Halogen Lamp - Elio - Cultural Heritage Science Open Source

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Elio is our general-purpose halogen lamp for imaging in the infrared spectral region as well as the visible range. You can use It for standard photography (VIS), infrared (IR) photography, and Infrared Reflectography (IRR). Elio is very light-weight and compact and it hosts common J78 halogen lamps that are easy to find in any hardware store, no-special-costly-nightmare-to-find bulbs. Maintenance of these lamps consists of only replace cheap bulbs.

> Download our 2018 catalog and check out its current cost.
>
> Download “Interested in our tools? Download our Catalog”
> — Catalog-2018.pdf – Downloaded 2690 times – 112 KB

- Projector style: flood light.
- Dimensions: 14 x 13 cm (5.5 x 5.1 in).
- Bulbs: R7S (78 mm), 150W, 110-240 V.
- Weight: 560 gr (1.23 lbs).
- Power cable length: 5 m.

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Bulbs maintenance. We ship each Elio lamp with the bulb mounted (150 W) and we include 2 spare bulbs. it is easy to replace the bulb and they are easy to find in standard hardware stores. Just ask for standard J78 halogen lamps. Using standard bulbs means low-cost maintenance and very long operational time for your purchase.

We ship each Elio lamp with the bulb mounted (150 W) and we include 2 spare bulbs.

Emission from VIS to IRR. These halogen lamps emit radiation from VIS to the IRR, so they can be used for both Technical Photography and Infrared Reflectography. Color Temperature (2800-3200 K).

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The Halogen lamps are set on their respective tripods for Infrared photography.

Select bulbs for 110 V or 220 V. The bulbs can be easily changed to work on 110 V (as in the USA) or 220 – 240 (as in Europe). Each lamp comes with 3 spare bulbs. Also, we chose the easiest halogen bulbs to be found when you ran out of our spare bulbs set. They are standard R7s J78 bulbs which you can conveniently find in hardware stores in your area or where ever you are traveling to.

Tripod included. Each lamp comes with its own tripod.

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The halogen lamp comes with its own light-weight tripod.

Power switch. Conveniently located close to the power plug to switch on and off the lamp during the technical photography documentation.

We are committed to providing an environment-friendly service. Our tools are shipped with a QR code that points to their relative web pages which contain all the information about the items. For your convenience, you can print out those web pages by simply downloading their pdf version. Check for the download links.

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Halogen Lamp - Elio - Cultural Heritage Science Open Source

Halogen lamp for infrared photography (IR) and Infrared reflectography (IRR)

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Halogen lamp for infrared photography (IR) and Infrared reflectography (IRR)

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Halogen lamp for infrared photography (IR) and Infrared reflectography (IRR)

All of our tools work on both 110 V (USA) and 220 V (European) voltages. You can use them worldwide. We provide our tools with the original European power plug and a **free** power adapter to USA or UK standards depending on your choice.

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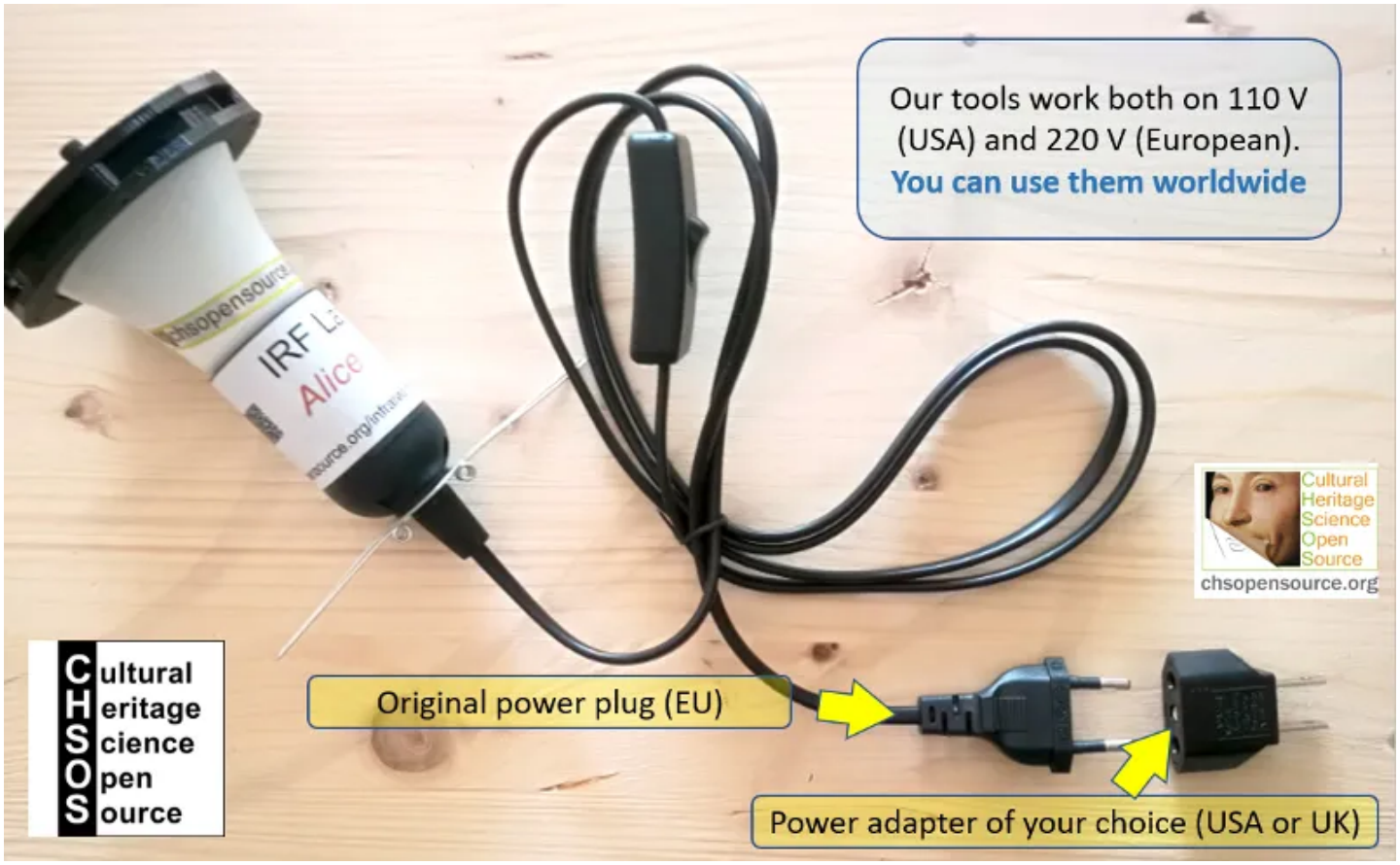

