTION 2 - Shooting colour

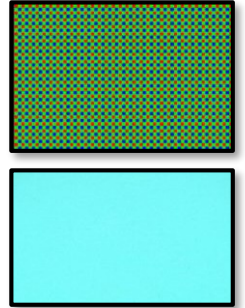
- Creating B&W in post during grading



Several paths - Different results

## OPTION 3 - Shooting colour without infra-red cut filter

- Creating B&W in post during grading



A lot of possibilities haven't been explored in these tests in particular with the use of colour filters but I did want to stay on a simple system of shooting

Several paths - Different results

## **OPTION 3 - Shooting colour without infra-red cut filter**

- Creating B&W in post during grading



**CHOSEN OPTION FOR THE  
SHORT FILM  
'ESCAPADE'**



## L'option Panasonic

### Varicam LT

Equipped with a **detachable** infrared cut filter,  
Replaced by a clear filter for conserving the same  
flange depth

It is a very rare option: usually, removing the IR cut filter reduces the capacity of the camera to this unique purpose.



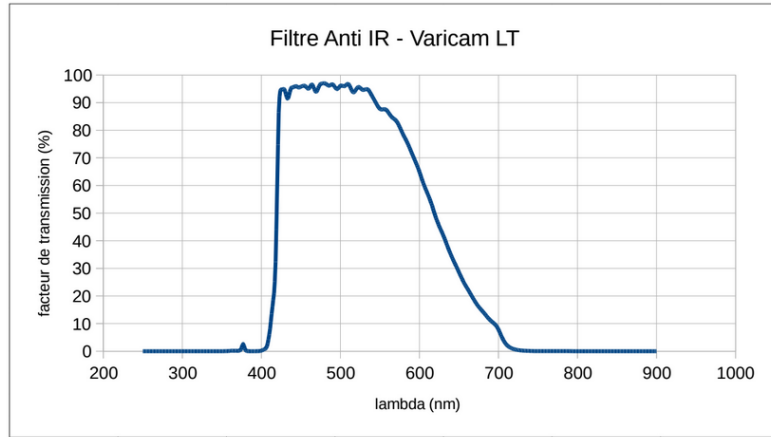
A very big thank you to:

- **Luc Bara** - Technical Product Manager - PANASONIC Europe

For lending me the camera, as for his trust, availability and the most valuable information on this device and the workflow.

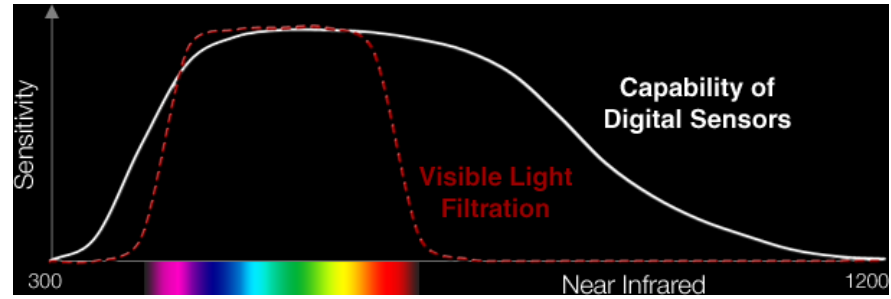
# B&W with digital cameras

## Varicam LT Panasonic



National French Film School ENS Louis-Lumière  
Laboratory of Sensitometry & Colorimetry -Jan 2017

## Digital sensor and infrared



Valuable information on infrared on Red website:  
<http://www.red.com/learn/red-101/infrared-cinema>

In order to validate this research, we have shot a short film

## “Escapade”

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Using option 3

- **Shooting colour without infra-red cut filter**
- **Creating B&W in post during grading**

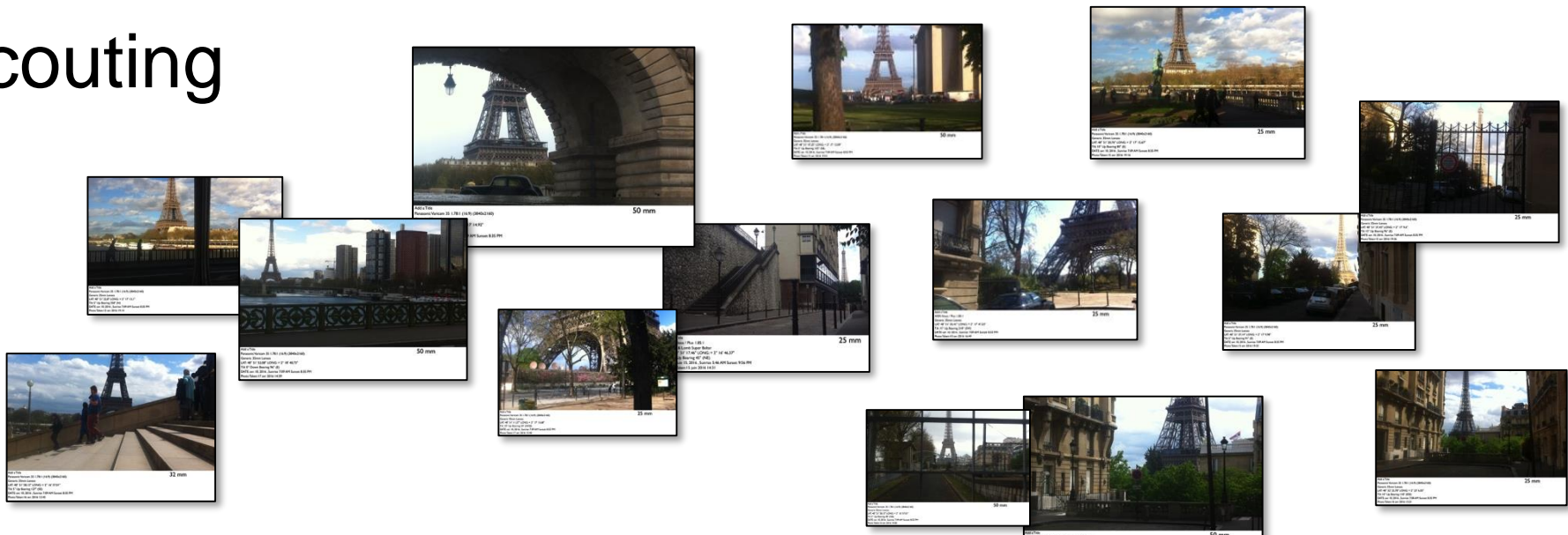
# Escapade

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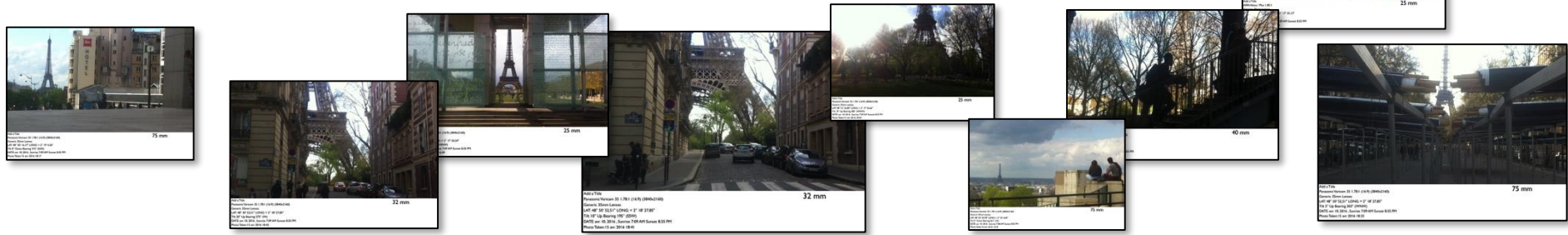
Directed by Ben Elia



# Scouting



Intensive scouting by **Ben Elia** with the Artemis application



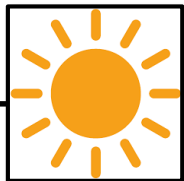


# The film on Vimeo

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<https://vimeo.com/182057250>

## TESTS METHODOLOGY



USING COLOUR TEMPERATURE

DAYLIGHT SHOOTING

CAMERA WITHOUT IR CUT FILTER



## Methodology:

- Giving the colourist the maximum of room to handle the hues of colours
- 
- Having the smallest crew to get more time to shoot



# Tests 1 Spring 2016

Daylight shooting with:

- François Paturel - Cinematographer & DIT
- Laurent Desbruères - Colourist



A very big thank you to RVZ for lending me the lens and the gears:

- Samuel Renollet and his team - Technical Manager
- Philippe Guillemin - Chief planner
- Frederic Lombardo - Optical technician





# Tests 1 Printemps 2016

4K, infrared, noise and sharpness.

