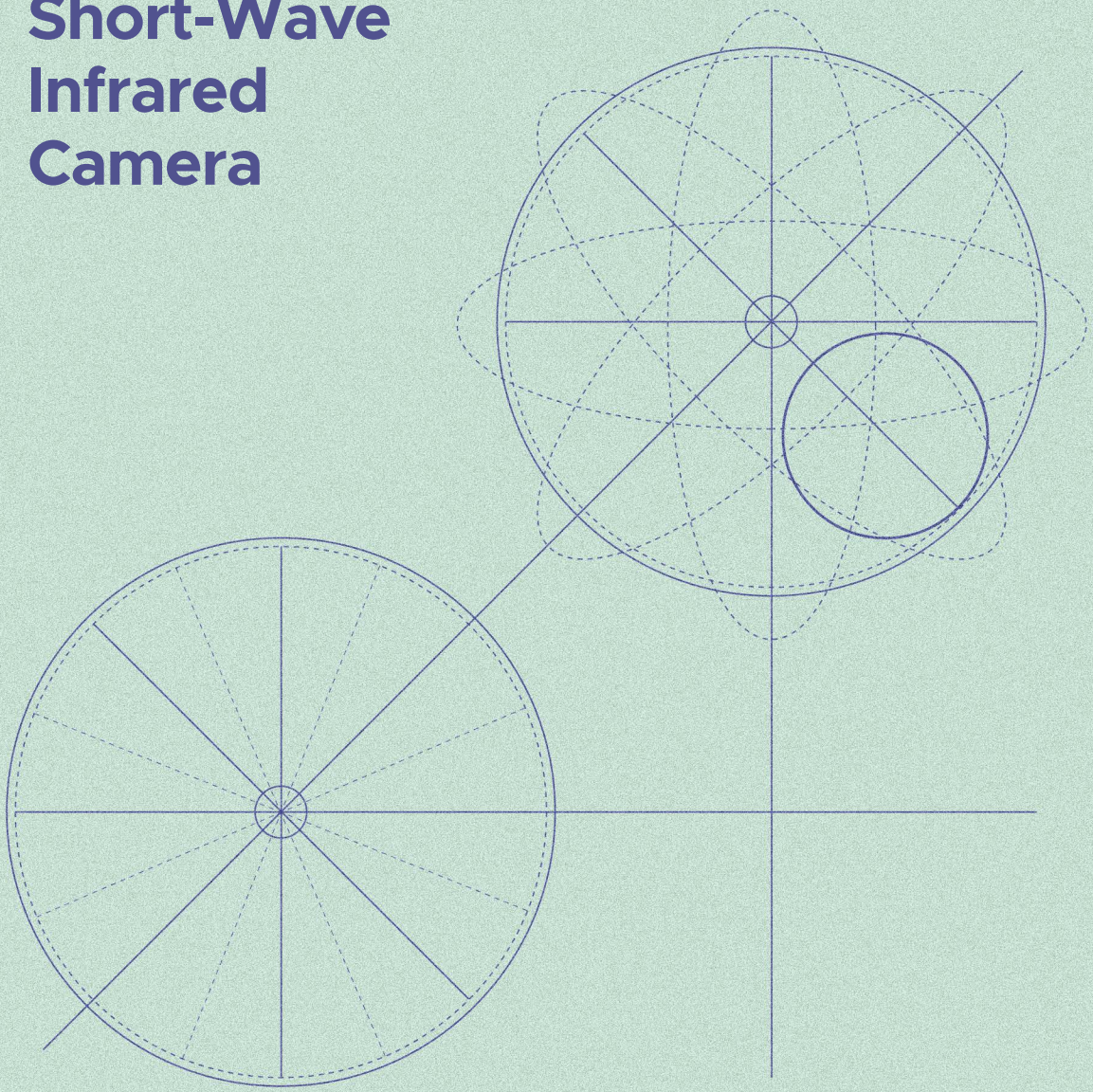
SWIR

Quantum Dot Short-Wave Infrared Camera

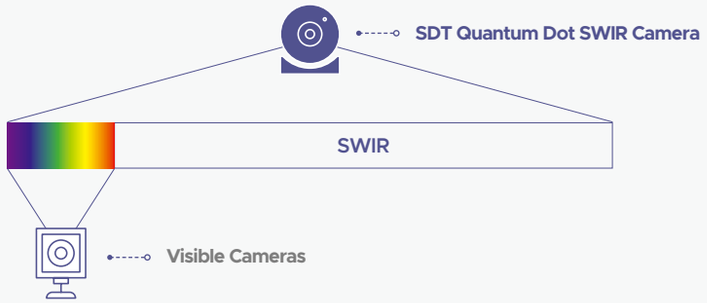


Quantum Sensing

SWIR

SDT Quantum Dot SWIR Camera

The SDT Quantum Dot SWIR Camera utilizes advanced quantum dot technology to deliver exceptional sensitivity in the Short-Wave Infrared (SWIR) range - comparable to traditional InGaAs cameras but at a fraction of the cost. This innovative camera is not only more affordable but also remarkably compact and lightweight, making it the perfect choice for applications in defense, agriculture, life sciences, and telecommunications.



