

## **Banpil Photonics, Inc. issued with patent for multispectral image sensor with capabilities for next generation imaging applications**

### **Banpil sensor 4-in-1 band coverage of entire wavelength - near uv, visible, near IR, shortwave IR - in single "monolithic" sensor performing multi-functions at low power and cost effective**

SANTA CLARA, California - July 1, 2009 - Banpil Photonics, Inc., a leading company in expanding the boundaries of optics and electronics through innovation, today announced that it has been issued with a new patent that covers its multispectral (also known as multicolor or broadband) image sensor technology. Banpil's broadband image sensor is capable of a broad spectral range (below 300 - 2500 nanometers) and high sensitivity varying from ultraviolet to visible to shortwave infrared (IR) light.

This is the second patent in Banpil's image sensor portfolio in the revolutionary technology, which the company sees replacing current image sensors. Solid-state image sensors with higher resolution are used in many commercial and light imaging applications. Such sensors typically comprise of CCD (charge coupled device) or CMOS image sensors fabricated from silicon technology. However, the detectable spectral ranges of CCD/CMOS are limited to wavelengths below 1000 nanometers where silicon exhibits absorption. In addition, CCD and CMOS image sensors have other shortcomings such as the inability to achieve high-speed response combined with high quantum efficiency over a broad spectrum.

CCD and CMOS sensors are mature technologies that have revolutionized imaging in many applications. However, they have limitations that render these sensors nearly useless in less than perfect visibility conditions like rain, fog, and most of all at night in automotive applications or in medical imaging of the insides of our bodies, and in security surveillance in poorly lit areas, for instance.

"It is highly desirable to design a monolithic image sensor array, offering high quantum efficiency combined with high speed over broad spectral ranges, and the possibility to rapidly and randomly address any pixel," noted Banpil CEO, Dr. Achyut Dutta. "We are very pleased and proud to obtain this patent after the successful demonstration of our new broadband technology as a next generation solution to imaging sensor requirements."

The patent issuance and addition to Banpil's portfolio will allow the company to now more readily work with other technology companies in joint R&D to develop next generation applications and also to license the image sensor portfolio for third party application product development. "Our significant breakthrough will provide licensees and partners a sustainable competitive advantage because our

sensor will enable sensing capabilities across the entire wavelength region ranging from near ultraviolet light (UV), to visible light, past near infrared (NIR) to shortwave infrared (SWIR), all within a monolithic sensor, and therefore quite cost effective," added Dr. Dutta.

In addition, Banpil's image sensor meets the next generation imaging systems requirement of a single sensor that covers multiple spectral bands and that can be used for different applications. This will enable a large number of end users to take advantage of economies of scale for inexpensively manufacturing of the multispectral image sensors. The use of a single sensor with multifunctional capability can make applications small, light, and of low-power requirement.

Banpil's multispectral image sensor will have applications in consumer electronics like mobile camera phones and digital cameras enabled with night vision functionality, industrial applications like automobile sensors and machine vision, medical imaging applications such as disposable endoscopes and camera pills, and defense and security applications such as high sensitivity surveillance cameras and night vision gear. The sensor will also have scientific applications in space spectroscopy and remote sensing as well as in communications. The addressable market size for applications that will most benefit from Banpil's innovation is estimated to exceed \$3.5 billion by 2013 according to various analyst research firms including Frost & Sullivan, Strategies Unlimited, and iSuppli.

Banpil has made sample-level sensor array products available for demonstration. The company welcomes opportunities to work with application developers to explore new or enhanced applications including joint product development, licensing, manufacturing partnerships as well as camera IP core partnerships. Banpil is also actively seeking licensees, strategic partnerships with camera manufacturers, and investors.

#### **About Banpil Photonics, Inc.**

Banpil Photonics develops and licenses fundamental technology expanding the boundaries of optics and electronics. The company has developed an extensive IP portfolio of high-speed interconnects, multispectral image sensors, and high-efficiency photovoltaic technologies. Banpil innovations enable the development and manufacture of new generations of low-cost, high-speed electrical interconnects for chip-to-chip, chip-to-board, board-to-board, and rack-to-rack applications; multispectral image sensors for automotive & medical imaging, mobile, security, remote-sensing, and communication applications; and photovoltaic technology for solar cell applications. For more information, visit [www.banpil.com](http://www.banpil.com).

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