Depending on the wavelength captured in the infrared, the level of signal-to-noise ratio may vary. When pushing to the infrared limit with thermic cameras, I experienced some serious noise problems.

During the viewing process on a big screen, teaming with Laurent Desbruères and Jérôme Validire, colorists, we did not witness any particular problem. There is a minor loss in definition which, by night, increases according to street lighting. Some more extensive tests might have helped but, they would have been very time consuming.

With this type of cameras, the relation between the amount of photosites (about 10 millions) and the issuance of a 4K recording often leads me to use glass or digital filtering in order to avoid an oversharped image.

This problem has not emerged and I have not used any filter.



Chosen option

## OPTION 3

### SHOOTING

Shooting colour without infra-red cut filter



### POST-PRODUCTION

Creating B&W in post during grading



That is the most classic method to generate a snow effect on nature, resulting from a white balance, or a filtering, during the shooting. However we chose a simpler method, less flattering at first but allowing a wider choice in post-production.



# TESTS METHODOLOGY

**OPTION 3**



**2 METHODS**



## SHOOTING

### Shooting colour without infra-red cut filter

Without executing white balance but with changing the colour temperature of the camera



With executing white balance



## POST-PRODUCTION

### Creating B&W during grading



See also on the Red website:

<http://www.red.com/learn/red-101/infrared-cinema>



## OPTION 3

**CHOSEN  
METHOD**

### SHOOTING

#### Shooting colour without infra-red cut filter

Whithout executing white balance but with changing the colour temperature of the caméra



### POST-PRODUCTION

#### Creating B&W during grading







## OPTION 3 - The 2 steps of the process

### SHOOTING

**Shooting colour without infra-red cut filter**



Capturing a wider range of colours during the shooting.



### POST-PRODUCTION

**Creating B&W during grading**



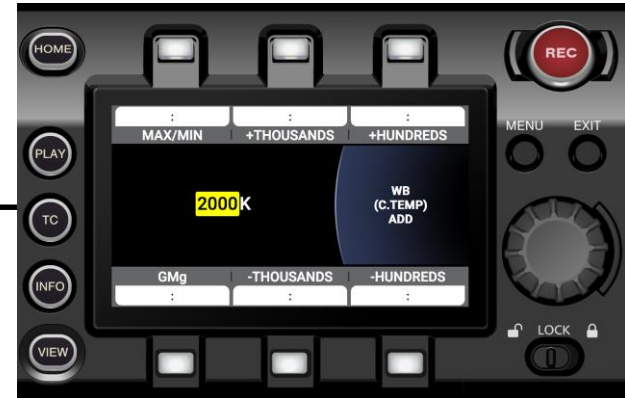
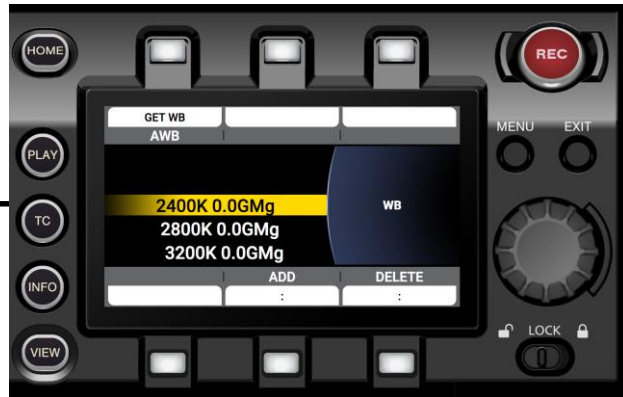
Choosing the colours in post, processing them and finally, converting them in B&W

This presentation will expose every single method we went through to optimize those two steps.



## INFLUENCE OF THE COLOUR TEMPERATURE ON THE COLOUR SEPARATION IN IR

On the Panasonic's Varicam - as on many others now - there is an option to select precisely the colour temperature by 100°K, from 2000°K to 15000°K.



Panasonic Varicam LT simulator

[http://pro-av.panasonic.net/en/vcs/simulator\\_lt/index.html](http://pro-av.panasonic.net/en/vcs/simulator_lt/index.html)

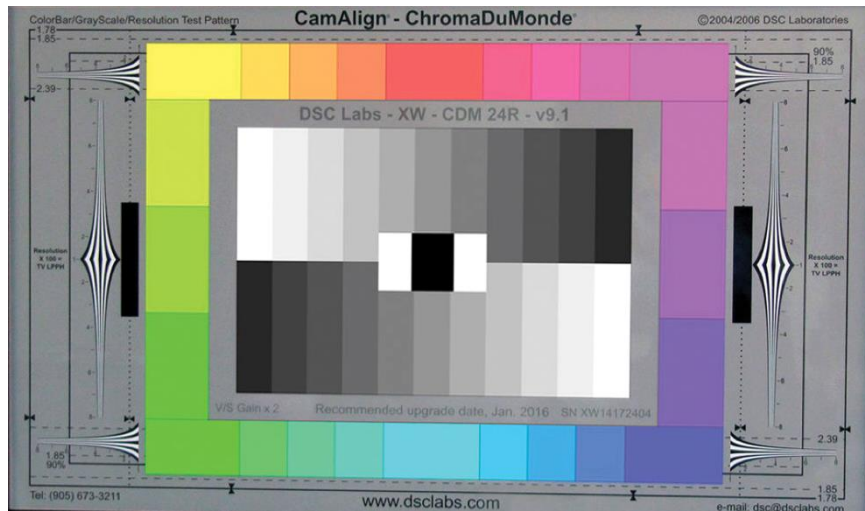


## CAMERA REFERENCE

### WITH IR CUT FILTER

Daylight shooting 5600°K

Colour temperature of the camera: 5600°K



## CAMERA WITHOUT IR CUT FILTER

Daylight shooting 5600°K

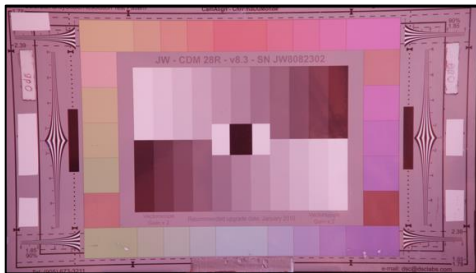
Colour temperature of the camera: 5600°K



