

Image Quality in Thermal Imaging Systems: THERMAL SENSITIVITY

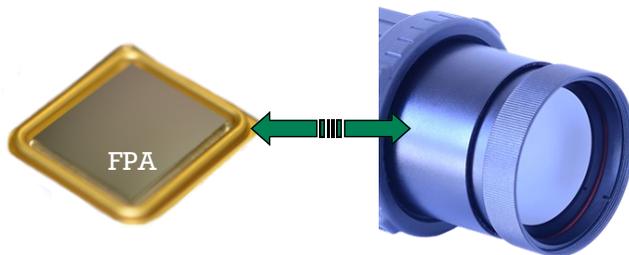
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How can you achieve a superb quality of thermal video image? Only by having a high-resolution thermal detector? There is another parameter that plays an important role in providing crisp image: thermal sensitivity. *Sensitivity* of a detector (FPA) determines the minimum temperature difference that a thermal detector can discern. It is a temperature value and usually expressed in milliKelvin (one-thousandth of a Kelvin). The lower the value, the higher sensitivity and, hence, the more detailed images a thermal camera can produce.

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Special points of interest:

- Defining Thermal Sensitivity
- Influence of lens' f-number
- Dare to Compare Leading Brands' Image Quality to GSCI's?



Sensitivity of 50mK means that the detector is able to distinguish two objects with temperatures of 11.25 and 11.75 degrees respectively.

However, there is a direct correlation between detector's thermal sensitivity and objective lens f-number. These parameters define **overall** sensitivity of a thermal imaging system:

$$\text{Overall Sensitivity} = \text{Detector Sensitivity} \cdot \text{Lens F-Number}$$

So if you have a thermal device with detector's sensitivity of 50mK and front lens f-number f/1.4 then the **overall** device's sensitivity is $50 \times 1.4 = 70\text{mK}$. The result implies that thermal image will be 40% less clear and accurate than that with f/1.0 front lens. So even a device with a very sensitive thermal detector would deliver poor performance if accompanied by a low-quality optics.

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Dare to Compare?

We have just discussed another parameter of a thermal imaging systems responsible for its performance: thermal sensitivity. When you shop around for a thermal imager, always ask a manufacturer for not only detector's sensitivity value but also device's front lens f-number. Quick calculation of **overall** sensitivity will help you ensure the device you are interested in meets your needs and expectations.



Next time we will be covering yet another important parameter of thermal imaging systems: refresh rate. *Meanwhile we invite everybody to compare characteristics of GSCI thermal imaging systems to those from the next leading brands.*

References:

1. http://en.wikipedia.org/wiki/Noise_equivalent_temperature_difference



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