
HOT
SHOT
IR
Cinematography
Panasonic
COMPACT CINEMA CAMERA
EVA1

01

02

~ EVA1 × IR Cinematography ~

Towards a new creative world.

IR movie shooting will give rise to new possibilities in digital cinema. From now on, it will become a shooting option that creators will want to explore.
However IR movies are different from regular shoots in that it is difficult to grasp how invisible light will appear on screen. It depends on the subject and your surroundings, so there is no way of predicting what the final image will look like. It is hard to get the exact images you were envisioning going into a shoot.
In this IR Cinematography issue of HOTSHOT, we introduce visual artist Yuji NUKUI's latest work, "palette", on which he uses the Panasonic AU-EVA1 with the IR Cut filter off. He discusses his visual production process during which he conducted numerous tests to control infrared light in order to produce unique fantasy-like images for his work.
IR Cut filter off function：Digital cameras are normally equipped with the capability of turning off the IR (infrared) Cut filter. The VARICAM LT, one of Panasonic's digital cinema cameras, allows you to do this manually, and the AU-EVA1 provides this option with the touch of a button. The IR Cut filter's on/off button has made it possible to switch over easily to specialized IR filming.
This is how "IR Cinematography", a new shooting method, came to be.

IR Cinematography"palette"

Infrared Radiation

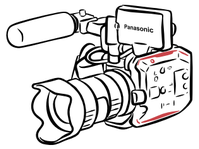
There are visible radiation (VI), ultraviolet radiation (UV), infrared radiation (IR) etc. in the sunlight reaching the Earth, and both infrared radiation and ultraviolet radiation are invisible light which cannot be seen by human eyes. The wavelength of sunlight is usually expressed in nm (nanometer). About 400nm~760nm is visible radiation, while 760nm~1mm is called infrared radiation. Furthermore, infrared radiation is divided into far-infrared radiation, middle-infrared radiation, near-infrared radiation, etc., and near-infrared radiation around 760nm~1400nm is generally effective for infrared photography. Near-infrared radiation as well as ultraviolet radiation, most strongly irradiate around 10am to 2pm during spring to summer time with high solar radiation in the warm climate like Japan.

IR Cut Filter

Almost all regular cameras are equipped with an IR cut filter so that the image can be viewed like seen on the naked eye. The filter that looks blue fixed in front of sensor is the IR cut filter. This eliminates the influence of infrared radiation to reproduce the same color as human naked eye because the image sensor of camera is sensitive to infrared radiation. The cutting point varies depending on the manufacture and camera, but the IR cut filter of Panasonic AU-EVA1 used for this shooting is designed to be cut around 700nm.
EVA1 and VARICAM LT are both designed to change the IR cut filter to a clear filter. VARICAM LT can be switched manually, while EVA1 can be done by one-touch.

Infrared Movie Shooting

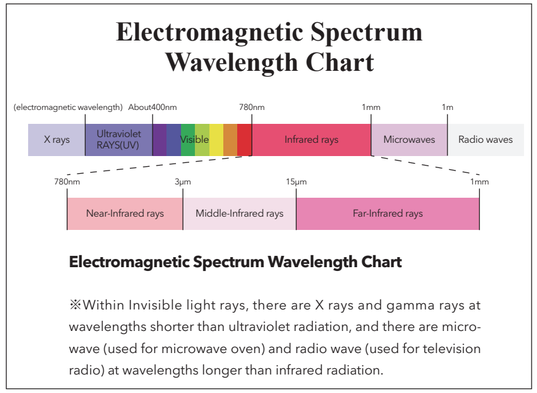
The Infrared shooting mixing near-infrared radiation light and a little visible radiation, has actually been done since film era by using IR filter. However, it required some experience to produce desirable image because it was difficult to manipulate both focus and shutter speed and guess the result until we develop the film. But since the effect is interesting, the IR shooting was used in many art photography works and was often used in record jackets of psychedelic rock album around 1960's.
EVA1 can shoot infrared color movie. The best part is that it can unlock the IR cut filter with a single touch. This is an epoch-making feature. Cinema cameras in general can obtain similar effects by using the IR filter, but they cannot get the eccentric texture of infrared image because the main light of near-infrared radiation is natively cut. Also, the effect and result differs from the sensor sensitivity. In general, it is necessary to know that an infrared shooting is not possible to shoot like a regular shooting because of the following reasons.



03

Elements of Infrared Movie Shooting

~ Before starting an infrared color movie shooting ~



Electromagnetic Spectrum Wavelength Chart

※Within Invisible light rays, there are X rays and gamma rays at wavelengths shorter than ultraviolet radiation, and there are microwave (used for microwave oven) and radio wave (used for television radio) at wavelengths longer than infrared radiation.

4 Basic Knowledge for Infrared Shooting

(1) Since infrared radiation is invisible light, you cannot actually see it on set and accurately measure the exposure of subject.
(2) Depending on the difference of reflectance of infrared radiation from the substance of subject, the reflection significantly changes.
(3) In order to make interesting image, you should choose certain useful area from near-infrared radiation area that something like IR pass filter can exclusively let it pass through.
(4) Then, you need to do color swap (color shift) infrared footages in some color grading system in order to see desirable "infrared-like-images".