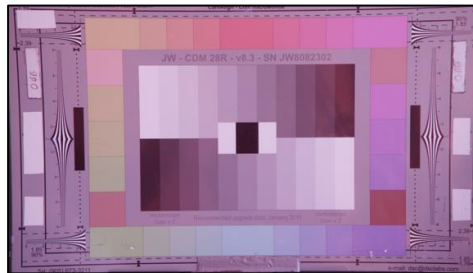


# INFLUENCE OF THE COLOUR TEMPERATURE ON THE COLOUR SEPARATION IN IR

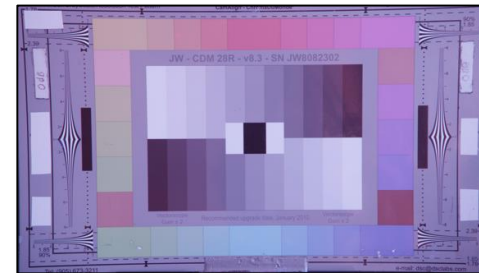
Camera colour T° 5600°K



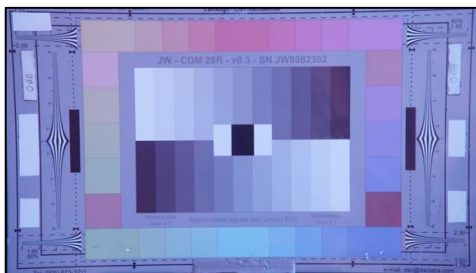
Camera colour T° 4300°K



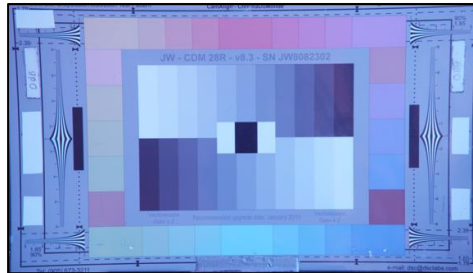
Camera colour T° 3200°K



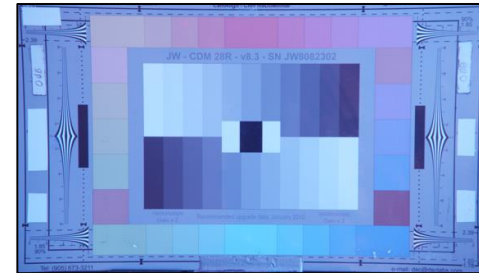
Camera colour T° 2700°K



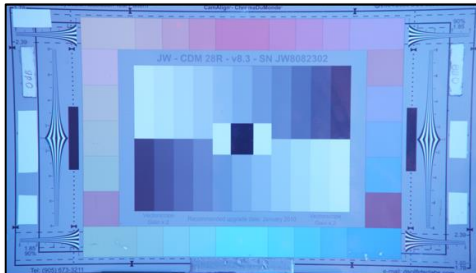
Camera colour T° 2400°K



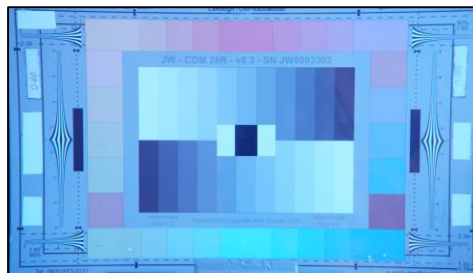
Camera colour T° 2300°K



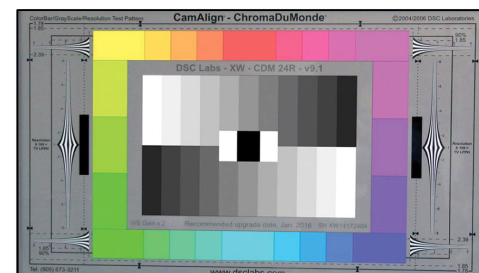
Camera colour T° 2200°K



Camera colour T° 2100°K



Ref: Camera with IR cut filter

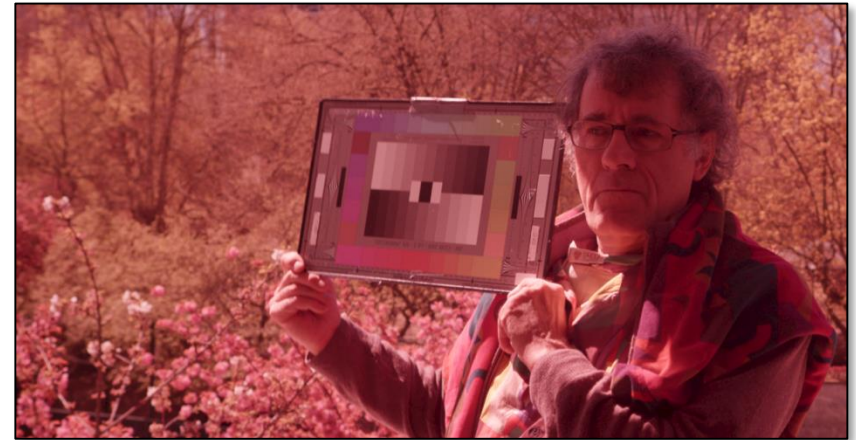




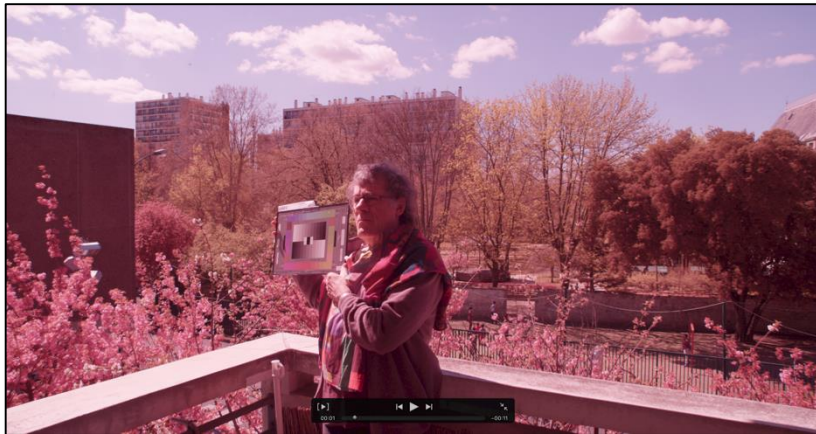


# INFLUENCE OF THE COLOUR TEMPERATURE ON THE COLOUR SEPARATION IN IR

Camera colour T° 5600°K



Camera colour T° 4300°K







# INFLUENCE OF THE COLOUR TEMPERATURE ON THE COLOUR SEPARATION IN IR

Camera colour T° 3200°K



Camera colour T° 2700°K





# INFLUENCE OF THE COLOUR TEMPERATURE ON THE COLOUR SEPARATION IN IR

Camera colour T° 2400°K



Camera colour T° 2200°K







Camera colour T° 2000°K



References of the colours of clothes

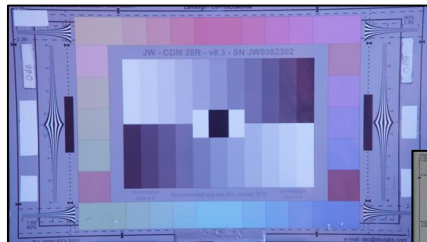




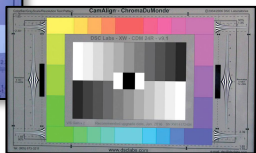


## SYNTHESIS DAYLIGHT TESTS

Camera colour T° 2700°K



Char twith  
camera with  
IR cut filter



Camera colour T° 2700°K



Cloth with camera  
with IR cut filter



In the present case, which is shooting without an IR cut filter and turning to B&W in post, the choice of the colour temperature on the camera is determined by its ability to separate the colours and not for its aesthetic qualities.

The plus: a camera without IR cut filter is giving access to more wavelenghts in order to process it during the grading session.