Infrared Photography (IR)

Infrared photography (IR) is used to detect underdrawing. IR is part of the Technical Photography documentation and it is used for the examination of many kind of artifacts.

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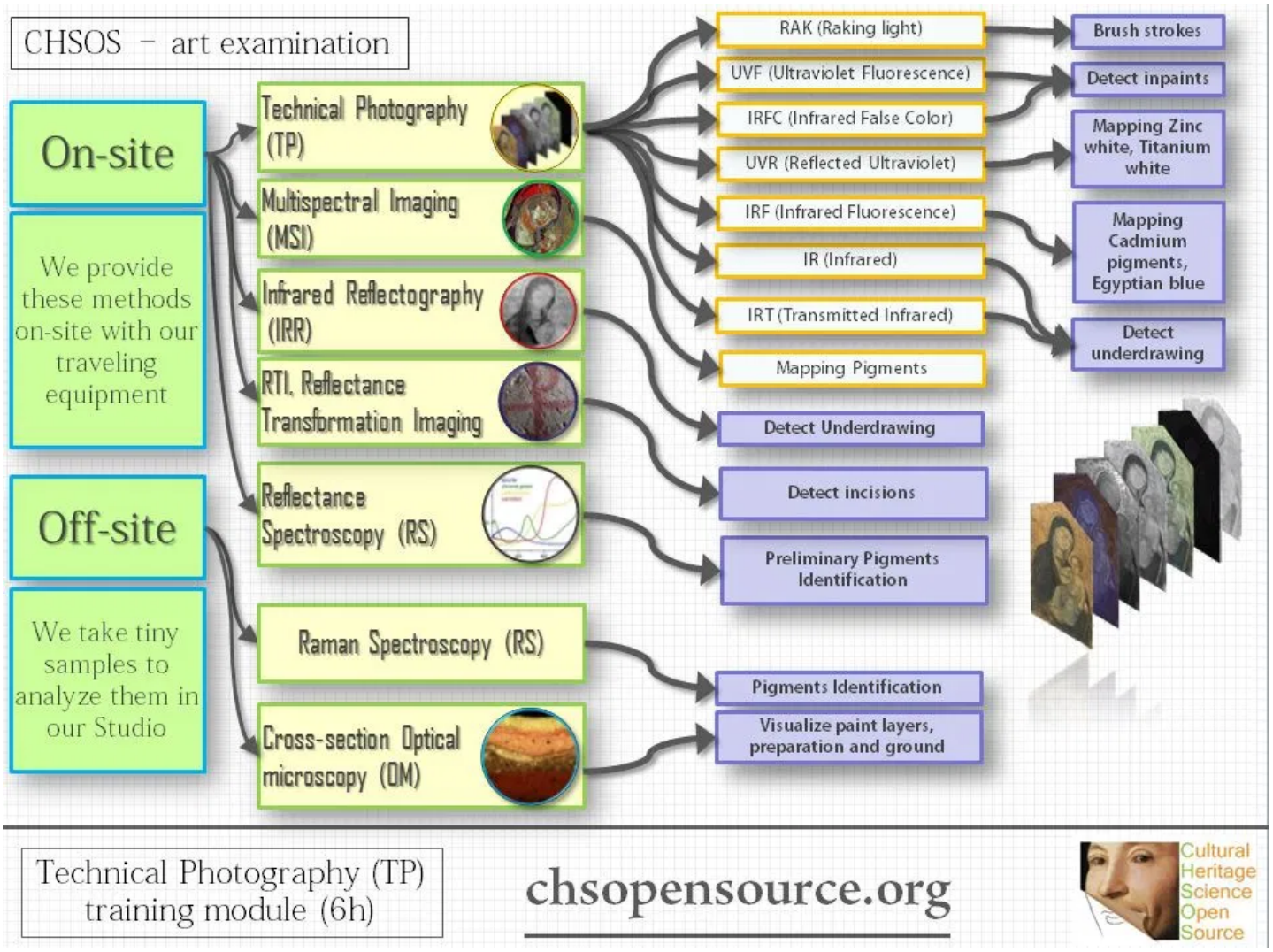

Infrared photography (IR) is an important part of a Technical Photography documentation of art and archaeology.