In addition, shooting environment such as humidity and temperature seems to make different reflections.
Although IR cut filter OFF function of EVA1 greatly expands the possibility of infrared shooting, it is difficult to establish an attractive infrared image alone, and new creativity with experience and knowledge is required.
From here on, let's look into the world of the new "IR Cinematography".

Read More on the "HOTSHOT" Website

04

Elements of Infrared Movie Shooting ~ Before starting an infrared color movie shooting ~

"palette" IR Cinematography Image Sample

ST
STANDARD

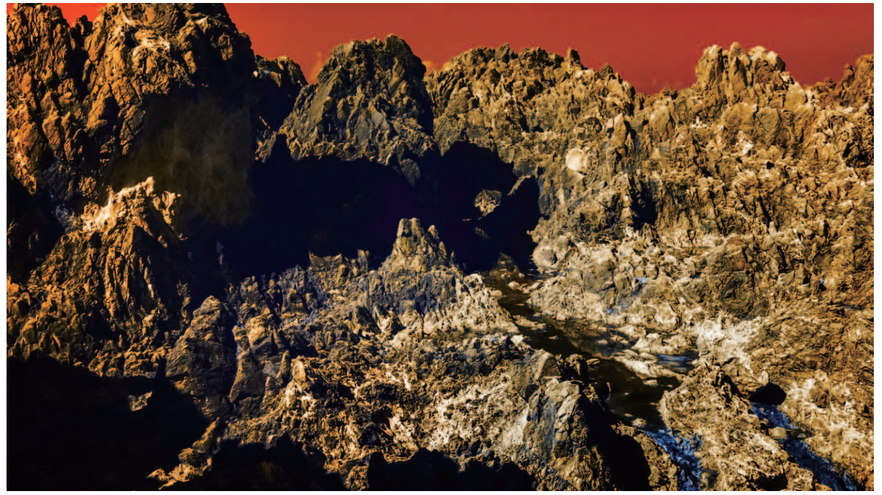
05

ST
STANDARD

Anna Peterson

IR
INFRARED

06



IR
INFRARED


4K
IR

"palette" IR Cinematography with AU-EVA1

"palette" is a challenging work of "IR Cinematography" about how we can take an advantage of IR shooting and apply it to storytelling while having IR cut filter OFF function of AU-EVA1 on its base. For a work, which is boldly used IR shooting for a creation of a new video project "CINEMA 41 (for one)" made by Yuji NUKUI (cinematographer), his team tested it for about 1 month before the shoot, checking infrared reflectance of stock materials, and studied shooting condition.
The shooting was performed based on the following 4 steps.

※Depending on the lens, stronger flare may occur because the regular lens' process of lens-barrel internal reflection and lens coating do not affect in the infrared shooting different from visible radiation shooting.

Read More on the "HOTSHOT" Website

Point 1

AU-EVA1 Camera Setting

IR Shooting → ON

COLOR SETTING
MAIN SCENE 1
(eV-LOOK1)

SCENE FILE SETTING
BLACK→M.PED -15
R.PED -5
G.PED -5
B.PED -15
PEDESTAL OFFSET OFF

GAMMA SELECT
→ V-504580L1

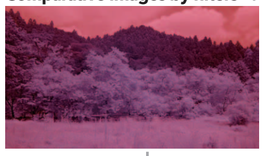
Color Temperature was set to 2000K in most of scenes, because Red color amount is reduced from RGB.

Point 2

IR Pass Filter

Set an IR pass filter of 3 different pass ranges (manufactured by STC Optical & Chemical Co.) in front of the lens depending on the scene you want to shoot. The IR pass filter partially cuts the near-infrared radiation and visible radiation.

Comparative images by filters



After color-swap

◎IRP 590

Captures infrared radiation including visible radiation area. (Interesting image can be obtained while making it easy to retouch)

○IRP 720

Cuts visible radiation + nearly monochrome (The Infrared image)

△IRP 850

Cuts visible radiation + narrower infrared radiation area = monochrome/high contrast

※Frequency of Usage ◎=often used, ○=used depending on the scene, △=seldom used (Comparative images by filters)

Point 3

IR Lamp

Use infrared ray projector to partially control the amount of infrared radiation for nighttime shooting and indoor shooting.

100W IR Lamp (custom made)
100W / Spot formulation 850nm x 2, 940nm x1 of Infrared ray lamp.

45W IR Lamp (Panasonic)
45W / Diffusion formulation 850nm Infrared ray lamp.

Special effect by mixing the projectors with regular lighting equipment

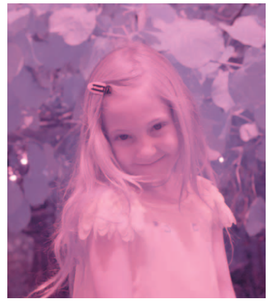
Point 4

Color Swap

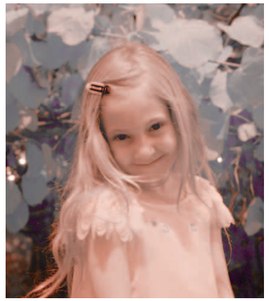
Color grading adjustment by DaVinci Resolve 15 after color swap processing by RGB channel change function.