## CONCLUSIONS DAYLIGHT TESTS

POST-PRODUCTION

SHOOTING



Camera colour T° 2700°K

SHOOTING



Standard desaturation



Desaturation through separation of colour phase



**In the case of a daylight shooting**, regarding the colour temperature, **we considered, during the grading session, that the most relevant setting on the camera** (depending the hour of the day and the degree of sunshine) would be **between 2700°K and 2400°K**. This option allows to reduce the predominance of red but, moreover, helps a proper separation of each colour. At the very beginning, « Escapade » was supposed to be shot mainly on daylight, the night shooting being only a complement. Then we decided to shoot the entire film at night, to increase the difficulty, thus validating our approach.



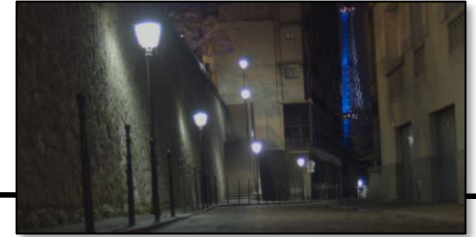
**When shooting at night**, in town, the setting turns out to be way more complex due to the variations of the colour temperature in the streetlight system. **How to proceed?**

# Tests 2



Night shooting and grading:

- Appolonia Elia - Actress
- The Eiffel Tower
- Ben Elia - Director
- Simon Feray - 1<sup>st</sup> AC
- Jérôme Validire - Colourist



A very big thank you to Visual Impact and Emit for lending us the gears:

- David Lesage - CEO - Visual Impact
- Olivier Cartier - Product manager - Visual Impact
- Andrew Steele - CEO - Emit
- Benjamin Steele - Chief operating officer - Emit



# The team (Full list: according to the locations - Minimum 3 personnes - Maximum: 8 persons )

- Actress: **Appolonia Elia**
- Director: **Ben Elia**
- Editor/ 1<sup>er</sup> Assistant director (prep): **Claire Balbusquier**
- Location manager/Still Photographer: **Olivier Cartier**
- Cinematographer: **Philippe Ros**
- Actor, Composer, sound designer & sound mixer: **Christian Fabre-Dit-Garrus**
- Camera operator: **Johan Jolivet**
- Focus puller: **Tonino di Marco**
- 2<sup>nd</sup> assistant camera: **Jordan Baudiquey**
- Head gaffer: **Camille Benoit Gaudin**
- SFX & prop specialist: **Olivier Zenenski**
- Prop assistants: **Flora & Jonathan Zenenski**



**Tonino di Marco** - Focus puller



**Ben Elia**, Director - **Johan Jolivet**, Camera operator

# Escapade - Tech specs

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## DELIVERIES

24 fps

4K DCP

## RECORDING FORMAT

AVC-Intra 4K 10-bit 4:2:2

V-Log

## DUAL NATIVE ISO

Use of

- 800 @ 800 ISO
- 1250 & 2500 @ 5000 ISO

## WHITE BALANCE

Extensive use of

- Selection between 2400 and 2800°K
- Choice of subtle gradations on Magenta & Green



# Escapade - Tech specs

## ASPECT RATIO

1:1,85

## LENSES spherical

- Canon prime T1,4
- Cooke prime T2
- Zeiss Ultra Wide zoom

## MONITORING

- Transvideo CineMonitorHD 12"
- Transvideo Rainbow HD
- Transvideo Starlite



# Escapade - Tech specs

## Focusing in 4K without IR cut filter

In spite of the neutral filter replacing the IR cut filter, it proved very difficult for Tonino di Marco to focus since a night shooting in-town would scan a lot of different wavelengths in the IR.

The lenses had been set without IR cut filter but, focusing would require a larger monitoring than the usual one on a shooting set.



Tonino di Marco - Focus puller

Therefore Tonino permanently swapped between the focus ring and the HD monitor set in Black & White mode when I wasn't myself using it in colour to set the colour temp and separate the phases.

Let say that, considering our limited resources, this shooting wasn't exactly a gift!

I would not recommend any infrared shooting without the skills of such an assistant!

# Escapade - Tech specs

## Electric list

### HMI:

- 200W Joker K5600

### LEDs:

- Flexlite Aladin
- BiFlex 30x30 Aladin
- Varsa Nila

## A big thank you to:

- François Roger - Marketing manager - Ciné Lumières de Paris
- Marc Galerne - CEO - K5600°



Jordan Baudiquey, 2<sup>nd</sup> camera assistant



# Escapade - Lighting 1

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'Escapade' is a short film in which I tried to remain minimalist in terms of lighting, in order to focus specifically on the Black & White work.

Few lamps in order to push both the camera and the workflow to their limits, but with always in mind the idea of using this opportunity to test new sources. For years now I've been lucky enough to receive the help of Marc Galerne, enabling me to test his new projectors, and for the LEDs, I could always rely on my professor François Roger from Ciné Lumières de Paris.

The problem I am facing right now, when shooting at 3200°K with recent projectors, whether in Black & White or in colour, is linked to the nature of the sources. I miss the Fresnel, Cremer-type, with a proper length of charriot between spot and flood to determine the better approach.

I'm not being nostalgic, it is just a matter of quality in the lighting texture and quality in shades. I am a huge fan of Big Eye and Alphas but, in many countries, when I'm working with 3200°K projectors, I can't find any lighting sources that could replace the Fresnel.

Failing it, I use the marginal rays of the 1K Par in medium to bring back that same sensation.

# Escapade - Lighting 2

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To feed the dialogue, here are two bits of interviews you will find in the AFC 2017 April letter:

‘I brought back to light some old projectors turned archaic, such as the Cremer, the Softlight, or directionnal with Fresnel’. **Pascal Marti** in *‘Pascal Marti, AFC, talks about his work on "Frantz", by François Ozon’*.

‘It looks like we’ve become accustomed to employing some devices with unexploitable ranges basically, and making them clean with diffusion.’

(...) ‘We have seen hands positioning themselves in front of an Alpha to watch the shade. It may seem trivial but, we had not seen it in a long time, people checking the quality of the shades and saying: « a Fresnel, that was something! », as if it didn’t exist anymore!’

**Marc Galerne** in ‘Micro Salon and BSC Expo 2017: a surprising situational analysis on Lighting’ AFC April letter

With Black & White, the viewer perceives each and every shade as a dramatic intention, as long as the rendering of that shade is good. I dislike the only close-up of the young actress in ‘Escapade’ because of the poor quality of the shade. Even though the LED sources that I used appear very powerful, they seem intended for a single use. I only resort to them with Grid Cloth layers.

I miss new directional projectors at 3200°K...

Tool-wise we are at the beginning of a deep mutation, and I can only hope everybody realize that we still need directional sources to dramatize an image.

## Constraints:

Due to availability problems we had to postpone our shooting to the summer.

As a result we had to face:

- The 2016 European Championship of football
- Numerous and tighter security controls in the city of Paris, with important traffic restrictions

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## Advantages:

- The Eiffel Tower was lit with unusual colours, matching the most requested flag on the web during the Championship. Therefore we had a wider range of choice in terms of colour selection!



# SHOOTING METHODOLOGY



## USING COLOUR TEMPERATURE



### NIGHT SHOOTING IN TOWN

### CAMERA WITHOUT IR CUT FILTER



## Procedure for the night shooting

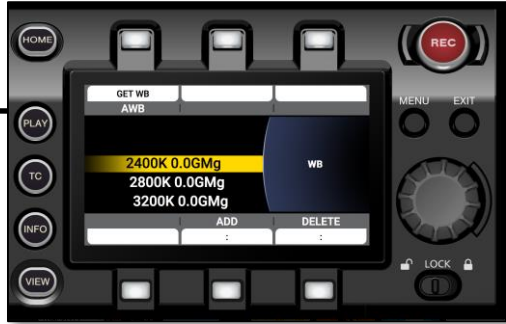
Even though we had time for preliminary tests, the night-shooting proved way more complex due to the different colour spectrum in the streetlight system.