Photographic set up

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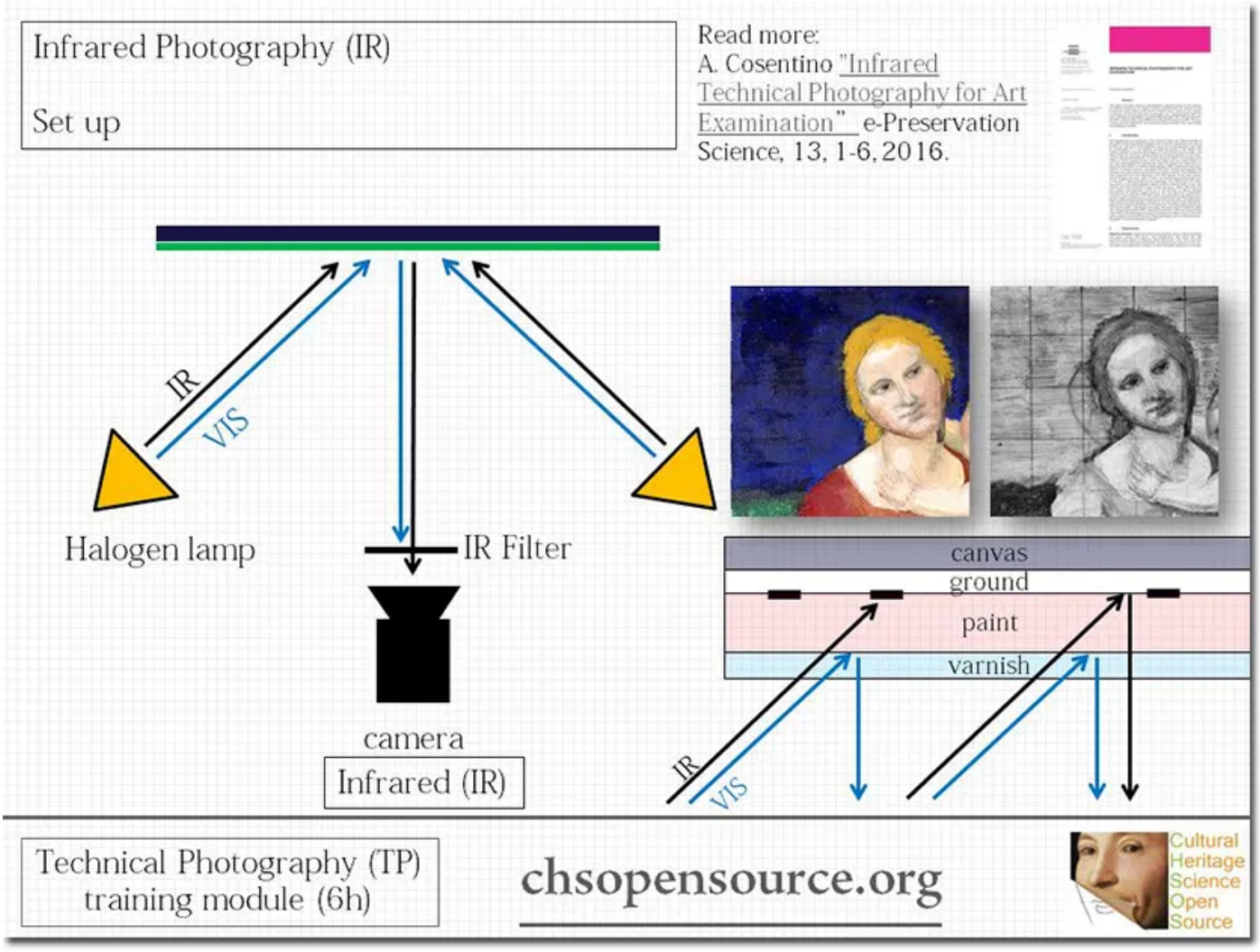

Infrared photography can detect underdrawing that absorbs infrared radiation such as carbon black paint.

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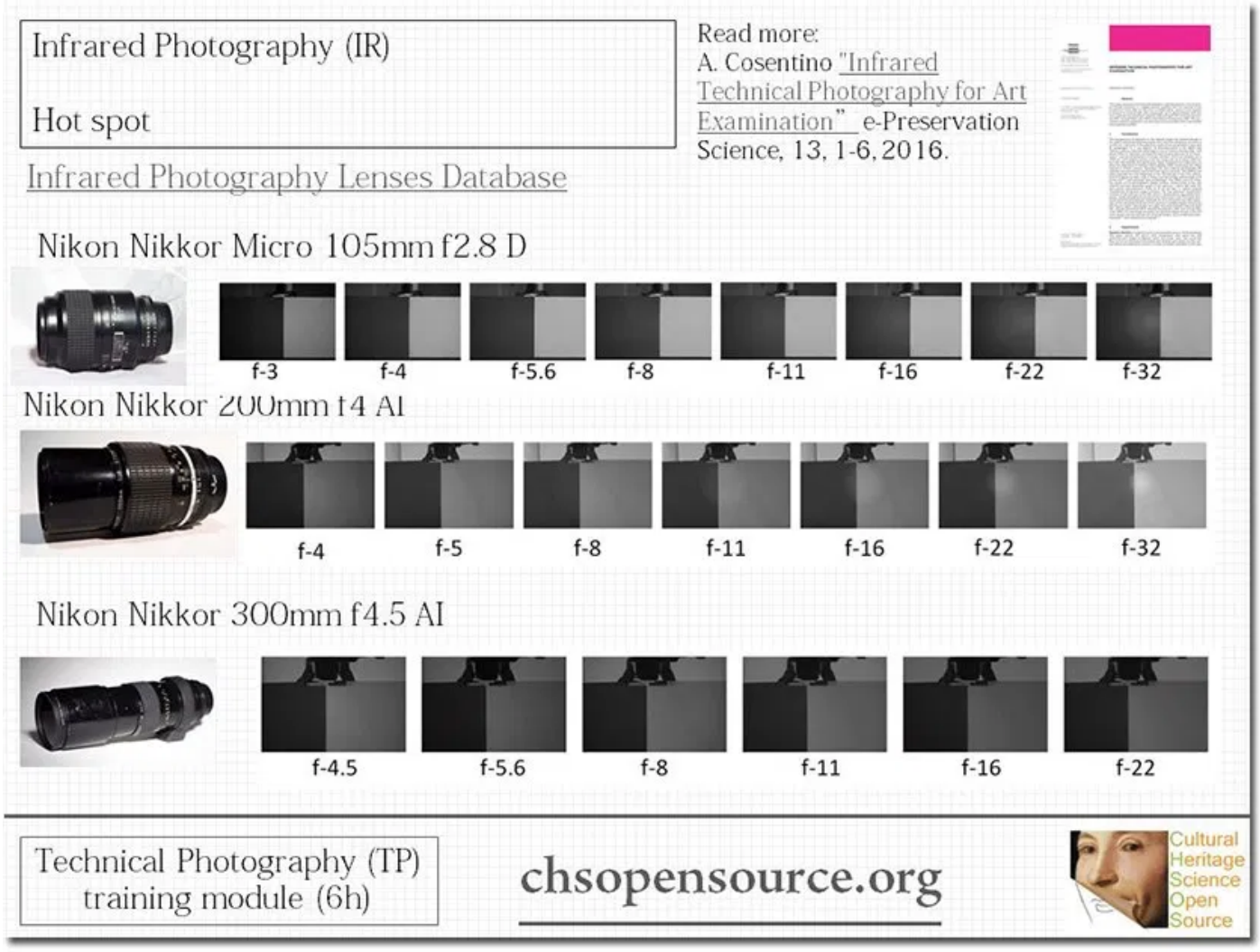

