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The development of x-ray imaging for airport security, defence and medical markets

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The application of current x-ray inspections systems to the identification of foreign objects in complex environments is limited by a number of factors. At best the systems are a compromise between conflicting performance requirements. The challenge facing x-ray system manufacturers is that many materials will show the same output characteristics using traditional X-ray absorption techniques. Coupled with the commercial drivers of the products' end users the technical challenges require a step change in the methods and science applied. Airport security provides a useful exemplar for the difficulty of the problem. In detecting the presence of liquid explosives in carry-on baggage we require a high level of analytical specificity with low false alarm rates in a wide range of sealed containers and a minimal impact on the passengers' experience.

Multi-spectral x-ray detectors using CdTe/CZT are becoming increasingly important for detection of x-rays and gamma rays in these applications. One key feature is their ability to detect and separate out the entire energy spectrum emitted by an x-ray source into many different electronically configurable bands. Analysing the intensity of the x-rays across the whole spectrum after they have passed through an object provides a unique fingerprint of the object's composition.

Although the benefits of CdTe/CZT have long been known, the material has not been widely used since it is difficult to manufacture in commercially interesting volumes. Kromek has solved this through its patented MTPVT vapour-phase growth process, which has the ability to grow defect-free crystals larger than any other suppliers. We have supplemented this foundation technology with the development of detector technologies and the acquisition of Nova, a US subsidiary with a range of ASIC technologies for CdTe and CZT signal conditioning electronics. We are also active in algorithm development for end user applications such as threat detection and medical imaging.

Kromek's technology is vital to a wide range of market sectors, pioneering digital colour imaging for x-rays and advanced 3D imaging for the security, industrial inspection, defence and medical markets. Most recently Kromek has developed a family of products for the global aviation and border security markets to combat threats posed by liquid based explosives and precursors, and the smuggling of narcotics dissolved in alcohol. In this presentation we will give an overview of Kromek's technologies and their applications.

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oral

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