The only option left was to use the waveform and check if the colour phases were adequately separated.

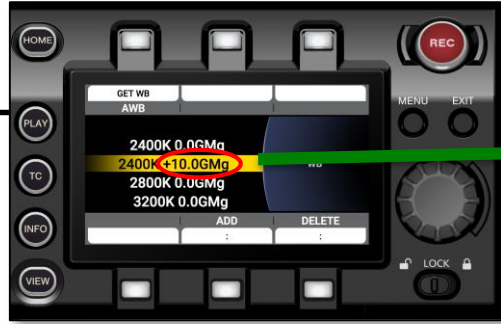
The use of GMg (Green & Magenta) adjustments to assess our choices of colour temp helped refining this separation.



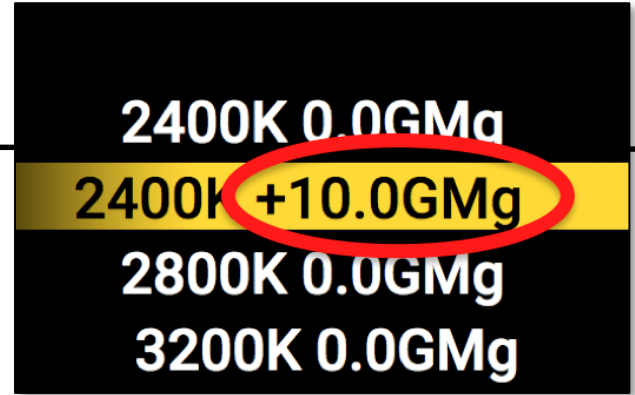
# NIGHT SHOOTING IN TOWN - CAMERA WITHOUT IR CUT FILTER



Selection of colour temperature



Adjustment of Magenta or Green



The difference obtained between  $2400^{\circ}\text{K}$  and  $2400^{\circ}\text{K} + 10.0 \text{ GMg}$  would allow us, for example, to reveal with more details the shade of the trees on the wall.





## Procedure for the night shooting

### SHOOTING

#### Shooting colour without infra-red cut filter



Capturing the maximum range of colours when shooting, using colour temp and GMg adjustments, with the vectorscope.



### POST-PRODUCTION

#### Creating B&W during grading

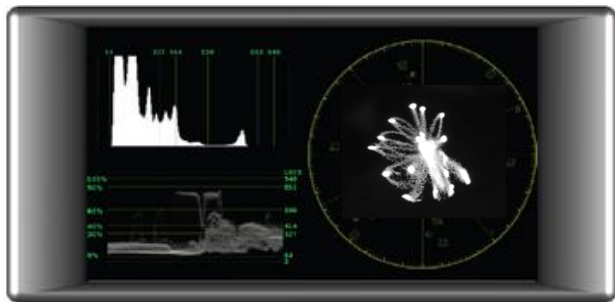


Choosing the colours in post-production, processing them, then finally turning them to Black & White.

**SHOOTING****WORKING ON THE VECTORSCOPE**

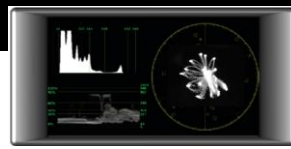
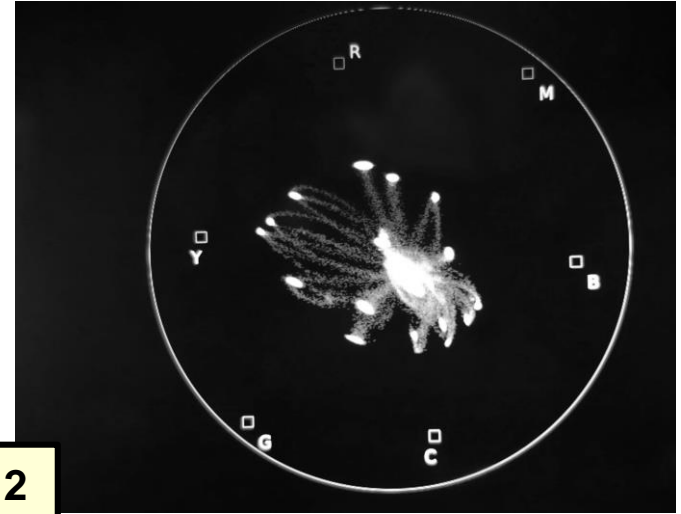
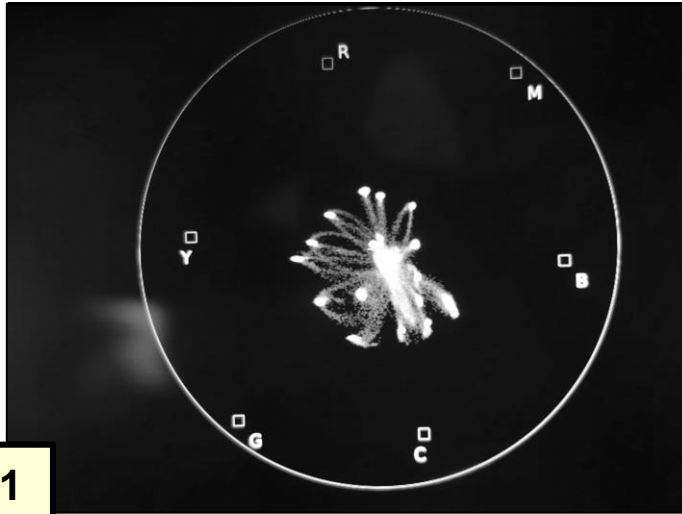
The aim was to keep an 'independent film' shooting style.

Therefore I used a simple and handy monitoring system, the Starlite Transvideo.



I used the waveform for the exposure, the vectorscope being accurate enough to ensure that the colour phases were correctly separated.



**SHOOTING****WORKING ON THE VECTORSCOPE**

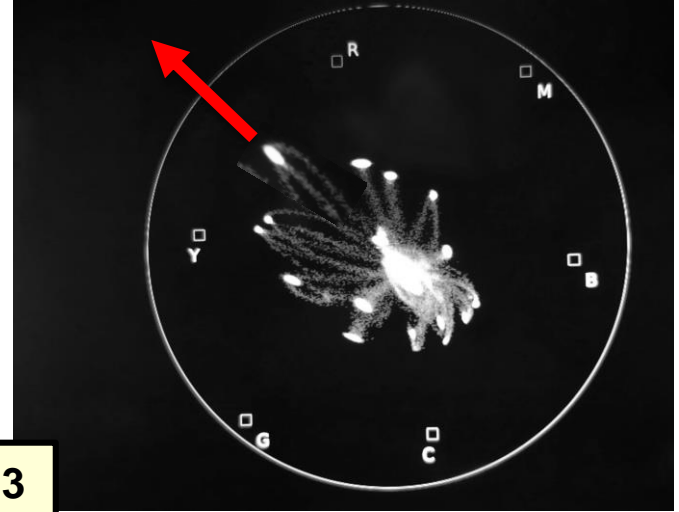
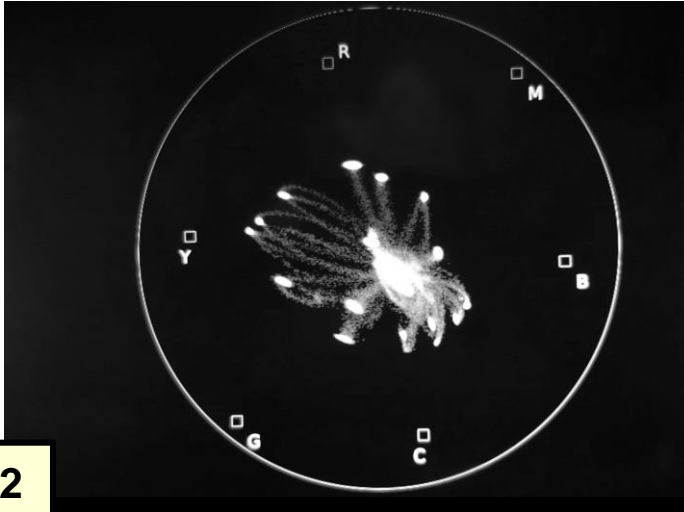
Selection of the colour temp and GMg (Green & Magenta) adjustments within the camera on the set, in order to obtain a better separation of colours.