Normal photographic lenses can be used for infrared photography but look out for hot spots. Check out the Infrared Photography Lenses Database

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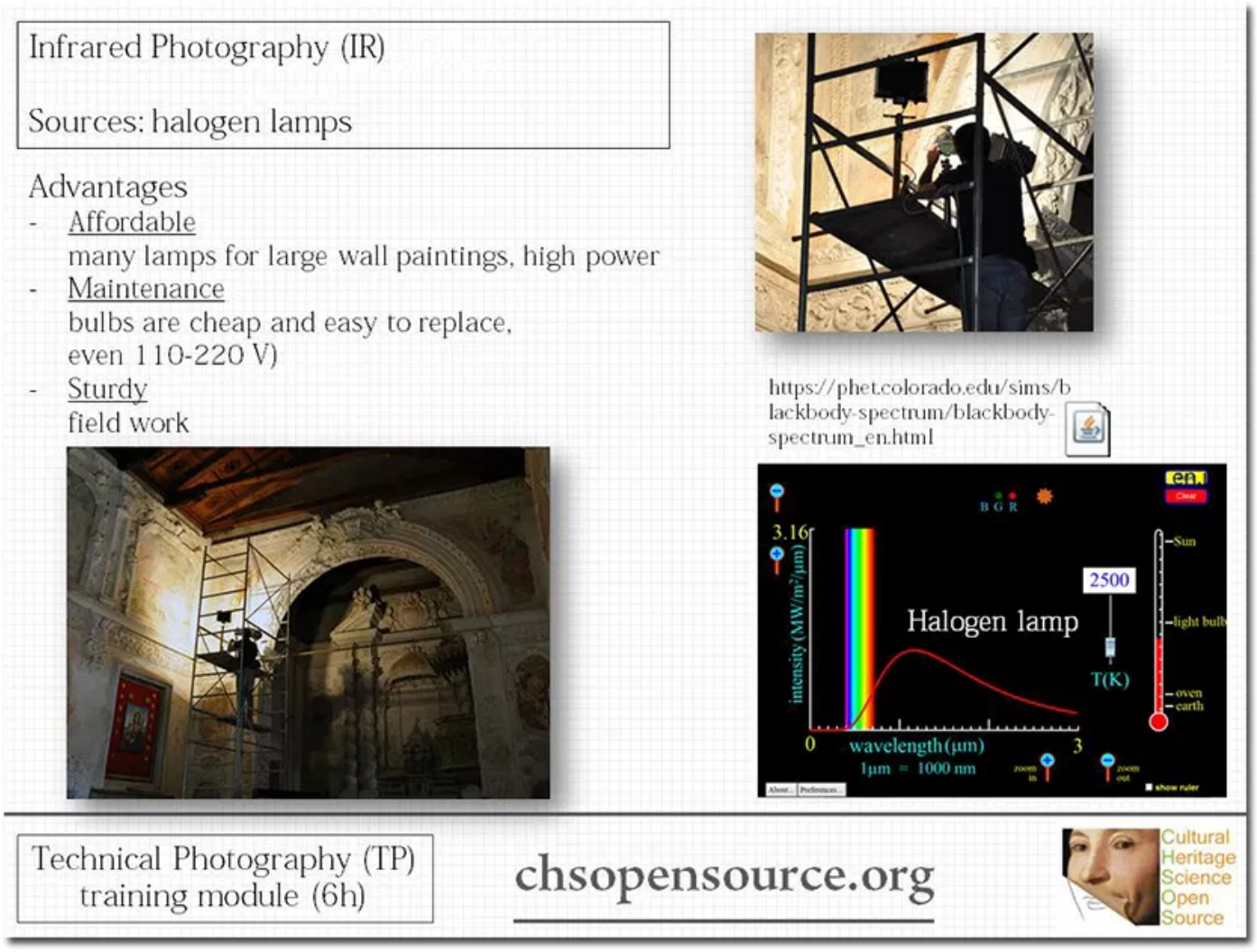

Halogen lamps are the best source of infrared radiation for documentation of large art works, such as wall paintings.