※In the color mode setting of AU-EVA1 camera, compared to V-Log shooting, using scene files with the adjusted parameters is easier to control the color in post.

Infared original



After grading



DaVinci Resolve

IR
INFRARED

IR
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Anastasia S.

"palette"
Behind
the Scene

COLUMN

Creator's Voice

Yuji NUKUI〈"palette" Director & DP〉

IR Shooting made possible with the EVA1

IR filming has been around since the film era; it's not a new concept. If you simply load infrared film in a camera, you could shoot.
However, it would be necessary to revamp film cameras for today's digital shoots because there is an internal IR Cut filter in front of the camera's sensor. This is one reason why digital IR shoots haven't been possible until now.
In "palette", a fantasy piece currently in production, I use the Panasonic AU-EVA1, and the main reason for this is "the menu allows the IR Cut filter to be turned on/off at the push of a button." It is the only camera with this feature.
"palette" tells the story of a woman who was born with a sense of color that is different from everyone around her. During those moments where she reminisces about her childhood, we mostly used IR-shot scenes. In order to express the distinctive color of the world that only the protagonist can see, it was necessary to shoot in IR. You can switch quickly between IR and regular filming at the touch of a button in the menu, eliminating the need for an IR-ready camera in addition to a regular camera, and this facilitated things on set. It made the shoot more budget-friendly as well.
As expected, the amount of infrared light from the sun had a huge impact on each one of our exterior IR shoots.
On days when we were shooting, we had to deal with inconveniences caused by the weather or time of day, so it was a big plus schedule-wise that we could toggle between shooting IR and regular scenes.

IR Shooting On "palette"

"Shooting in IR" doesn't automatically create a cinematic mood or look. Shooting in IR was never the goal; the goal was to convey emotions and tell a visual story via images.
When attempting to conform to this idea while using IR, it becomes incredibly challenging. In other words, it is "creating work that is worthwhile."
With "palette" the major question was how to come close to achieving the image we envisioned. We conducted various tests over and over – tests of the materials for the shoot, of the time of day, and balancing regular and IR lighting.
IR lights are around on the Japanese market, but currently the only IR lights available were those made for use in small security cameras. Of course it is possible to conduct an IR shoot without IR lighting, but as much as possible, I wanted to achieve my vision, so our film team developed our own IR lights to try to achieve this. We wanted to avoid images lacking a sense of perspective typically seen in IR images.
There were so many things we had to keep in mind on set, but foremost was the need to rid ourselves of any pre-existing conceptions. You can't rely on your eyes or on a light meter to gage light and dark because it just doesn't translate. There's no predicting what color will be reflected on screen.
Creatives hoping to shoot IR from now on need to start from scratch and embrace curiosity, experiment, discover, and run tests. Concerning sequential art images, an important consideration was how to connect images that were shot on days with such different conditions and make them all work together.
The arrival of an IR-ready movie camera has broadened the range of visual expression that has never been seen before.
Naturally, it is well suited for music videos and experimental imagery, but it will also create interest when used in TV dramas, raising the question "How did they shoot that?"
Why?
Because IR shooting is "manipulating light which the eye cannot see to create a visual world."

Read More on the "HOTSHOT" Website

palette

Starring:
Anastasia S.
Anna Peterson

Production: CINEMA 41 is

Director / Director of Photography & IR Cinematography Supervisor: Yuji NUKUI

EVA1 Camera Operator & DIT: Yusuke TAMURA
Production Designer / Visual Effects: Kenichi TAKAHASHI (beyonDesign)
Gaffer: Keisuke KAMIJO
Location Support / Decoration: Kiyoshi TAKANASHI
Sound Design & composer: Masaaki ENATSU (marimoRECORDS)
Make up Artist : kico
Assistant Director: Saki MATSUMOTO
Behind the Scene Videographer : Hideaki TSUBAKI, Shogo IDOGAWA (Grid)
Drone & Camera Tech. / IR Lamp Productor: Toshihiro TSUBAKI (Grid)
Still Photographer: Mika INOMATA (Grid)
Production Assistant / ▶HOTSHOT Designer: Akira ASUKA
Film Editor: Shintaro HORI
Casting: Sadayuki MIZUSHIMA
Best Boy: Emi SAKURAI
Key Grip / Electrician: Akiyoshi CHO, Toshiki NAKAMATSU, Takaoki MISHIRO
Equipment Operator: Eiji SUZUKI (KUROSAWA Film Studio)
Generator Operator: Yuusuke SASAKI (Apache)
Translator: Emi OTSUBO, Hiroyuki HAGA

Special Supporter: Yuwa TAMURA, Mari TAKAHASHI

Special Thanks :

SIGMA
STC Optical & Chemical

KUROSAWA Film Studio
Apache Generator
Galden Sado
Senkakuwan Ageshima Kanko
Marupo
MANSIKKA
rendez-vous de brocante

Cover Photo: Yuji NUKUI (CINEMAFORCE)

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