**POST-PRODUCTION**

GRADING SESSION

INCREASING THE SEPARATION OF COLOURS



The 'gap' in the allocation of bits is largely offset by the calculators in the grading station. However, do not even try to perform the same operation with a basic grading software on your personal computer!



## SEPARATION OF THE COLOURS ON SET

SHOOTING

1



2



Analogy with a hand whose fingers would be spread in stretching them out.

Purpose: Prepare the separation/selection of colours



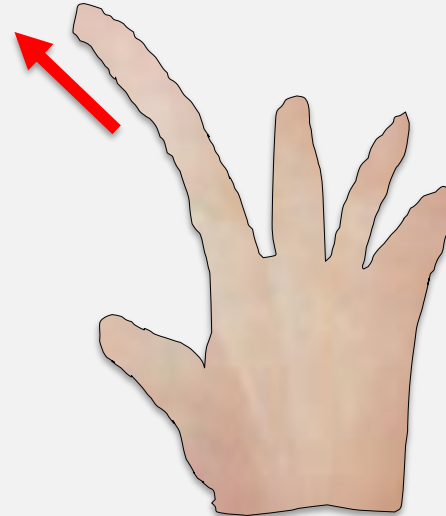
**POST-PRODUCTION**

**GRADING - STRETCHING THE PHASES**

2



3



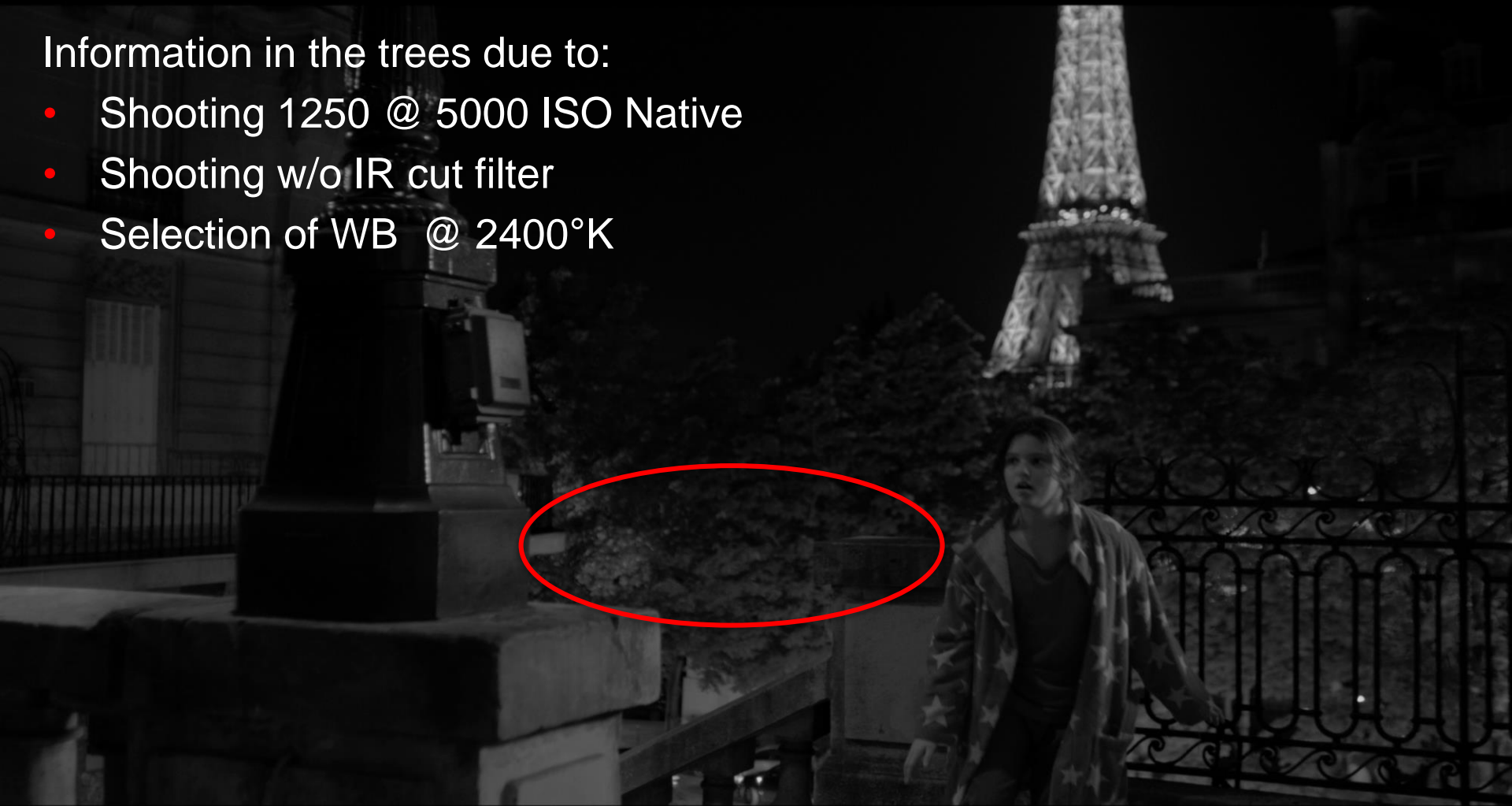
In post-production, the colourist will 'draw' one or more phases of colour he/she wants to bring out.

No, it's not painful!



Information in the trees due to:

- Shooting 1250 @ 5000 ISO Native
- Shooting w/o IR cut filter
- Selection of WB @ 2400°K