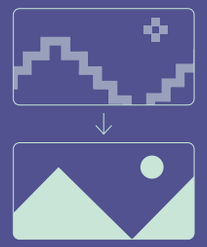
Main Advantages

Technology	Spectral range	Quantum Efficiency at 1,500nm*	Dark current*	Pixel pitch (resolution)	Price per camera
Silicon CMOS	300 – 940 nm	0 %	1 - 0.001 nA/cm2	< 1-3 µm (> 2-10 MP)	$
InGaAs	400 – 1700 nm	> 70 %	< 10 nA/cm2	5 – 20 µm (< 1.36 MP)	$$$$$
Ge on Silicon	300 – 1600 nm	< 20 %	> 20,000 nA/cm2	7 - 10 µm	$$
Quantum Dot	**400 – 1700 nm**	**> 40 %**	**< 200 nA/cm2**	**< 2-20 µm (> 0.3 – 10 MP)**	$$

*at room temperature

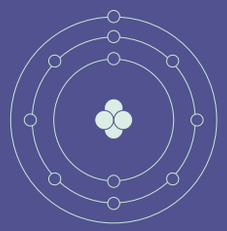
With its exceptional sensitivity, the **Quantum Dot SWIR Camera** can detect extremely low levels of light and infrared radiation. Its versatility makes it suitable for a wide range of vision applications, including nighttime surveillance and more.

Unlike InGaAs cameras, which require rare materials and specialized manufacturing equipment, our Quantum Dot sensors leverage existing semiconductor production infrastructure. This innovative approach enables high-volume production at significantly lower costs compared to other technologies.



What is a Quantum Dot Camera?

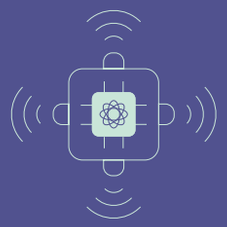
A quantum dot camera leverages the unique properties of quantum dots to provide exceptional sensitivity in challenging conditions, such as dust, mist, and smoke.
This enables it to capture clear, high-resolution images even in environments with low visibility. While it excels at seeing through obstructions, its strength lies in enhancing image clarity



What are Quantum Dots?

Quantum dots are tiny semiconductor nanocrystals, just a few nanometers in size, with unique properties that make them stand out. These nanocrystals trap electrons in a very small space, creating a phenomenon known as the quantum confinement effect.

One of the key features of quantum dots is their ability to emit light at different wavelengths depending on their size. Smaller dots emit shorter wavelengths like blue or ultraviolet light, while larger ones emit longer wavelengths, such as red. This flexibility makes quantum dots incredibly useful in a variety of fields, from displays and bioimaging to image sensors.



What is Quantum Sensing?

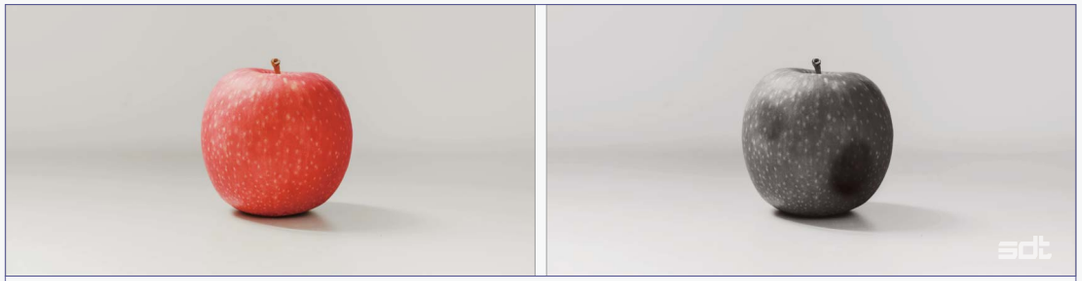
As the need to detect signals that were once undetectable grows across industries like defense, semiconductors, and healthcare, quantum sensing technology has become a crucial advancement. In defense quantum sensors are transforming the ability to detect stealth aircraft; in healthcare they're helping create ultra-precise MRI machines that can detect cancer at earlier stages.

With incredible resolution, precision, sensitivity, and speed, quantum sensors are set to play a key role in shaping the future of technology.

Use Cases

Visible Camera | **SDT Quantum Dot SWIR Camera**

Detect mixtures, even when the colors of the combined substances appear identical to the naked eye.



Examine the inside of produce to detect damage and assess its quality.

See through smoke, fog, mist, and dust to enhance safety in firefighting, search and rescue operations, and traffic management.