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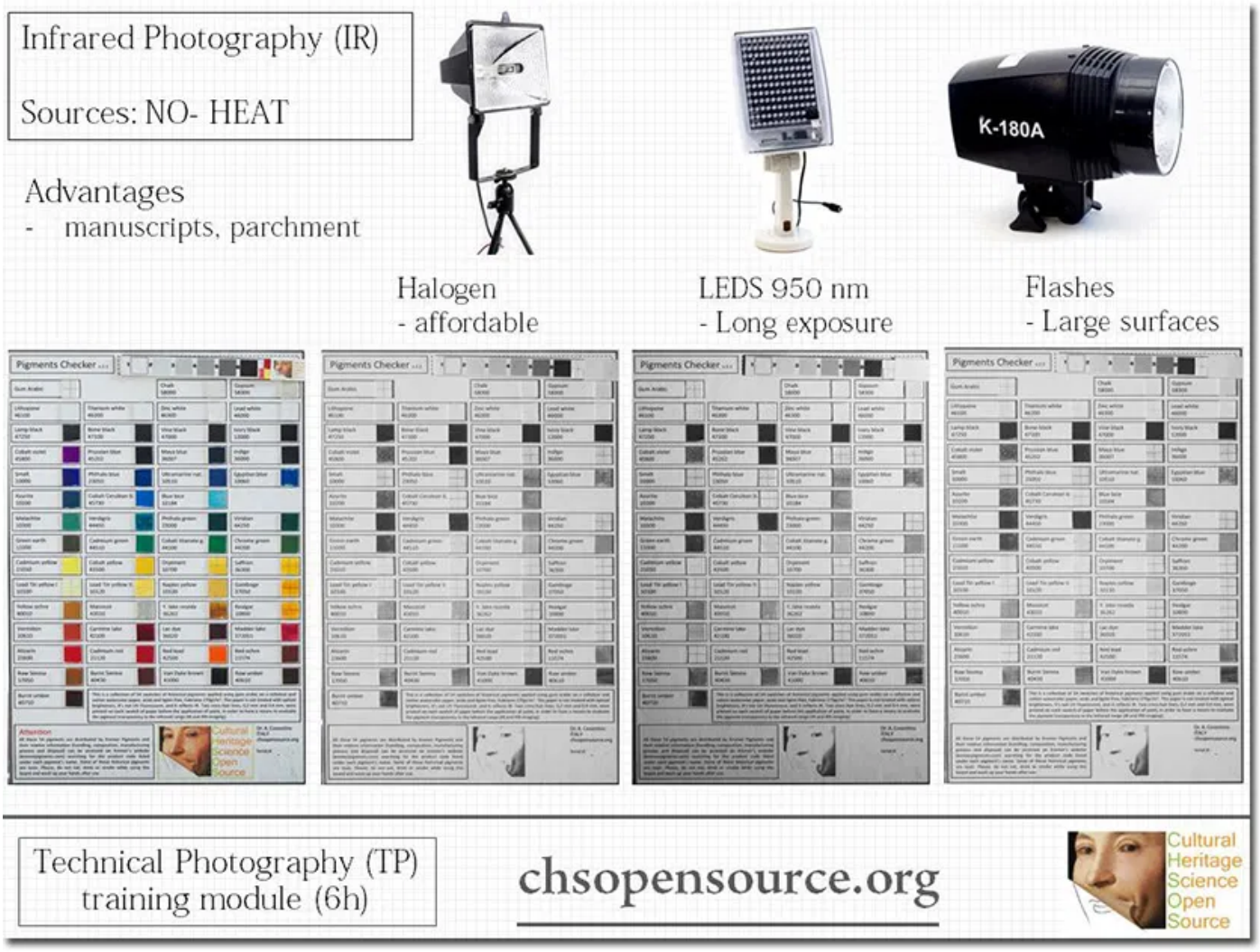

LEDs and flashes are suitable infrared sources for heat-sensitive materials such as manuscripts.

Applications in Art examination

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Pigments Checker is used to check which pigments become transparent in infrared photography.