**POST-PRODUCTION**

Colourist

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Jerome Validire

**CINEMAGE**

**POST-PRODUCTION**

# COLOUR SELECTION

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Application

**UNDER THE PONT ALEXANDER III - LARGE SHOT**





Final grading



Recorded image V-Log w/o IR cut filter



Passage to B&W



First grading



Pass on Eiffel tower: selection of hue



Pass on little girl: selection of hue on stars of the dressing gown





Check in colour





Final grading

POST-PRODUCTION

# COLOUR SELECTION

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Research

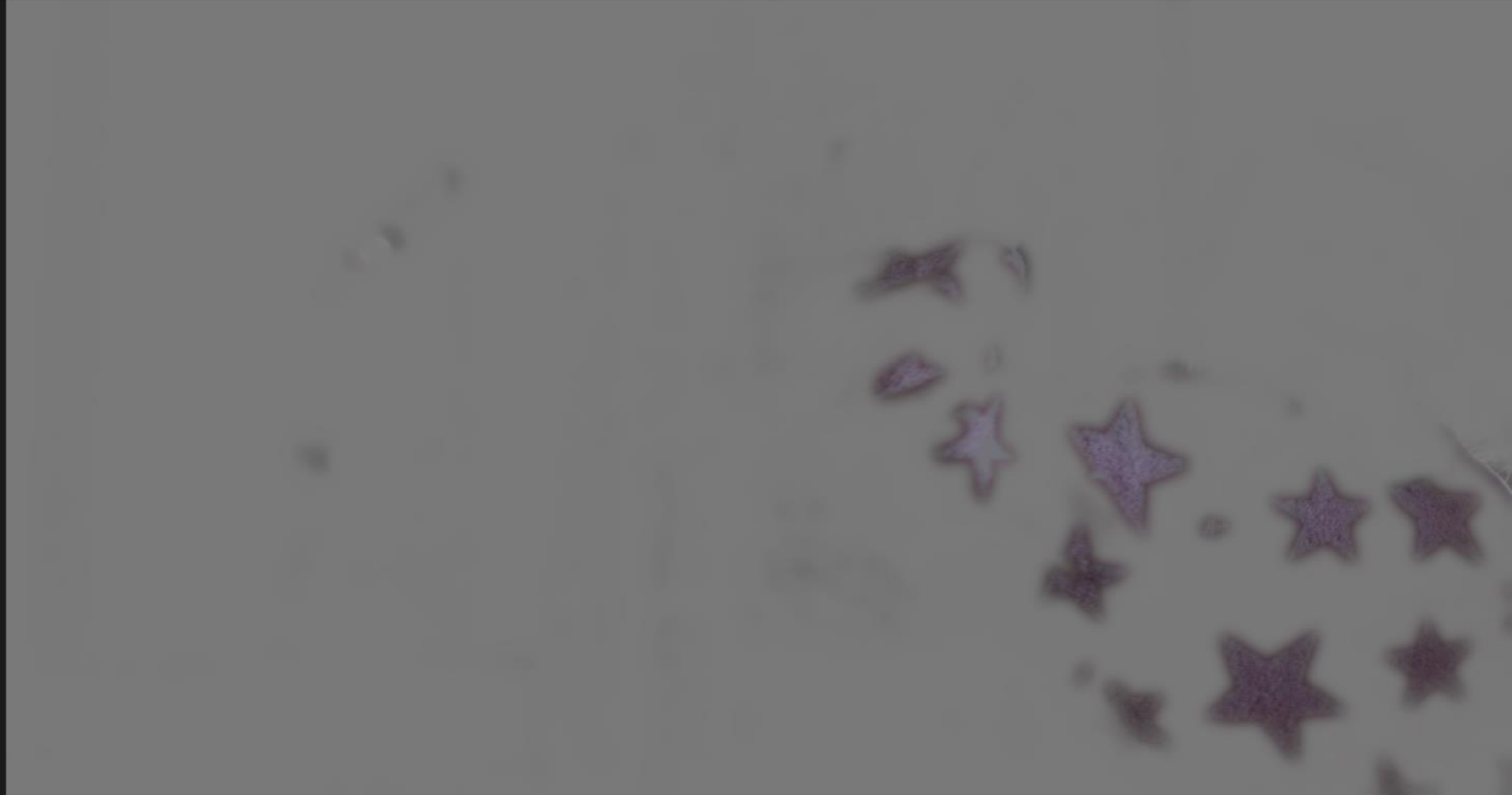
UNDER THE PONT ALEXANDER III - MEDIUM SHOT



Final grading



Check in colour



Pass on little girl: selection of hue on stars of the dressing gown



Pass on little girl: selection of hue on stars of the dressing gown



Before



After





Before the hue selection



After the hue selection - Final grading

**POST-PRODUCTION**

# COLOUR SELECTION

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Application

**THE STAIRS OF BERTON STREET**



Final grading



Recorded image V-Log w/o IR cut filter



Passage to B&W



First grading in colour - Selection of hue on stars of the dressing gown and of the shadow of the tree on the wall





Final grading

# Varicam LT

Panasonic



Point of view on the camera on set & through the grading session

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## Varicam LT

Panasonic



On set the camera offers a very good ergonomics with friendly access to the menus.

Even with this internal recording format (AVC-Intra 4K 10-bit 4:2:2 Vlog), we observe a lot of flexibility while grading.

These night tests with little light prove that, with more lighting resources or in case of a daylight shooting, a camera without IR cut filter and a colour temperature refining device - combined with the grading process, may offer a good deal of artistic possibilities in Black & White.

The V-Log by Panasonic proves itself quite efficient for these selections of colours on the way to a final result in Black & White.

# THE TEAM AND THE SPONSORS OF 'ESCAPADE'

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Special thanks to all of you!

STARRING

APPOLONIA ELIA AND BEN ELIA

PRODUCERS

BEN ELIA AND PHILIPPE ROS

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VARICAM

TECHNICAL PRODUCT MANAGER LUC BARA PANASONIC FRANCE



# SELECTION OF COLOURS

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Preliminary research on Colour and Black & White

## RESEARCH ON BLACK & WHITE AND COLOUR

“Citibot” Director: Ben Elia



<http://www.philipperos.com/content.php?id=67&page=1>

“Rock, Paper Scissors” Director: Baker Karim



<http://www.philipperos.com/content.php?id=67&page=1>

For many years now, whether on the camera with François Paturel, Christian Mourier (former engineer at Sony), then with Olivier Garcia (HDSystems), then in post-production with Laurent Desbruères, I have always sought to modify the rendering of an image through the creation of ‘digital stocks’.

In those two examples above, shot in colour then converted into Black & White during the grading phase, the Gamma curve set by Olivier Garcia helped me work from 1600 ISO to 6400 ISO without any noise in 4K on a F65.

Obviously the Gamma curves played a big part in this result but, less known is the work on selection and modification of colours.

## COMBINED WORK ON COLOUR: IN-CAMERA /DURING GRADING

This Black & White work performed on 'Escapade' offers a lot of similarities with the one we carried out on Black & White and colour straight into digital cameras.

First approach in the treatment of the camera, followed by a completion in the grading room.

Hence a major bias during the shooting, without any possibility of turning back, far from the 'comfort' of Raw. This work on Black & White is hardly repeatable in post-production, even with Raw. However, considering the present knowledge and techniques, we could as well imagine some sophisticated menus to enable a direct control on cameras, or even in post-production through a development of the Raw.

Regarding the Varicam LT, I could as well take advantage of the Matrix in addition to variation and saturation of the colour phases\* but, in doing so, I would have used the Rec.709 space without the V-Log that played a major role in the selection of colours.

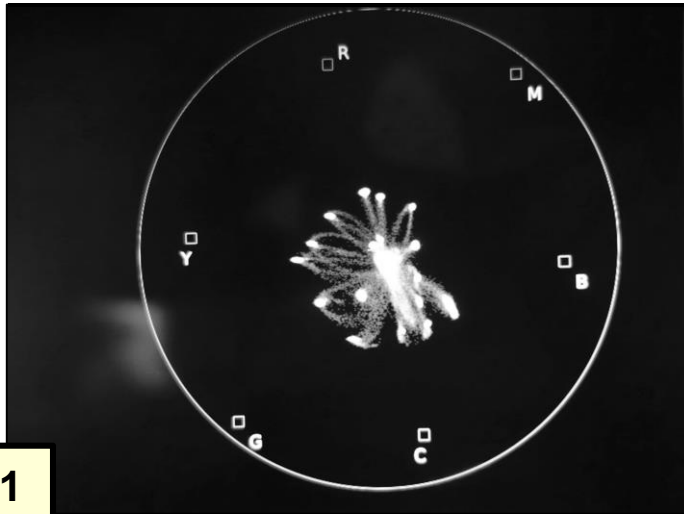
It is very much likely that manufacturers give these parameters back to the shooting teams.

What is at stake is a direct access to a wider range of artistic options, therefore to unseen images.

