Wednesday, December 9, 201

IMAGING Tech Pulse

PHOTONICS MEDIA

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Imaging & Sensing Tech Pulse is a special edition newsletter from Photonics Media and Raptor Photonics covering key developments in imaging & sensing technology.

Reduced to the Essentials — Portable Imaging Gets High-Tech

Capable of providing streamlined access to medical data in real time, and with the ability to perform diagnostics in remote areas, portable imaging technologies for medical applications are of increasingly significant interest to medical practitioners and technology companies alike.

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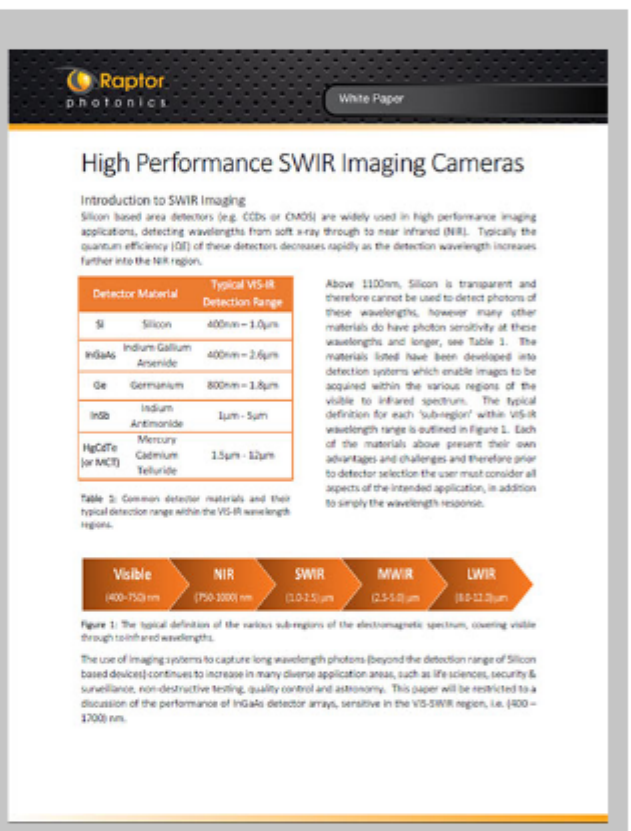
PROMOTED CONTENT

Raptor Photonics Ltd.

High Performance SWIR Imaging Cameras

Silicon based area detectors (e.g. CCDs or CMOS) are widely used in high performance imaging applications, detecting wavelengths from soft x-ray through to near infrared (NIR). Typically the quantum efficiency (QE) of these detectors decreases rapidly as the detection wavelength increases further into the NIR region.

The use of imaging systems to capture long wavelength photons (beyond the detection range of Silicon based devices) continues to increase in many diverse application areas, such as life sciences, security and surveillance, non-destructive testing, quality control and astronomy. This paper will discuss the performance of InGaAs detector arrays, sensitive in the VIS-SWIR region.


Raptor photonics — White Paper

High Performance SWIR Imaging Cameras

Introduction to SWIR Imaging

Silicon based area detectors (e.g. CCDs or CMOS) are widely used in high performance imaging applications, detecting wavelengths from soft x-ray through to near infrared (NIR). Typically the quantum efficiency (QE) of these detectors decreases rapidly as the detection wavelength increases further into the NIR region.

Detector Material		Typical VIS-IR Detection Range
Si	Silicon	400nm – 1.0μm
InGaAs	Indium Gallium Arsenide	400nm – 2.6μm
Ge	Germanium	800nm – 1.8μm
InSb	Indium Antimonide	1μm - 5μm
HgCdTe (or MCT)	Mercury Cadmium Telluride	1.5μm - 12μm

Table 1: Common detector materials and their typical detection range within the VIS-IR wavelength regions.