IR versus IRR

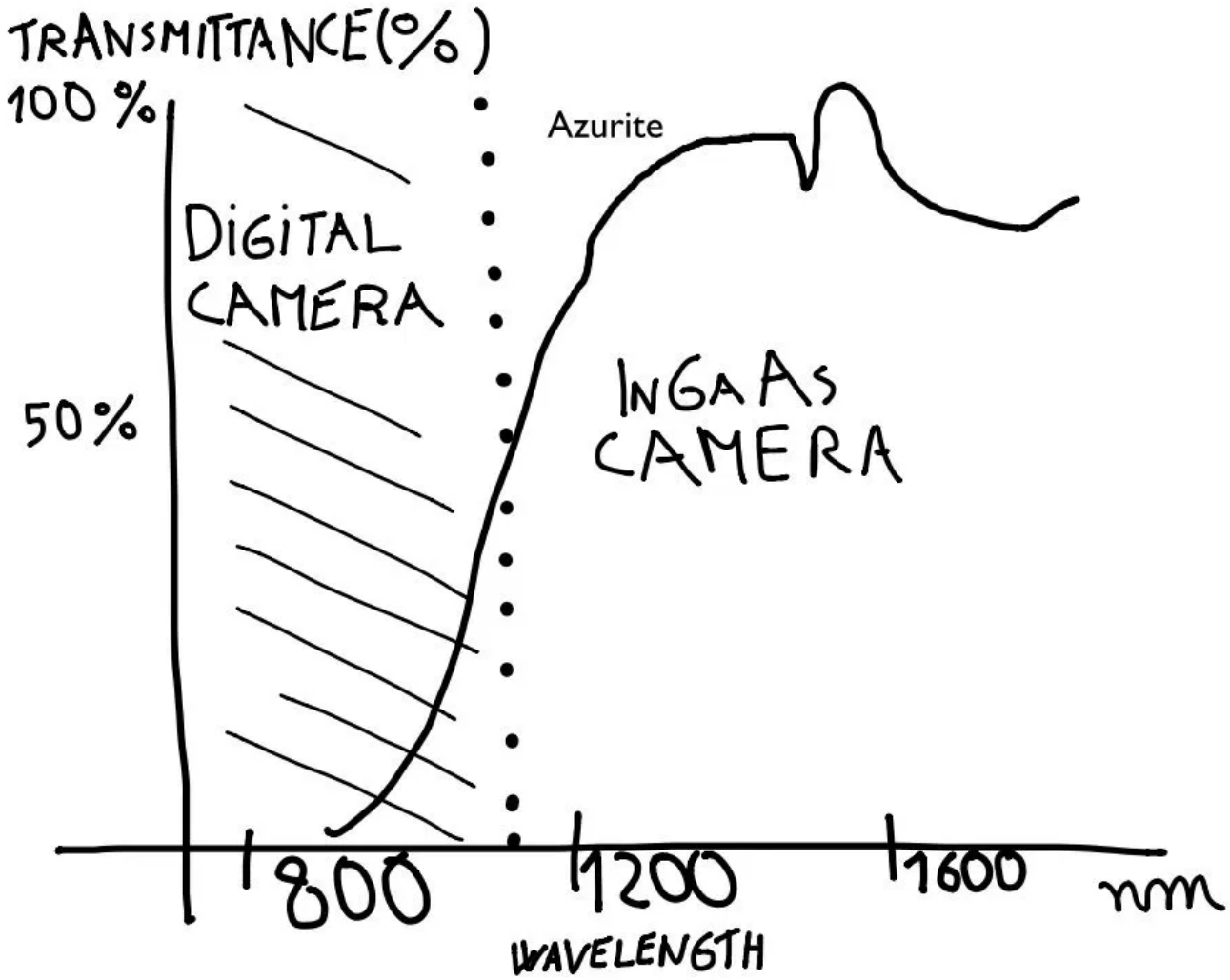
Infrared Reflectography (IRR) is imaging infrared over 1100 nm and up to 1700 nm or 2500 nm (depending on the imaging detector type). A full spectrum digital camera can record light until about 1100 nm while an InGaAs camera until about 1700 nm.

Pigments that are MORE transparent with an InGaAs camera

Some pigments become considerably more transparent at longer infrared wavelengths (i.e. using an InGaAs camera). This statement is true for some historical pigments, not for all of them. And in many cases the increase in transmittance is negligible.

Azurite, the affordable blue used in pre-industrial age European art, is an example of those pigments whose transmittance increases at longer infrared wavelength (IRR).

Increase in transparency using an InGaAs camera it's shown also by red ochre, Prussian blue, bitumen, burnt umber, Van Dyke brown, titanium white, phtahlo green, verdigris and yellow ochre.



Azurite is one of those pigments which benefit from the inspection with IRR rather than IR. Transmittance is already at about 50% in the range of a full spectrum digital camera. The InGaAs camera provides another 50% transmittance increase.

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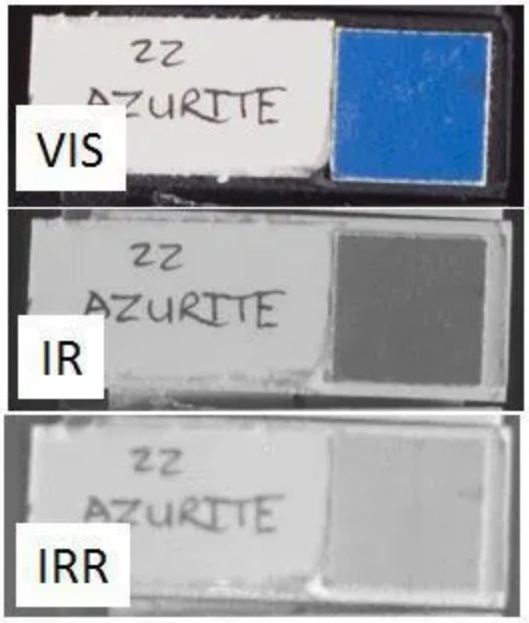
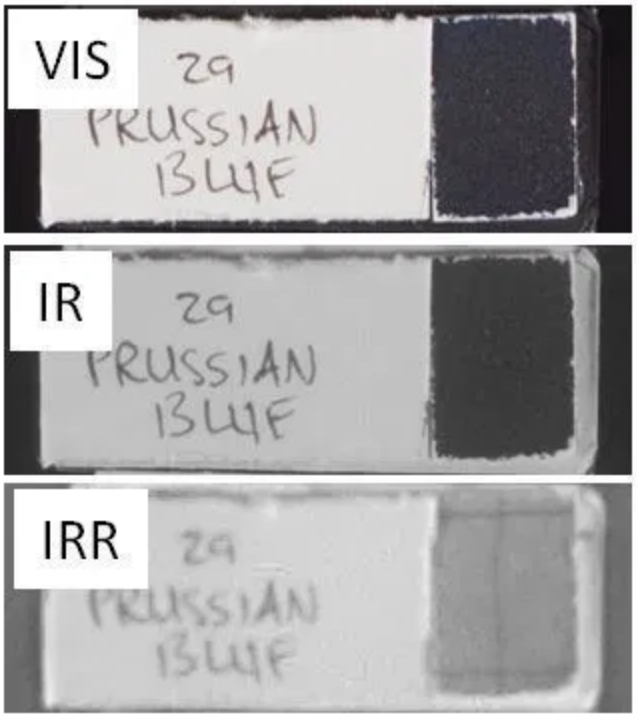


Azurite seen through a digital full spectrum camera (IR) and an InGaAs camera (IRR). The latter increases transparency of the pigment (a vertical underdrawing line becomes visible).