Applications

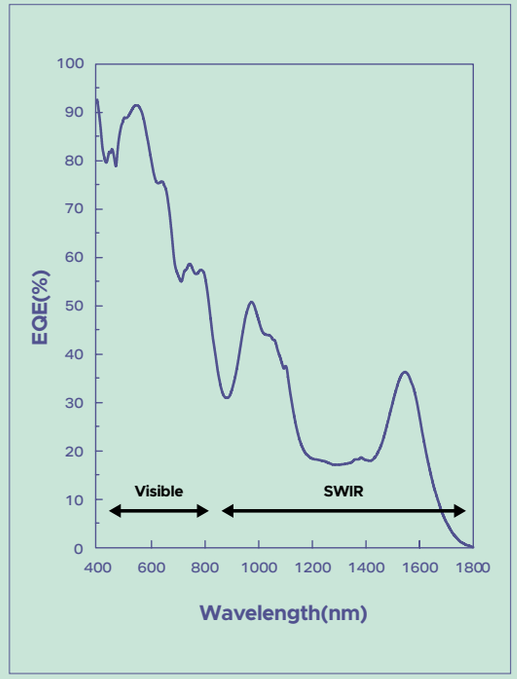
- Seeing through obstructions
- Night vision
- Goods sorting
- SWIR multispectral imaging
- Skin sensing and eye tracking
- Crucible crack detection

Specifications

Item	Specifications
Sensor size	3.20 x 2.56mm^2
Sensor Format	640 x 512 pixels (0.3MP)
Pixel pitch	5μm
Pixel size	3.8 x 3.8μm^2
Spectral range	400 - 1,700nm Can be tuned upto 2,500nm
Shutter type	Global
Max frame rate	220 Hz

In collaboration with Quantum Solutions SWIR image sensor

Spectral Response



References

Military

Intelligence, Surveillance and Reconnaissance

Quantum Dot SWIR Cameras provide outstanding sensitivity across visible, near-infrared, and short-wave infrared wavelengths, ensuring clear target identification even in challenging environments like smoke, dust, or fog. Whether in smoke grenade deployments or firefighting operations, these cameras offer a cost-effective alternative to traditional surveillance technologies, making them an ideal solution for military forces seeking reliable, wide-scale adoption.

Semiconductor, Display, and Battery

Crack Detection

Quantum Dot SWIR Cameras leverage thermal infrared imaging to precisely measure heat distribution across semiconductor chips, enabling the early detection of overheating. This cutting-edge technology is essential in the semiconductor and display industries, significantly enhancing safety and performance by identifying potential issues before they escalate. Additionally, in battery production, these cameras efficiently detect cracks and delamination in crucibles used during the sintering process, optimizing manufacturing efficiency.

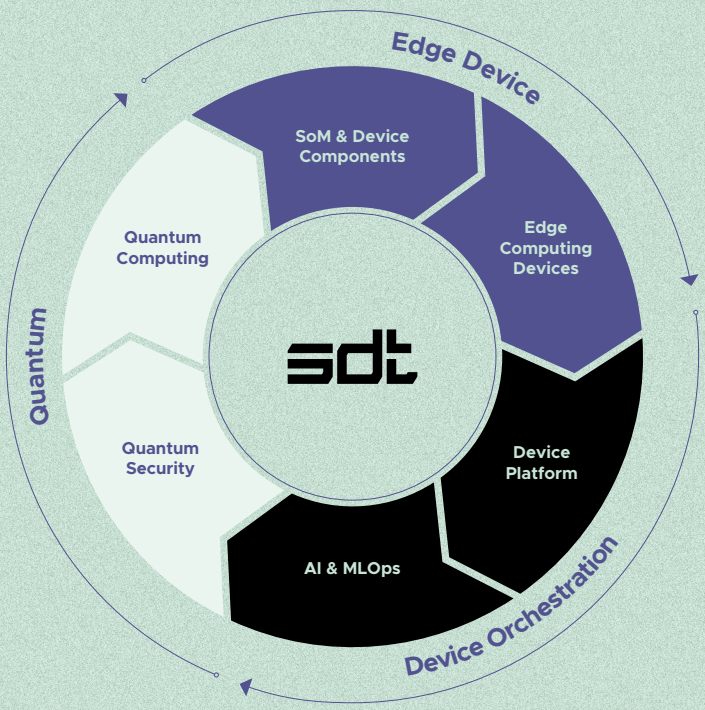
Agriculture

Non-Destructive Testing

Quantum Dot SWIR imaging enables non-invasive inspection of the quality and ripeness of agricultural products. This advanced technology can detect fine cracks, early signs of decay, pest damage, moisture content, internal defects, and the texture of fruit skin. By leveraging these insights, producers can optimize harvest times and ensure the highest product quality.

Bringing All-in-One Machine Vision solution to your sites.

SDT delivers comprehensive, all-in-one machine vision solutions featuring cutting-edge SWIR technology, expertly designed to address your needs.



QRNG IP Camera
Quantum Communication

Quantum Control Devices
Quantum Computing

Quantum Dot Sensor Camera
Quantum Sensing

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