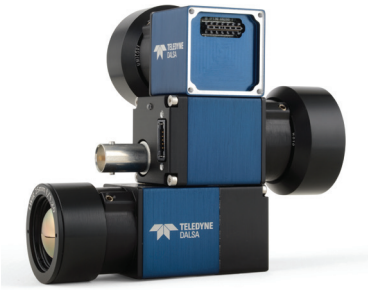
FAQ: Microbolometer Technology and Infrared

What is the difference between a microbolometer camera and uncooled cameras?
Basically none. The term "uncooled" has become a synonym for microbolometers, which are mainly used to image Long Wave Infrared Wavelength (LWIR).



Calibir 640 Series

What does LWIR stand for?
LWIR stands for Long Wavelength InfraRed. This is the part of the electromagnetic spectrum ranging from 8 µm to 14 µm.

What is the difference between an IR camera and LWIR cameras?
Frequently, the IR spectrum is grouped as Near Infrared (NIR), Short Wave IR (SWIR), Mid Wave IR (MWIR) and Long Wwave IR (LWIR). An "IR camera" refers to any one of these categories, whereas the LWIR specifically refers to the electromagnetic spectrum between 8 µm to 14 µm

What is a radiometric camera?
A radiometric camera is a thermal camera that can measure the absolute temperature of the target. Instead of outputting temperature as grayscale values it outputs real-world measurement in degrees Celsius, Fahrenheit or Kelvin. A radiometric version of Calibir is planned for introduction in the 2nd half of 2016.

What is the observable temperature range in the scene?
The temperature range that can be imaged depends on the gain setting of the camera. At lower gain the camera is able to image temperature differences in a single scene of about 120 Celsius degrees. In high gain this range is smaller. Although the Calibir can image this, it does not mean that this can be measured from the image. For this a radiometric design is required.

What does sun safe means? Is the camera sun safe?
The camera comes with a detector that offers a basic sun safe protection that is sufficient for most applications. If there are specific concerns about the conditions the camera is used, please contact Teledyne DALSA to discuss mitigations.

What are the advantages of uncooled over cooled?
Size, Weight, Power and Price. Uncooled technology is capable of providing compact and low cost LWIR imaging solutions as it does not require active cooling of the sensor. In general cooled cameras provide higher performance (lower NETD), but it comes at a cost.

What does TEC-less mean?
TEC-less means that the camera does not need/have a Thermo-Electric Cooler (TEC). Calibir is a TEC-less camera, which means that the camera corrects for any temperature drift that the detector is exposed to and that no temperature stabilization is required.

What is meant by Calibration?
Calibration is a procedure in which the camera behavior over a specified temperature range is measured; based on the measured data an algorithm is created that can compensate for any temperature change to which the camera is exposed.

What does NETD mean?
NETD stands for Noise Equivalent Temperature Difference. This is an important parameter that basically specifies what the smallest temperature difference is that the camera can detect. NETD is often specified at room temperature, an f/1 aperture and at 30 frames/s operation.

What are the common types of microbolometers?
There are two common type of microbolometers based on the type of materials used: microbolometers based on Vanadium oxide (VOX) and microbolometers based on amorphous silicon (aSi). The difference between the two is partly based on the fact and partly on perception. In general, Vanadium Oxide is more sensitive and this allows for lower NETD values. Amorphous silicon is considered cheaper because the process is better controlled and more uniform, which suggests a higher yield, and therefore a lower cost. The Calibir 640 series uses currently an amorphous silicon detector.

How does Shutterless operation work?
The shutterless operation is a further progression of the calibration of the camera. The camera carefully monitors itself at start up and from its first images determines the correction factors that are required to obtain consistently high quality images.

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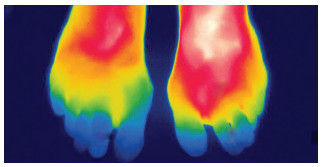
How does the Adaptive Contrast Enhancement work?
The contrast enhancement algorithm is basically monitoring the image content of a scene and then adaptively optimizes the contrast of the scene so that both hot and cold objects are visible in the scene.

Is the Calibir 640 Series controlled under ITAR regulations?
No. Teledyne DALSA has obtained a Commodity Jurisdiction Determination from the US Department of State, Directorate of Defense Trade Controls which confirms that the Camera is not subject to export control under the ITARs. (Reference DDTC Case CJ 0663-15). The Camera is however controlled by the US Department of Commerce under ECCN 6A003.b.4.b.

Is the Calibir 640 Series subject to export control in the US?
As noted, the US Department of Commerce has classified the Calibir 640 Series Camera under ECCN 6A003.b.4.b. Therefore, a DOC-issued license is required to export the Camera from the US. Currently, a license is not required to export the Camera from the US to Canada. Customers should confirm the applicable export requirements prior to export of the Camera from the US.



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