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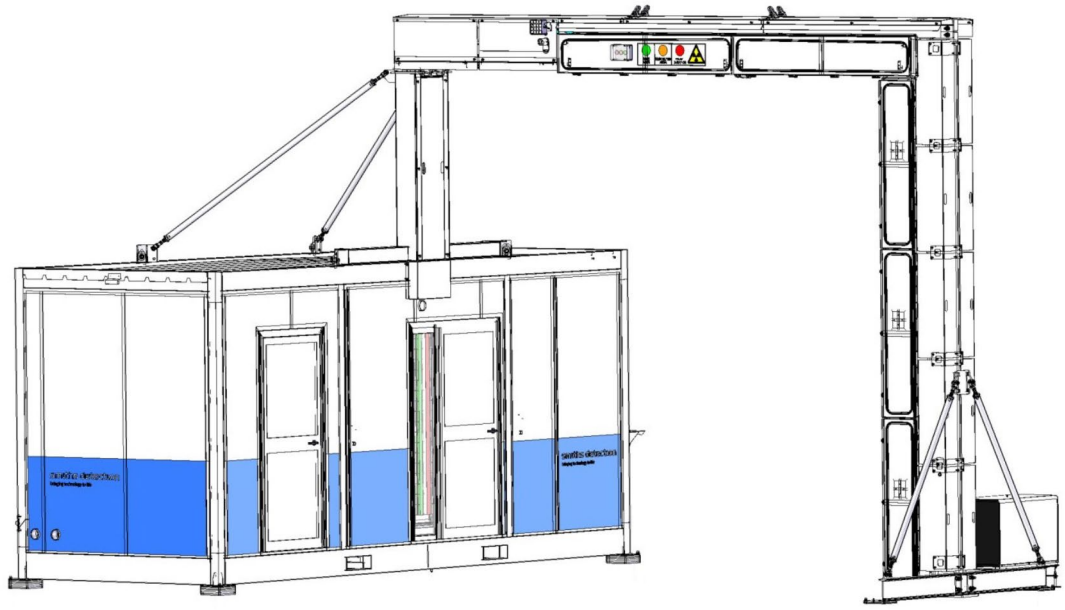
aerotech
Soluções em tecnologia

HCVP™ 2 series

COMPACT, HIGH ENERGY, PASS THROUGH X-RAY SYSTEM FOR TRUCKS, CONTAINERS AND AIR CARGO



Feature Highlights

- For inspecting loaded trucks, containers and vehicles at entrances to Ports, Airports, Border crossings and Critical Infrastructure sites
- High inspection rate with minimal system operators — up to 120 vehicles per hour
- Steel Penetration ≥ 320mm
- Small footprint with low X-ray emission
- ViZual technology using 4 colour discrimination provides a high-performance imaging capability with organic/ inorganic substances discrimination.

The HCVP series of pass through screening systems is designed to optimize security checks at ports, airports, border crossings and critical infrastructure areas. It reduces the need for manual inspection of trucks, containers and vehicles by verifying manifests and checking for threats such as explosives, narcotics, weapons of mass destruction (WMDs) and contraband.

High performance imaging equips operators with detailed radioscopic images of the container or vehicle and its contents.

Additional capabilities offered by the HCVP 2 series model include discrimination of organic and inorganic substances, delivering rapid and reliable results in a single scan.

Designed as a standalone unit, the HCVP systems have minimal external infrastructure requirements. They offer ease of operation and a small footprint, yet meet the most demanding, international security screening standards.

General Specifications

Scanning principle	Pass through X-ray system with target vehicle driven through at a slow speed

System specifications

Scanning height	From 0.15m (lowest point) to 4.70m (0.49 - 15.42ft)
Max. inspected vehicle dims. [W x H]	3.50 x 4.70m (11.48 - 15.42ft)
Recommended crew	1 system operator, 2 image operators
Operating temperature	-20 to +40°C [+ 55°C optional] (-4 to 104°F [131°F optional])
Relative humidity	Up to 95%
Electrical consumption	Standard 30kVA + 12 kVA (if operator's bungalow)

Computer system

DaiSy workstation	Two image analysis workstations equipped with one 24''flat LCD screen each. Contrast and edge enhancement, filters, marks and annotations, histogram equalisation, review of stored images and manifest data for comparison, image conversion to standard formats, objects measurement
Database workstation (DBW)	SQL database
Data storage	RAID 5 – up to 60,000 datasets
Operating system	Windows 10, Windows Server 2016
Printer	A4 colour laser printer

Radiation protection safety

Surveillance	Video surveillance, 3 colour CCTV & infrared barriers
Markings	Three colour indicator, sirens & regulatory displays
Speed	Speed display in standard
Regulations	In compliance with WHO, ICRP 103, EU and ANSI regulations

Health & security

Dose in the environment	Average <0,5µSv/h <1mSv/an
Dose rate in operator room	Average <0,5µSv/h <1mSv/an

Options

ARD™	Automatic radioactive material detection (gamma / neutron)
OCR-ALPR	Automatic license plate recognition
OCR-ACCR	Automatic container code recognition
Operator bungalow	Air conditioned
DaiSy image analysis	Additional station(s) with 24in LCD flat screen
DaiSy check-in	Station(s) with manifest and data recording scanner
DaiSy re-check	Station(s) for second analysis and decision
ClearCab	Scan of the driver cabin, compliant with ANSI N43-17 2009
iCmore	Automatic Target Recognition
Radiation protection	Concrete walls
Stop and go	Option can be provided, if enforced by local regulations
Remote Maintenance Tool	Remote maintenance access to HCVP

Configuration	**HCVP Z60-D5**	**HCVP Z60-DM**
Nominal energy (MeV)	4/6	4/6
Steel penetration (mm)	≥320 @ 7km/h	≥320 @ 7km/h
Throughput (trucks/hour)	120	120
Standard scanning speed	7 (km/h)	7 (km/h)
Scattered dose for the driver cabin	≤ 200nSv/scan @ 7km/h (without Clear Cab)	≤ 200nSv/scan @ 7km/h (without Clear Cab)
Absorbed dose per scan in fret	≤ 5µSv/scan @7km/h	≤ 5µSv/scan @7km/h
Safety area (L x W x H)	50 x 11,5 x 6m (without roof)	45 x 11,5 x 6m (without roof)
Material discrimination	Yes	Yes
Scan of driver cabin	Optional (with ClearCab fitted.)	Optional (with ClearCab fitted.)