Prussian blue seen through a digital full spectrum camera (IR) and an InGaAs camera (IRR). The latter increases transparency of the pigment (underdrawing crossed lines become visible).

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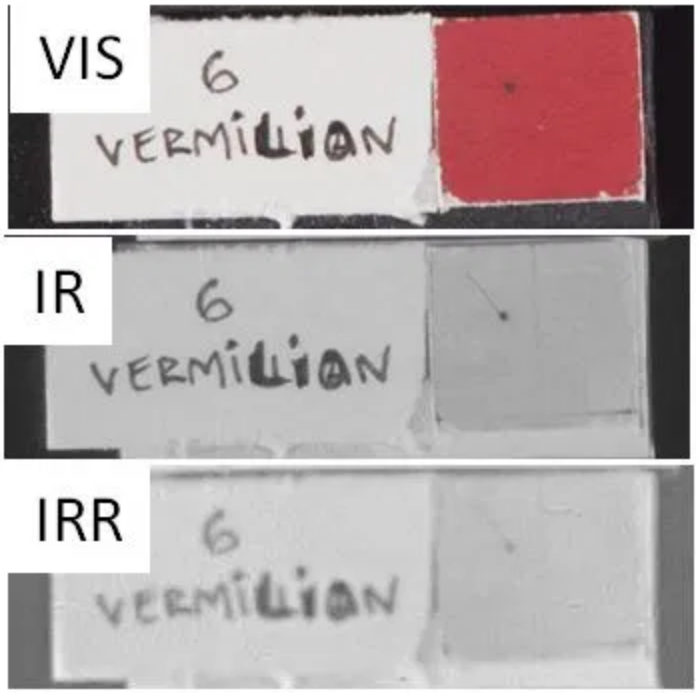
Pigments that have the SAME transmittance in digital full spectrum camera (IR) and InGaAs camera (IRR)

Vermilion is among the most used red historical pigments. It is common in oil and tempera paintings. The InGaAs camera does not increase its transparency, at all.

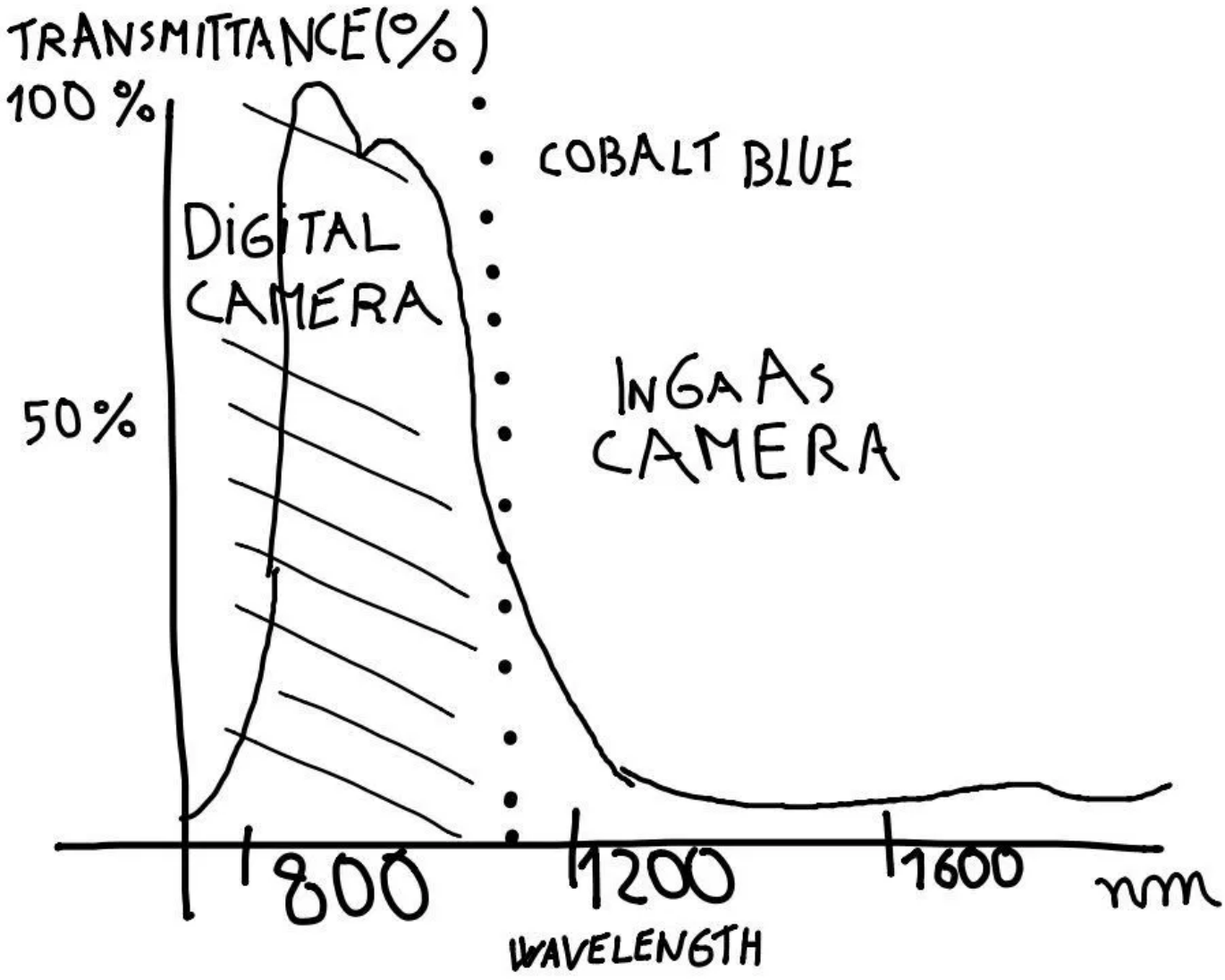
The same can be said for other pigments such as red lead, cadmium red, indigo and phthalo blue.