Above 1100nm, Silicon is transparent and therefore cannot be used to detect photons of these wavelengths, however many other materials do have photon sensitivity at these wavelengths and longer, see Table 1. The materials listed have been developed into detection systems which enable images to be acquired within the various regions of the visible to infrared spectrum. The typical definition for each 'sub-region' within VIS-IR wavelength range is outlined in Figure 1. Each of the materials above present their own advantages and challenges and therefore prior to detector selection the user must consider all aspects of the intended application, in addition to simply the wavelength response.

Visible (400–750) nm | NIR (750–1000) nm | SWIR (1.0-2.5) μm | MWIR (2.5-5.0) μm | LWIR (8.0-12.0)μm

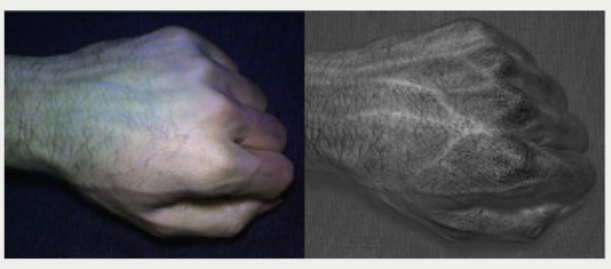
Figure 1: The typical definition of the various sub-regions of the electromagnetic spectrum, covering visible through to infrared wavelengths.

The use of imaging systems to capture long wavelength photons (beyond the detection range of Silicon based devices) continues to increase in many diverse application areas, such as life sciences, security & surveillance, non-destructive testing, quality control and astronomy. This paper will be restricted to a discussion of the performance of InGaAs detector arrays, sensitive in the VIS-SWIR region, i.e. (400 – 1700) nm.

Download White Paper

Camera Offers Multispectral Imaging for Consumers

A consumer-grade multispectral camera could help users find the best avocado at the grocery store or allow video games to distinguish between players by the features of their hands.



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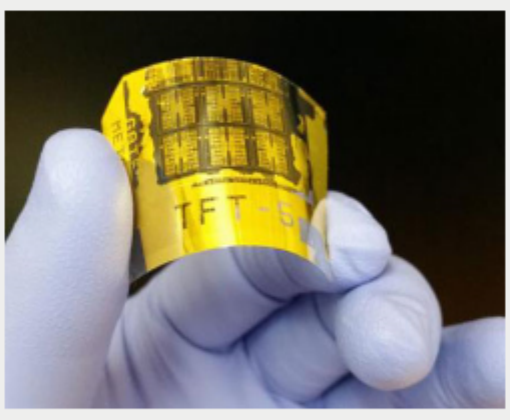
Record-Setting Phototransistor is Flexible and Sensitive

Inspired by mammals' eyes, a record-setting phototransistor could improve the performance of myriad products — from digital cameras, night-vision goggles and smoke detectors to surveillance systems and satellites — that rely on electronic light sensors.



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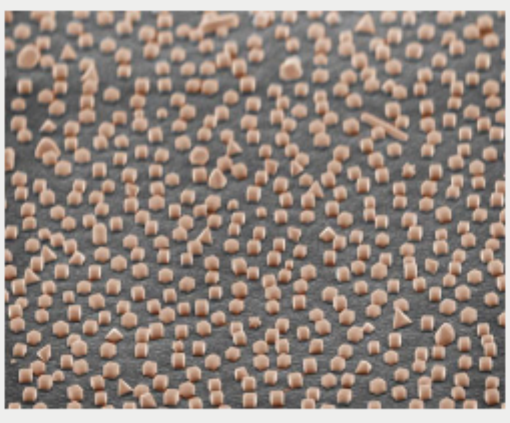
Plasmonic Absorbers Capture Specific Wavelengths

An experimental fabrication technique has created perfect absorbers for small bands of the electromagnetic spectrum from visible light through the near-infrared. The technique could allow advanced thermal imaging systems to be produced more quickly and inexpensively and with higher sensitivity.



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