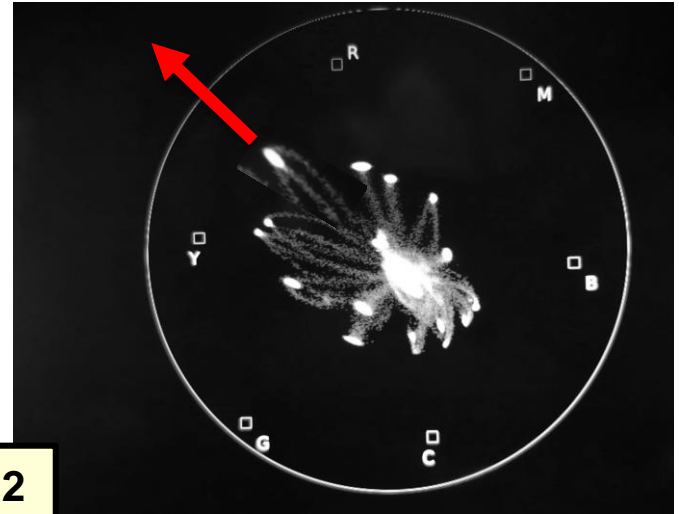
# COMBINED WORK ON COLOUR: IN-CAMERA /DURING GRADING

## SHOOTING

## INCREASING THE SEPARATION OF COLOURS ON THE CAMERAS



1

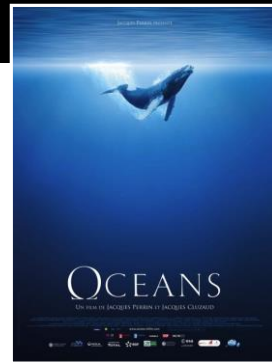


2

Keep in mind, and this is an important issue, that such a method inevitably generates a certain level of noise. This noise becomes noticeable if the parameters are pushed beyond a threshold only controllable in the screening room. Once again: do not try to repeat the trick with a simple grading software on your PC!

# COMBINED WORK ON COLOUR: IN-CAMERA /DURING GRADING

This method is similar to the one used in "Océans", splitting and modifying the colour phases through Multi-Matrix (variation and saturation of the different colour phases). The aim was to provide as much information to the colourist as possible. In the case of an underwater shooting in a green sea, between 0 and 30 feet depth, the phase setting in the Scene File



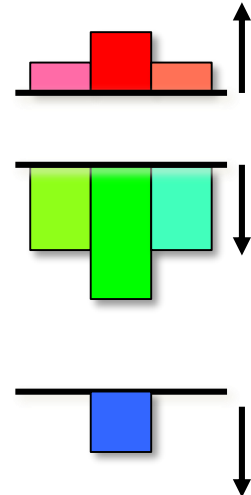
(SF) would amplify both red and magenta and at the same time would diminish green and cyan - and blue as well, but to a lesser extend.

**SF4 G**

GREEN SEA 0 -30 FEET

PAINT 11 MULTI MATRIX

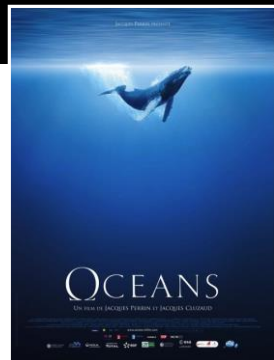
	B	B+	MG-	MG	MG+	R	R+	Y-
PHASE	0	23	45	68	90	113	135	158
HUE	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
SAT	-10	0,0	0,0	0,0	+5	+10	+5	0,0
	Y	Y+	G-	G	G+	CY	CY+	B-
PHASE	180	203	225	248	270	293	315	338
HUE	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
SAT	0,0	0,0	-15	-20	-15	0,0	0,0	0,0



# COMBINED WORK ON COLOUR: IN-CAMERA /DURING GRADING

In the case of an underwater shooting in a blue sea, at a deeper level this amplification would also affect the red, though with more power. Likewise, the decrease in blue and magenta would be stronger while green and cyan would mitigate substantially.

This method helped us 'bringing out' the red in depths where usually it doesn't appear.



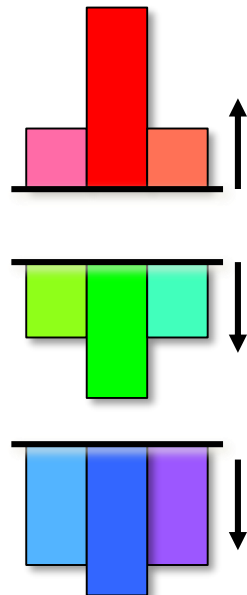
## SF5 B

MER BLEUE 10 - 25 m

In those days the Raw was barely born...

### PAINT 11 MULTI MATRIX

	B	B+	MG-	MG	MG+	R	R+	Y-
PHASE	0	23	45	68	90	113	135	158
HUE	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
SAT	-25	-20	0,0	0,0	+10	+25	+10	0,0
	Y	Y+	G-	G	G+	CY	CY+	B-
PHASE	180	203	225	248	270	293	315	338
HUE	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
SAT	0,0	0,0	-10	-20	-10	0,0	0,0	-20



# COMBINED WORK ON COLOUR: IN-CAMERA /DURING GRADING

An application in ‘B&W and Colour’ with a customized Matrix control in B&W with a single retained phase of colour - **saved during shooting** - can be seen in this short film demo: “Gare du Nord”

<http://www.philipperos.com/content.php?id=11&page=1>

This is an old HD film with cameras now obsolete, whose merit is to show that, if some functions are activated within the camera, it is possible to shape the Black & White and pick certain colours that will be increased later on.

But with strong bias during shooting. An extreme choice where Laurent Desbruères, the colourist, just ‘stuck the blacks’ before readjusting the chosen colour.



# Digital image in Black & White

## Other methods

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The following images have been created by **João Ribeiro (AIP)** on the film “Cartas da Guerra” directed by **Ivo M. Ferreira**. The colourist was: **Paulo Americo**.

Here is a very good example of a collaboration between a DP and a colourist for a magnificent final result (Alpha 7SII with internal recording 8-bit 4:2:0)

Any information upon this film available on the AFC website.

“Technical and artistic references extracted from the International Seminar DPC II de Focal in Lisbon”

<http://www.afcinema.com/References-techniques-et-artistiques-issues-du-seminaire-international-DPC-II-de-Focal-a-Lisbonne.html>





'Cartas da Guerra' Director: Ivo M. Ferreira - Cinematographer: João Ribeiro (AIP)



'Cartas da Guerra' Director: **Ivo M. Ferreira** - Cinematographer: **João Ribeiro** (AIP)



'Cartas da Guerra' Director: **Ivo M. Ferreira** - Cinematographer: **João Ribeiro** (AIP)

# REQUESTS TO MANUFACTURERS

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# REQUEST TO MANUFACTURERS

Filmmakers

Cinematographers

Colourists

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What do we need exactly?

What do we expect from cameras manufacturers and software companies specialized in grading?

# REQUEST TO MANUFACTURERS

A maximal control on the digital workflow

Friendly, simple menus

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As many parameters as possible opened on the camera

# REQUEST TO MANUFACTURERS

Simple, accessible menus and as many parameters as possible opened on the camera: these are not incompatible notions, quite the contrary.

We should be given access to several setting options such as:

- Menu documentary, “Run & Gun”
- Menu feature film (standard)
- Menu feature film (advanced)

This type of menu already exists more or less in certain cameras.

Such a request for a better control function-wise is part of the task endorsed by the Technical Committee (CCTC) of Imago\* I work in,

The purpose is, for any shooting team, to get access and be able to control the style and the image texture of the film they work on.

\*Imago is the European Federation of Cinematographers.

THANK YOU!

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Philippe Ros - Cinematographer AFC

[www.philipperos.com](http://www.philipperos.com)

2017