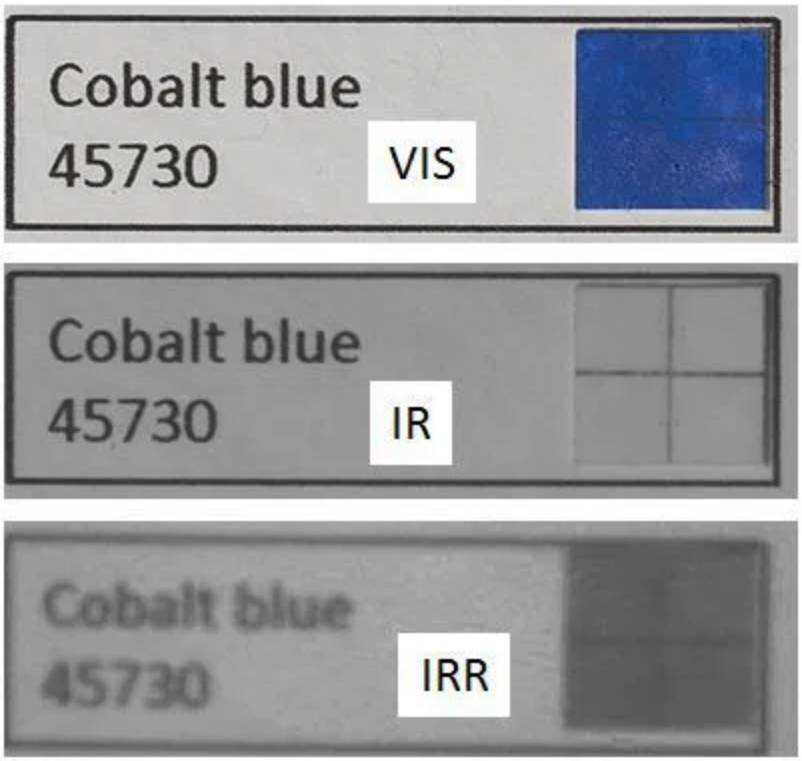
Vermilion seen through a digital IR modified camera (IR) and an InGaAs camera (IRR). The transparency is the same (a faint vertical and horizontal underdrawing line become visible in both IR and IRR).

Pigments that are LESS transparent with the InGaAs camera

Cobalt blue was loved by Vincent van Gogh who said to his brother Teo, 'Cobalt blue is a divine colour and there is nothing so beautiful for putting atmosphere around things...". Even if it seems counter intuitive, cobalt blue, cobalt green and smalt, are less transparent in the IRR (InGaAs) than in IR.



Transmittance curve for cobalt blue . Transmittance is higher in the IR range (digital full spectrum camera) than in the IRR range.



Cobalt blue seen though a digital full spectrum camera (IR) and an InGaAs camera (IRR). The transparency is less in the InGaAs image.

References

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Publications on Infrared Photography (IR)

A. Cosentino "Infrared Technical Photography for Art Examination" e-Preservation Science, 13, 1-6, 2016.

A. Cosentino "Identification of pigments by multispectral imaging a flowchart method" Heritage Science, 2:8, 2014.

A. Cosentino "Effects of Different Binders on Technical Photography and Infrared Reflectography of 54 Historical Pigments" International Journal of Conservation Science, 6 (3), 287-298, 2015.

Training Programs

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Technical specifications

Infrared Reflectography (IRR) allows to identify underdrawing and *pentimenti*. IRR is coupled with the panoramic method. It is performed with with a scientific camera that can image in the range 1000- 1700 nm. Pigments such as azurite, Prussian blue and malachite become transparent only in the far infrared at about 1500 nm. The imaging sensors of these cameras are small and numerous images are stitched together.

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Panoramic Infrared Reflectography (PIRR) is a valid alternative to the much more expensive scanners for Infrared Reflectography (IRR) The PIRR method consists of taking a series of images of a scene with a precision rotating head and then using panoramic software to align and stitch the shots into a single, seamless panorama. It can be implemented with consumer panoramic imaging tools, which can be upgraded following technical developments; as opposed to infrared scanners, which are products that cannot be modified. Self-assembled, modular equipment can be modified for specific tasks and upgraded with comparatively little funding, following technical and scientific developments in the consumer market, e.g. upgrading to an InGaAs camera with higher pixel count. The stitching software is easy to use; the overall panoramic method does not require specialized personnel or intensive training and, for these reasons the method is appealing to medium-small museums and private conservators who want to implement an affordable method to professionally document their collections.

Applications

Click here to visit our Artifacts categories

Learn this method. Our IRR Training module

The Panoramic Infrared Reflectography (PIRR) Training module provides technical insight on hardware and software tools for PIRR using budget equipment already available commercially for panoramic photography along with an InGaAs camera.

Topics

- Panoramic method
  - Stitching software,
  - InGaAs camera
  - Panoramic head
  - Arduino Controller

Infrared Reflectography for art examination, case studies review

Publications on Infrared Reflectography

A. Cosentino "Panoramic infrared Reflectography. Technical Recommendations " Intl Journal of Conservation Science, 5(1): 51–60, 2014.

A. Cosentino "Type II Super Lattice (T2SL) imaging technology for infrared reflectography of polychrome works of art" e-conservation Journal 5, 2016
Available online 15 March 2017.

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