For product information, sales or service, please go to www.smithsdetection.com/locations

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New augmented X-Ray technology for Cargo Inspection Systems

PRODUCT HIGHLIGHT / **How augmented X-Ray technology can increase your detection capabilities**

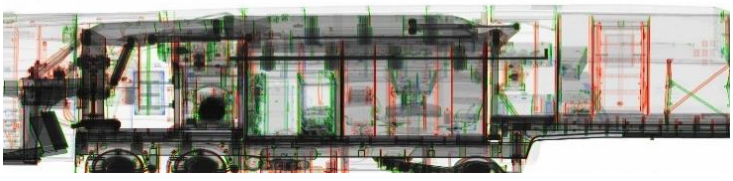
Our mobile, portal and gantry systems now offer new augmented X-Ray technology which uses multiple detection lines.

KEY BENEFITS:

- Innovative image quality advances and superior data acquisition
- Object positioning and depth information
- Electronic image stabilization,
- Accelerator frequency adaptation and safety zone optimisation
- Enhanced material discrimination and substantive performance advancements.

INCREASED IMAGE RESOLUTION

The new augmented technology offers a substantial improvement in terms of radioscopic image quality which now provides 10,800 small pitch-detectors, 7.5 times that of a standard system. The result is increased image resolution of x 1.5 in the vertical and horizontal planes and 7.5 times more pixels.



CAPTURING MORE DATA

In addition to this significant image quality improvement, available at both low speed and high speed (30-40 km/h), the new detection technology captures more data from each scan (up to 40-60 x more data).

This means that new image processing algorithms are now available, (made possible because of the additional data capture), providing the image operator with the following benefits:

- The ability to provide positioning information between the X-Ray source and the detection lines – comparable with Stereoscopy (a technique for creating or enhancing the depth in an image by means of stereopsis, similar to 3D). Via the DaiSy analyst workstation (GUI) the image displayed can inform the operator of the 'position' of an object within the container/ vehicle (image) and instantaneously calculates and displays (in real time) whether an object is closer to the detection lines or the accelerator and therefore discern its position; (front, centre, rear) within the container or vehicle screened.
- This information can improve the operator's perception of an objects depth and positioning, aiding in decision making and resulting in improved detection and operational efficiencies when a manual check is required following image analysis. As an example, the images below are of a Smiths High-energy Cargo Vision Mobile XT (trailer variant). The colours are used to determine and depict (via colour shading) whether objects are on the accelerator side, shaded in red, in the middle, shaded in green or detector boom side, shaded in blue. Please see the images on page two.

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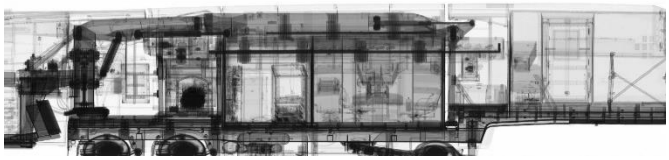
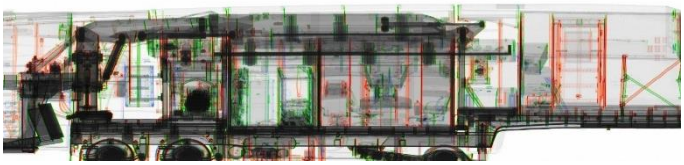
Standard (conventional) black and white X-Ray image

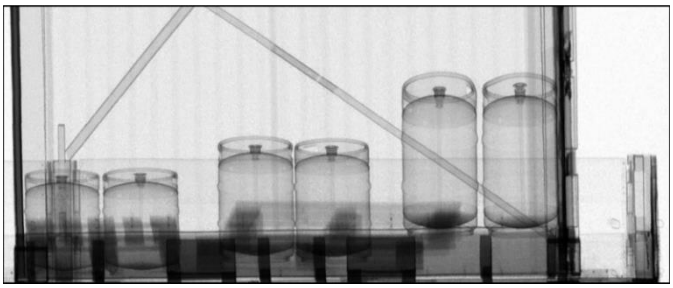


Augmented X-Ray image displaying 'positioning' of objects using the colour key mentioned.

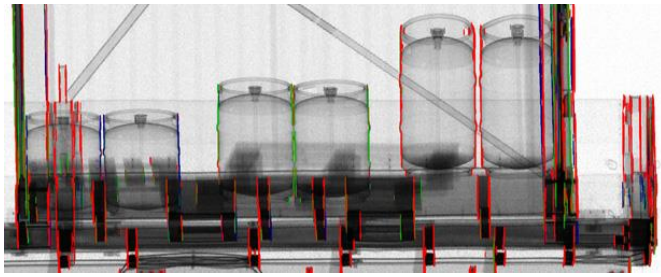


The images below further demonstrate the available depth information (in mobile and pass-through mode). As with the images above, for consistency, the accelerator side is shaded in **red**, the middle shaded in **green** and the detector boom side shaded in **blue**.

Standard (or conventional) black and white X-Ray image



Augmented X-Ray image displaying 'positioning' of objects using the colour key mentioned.



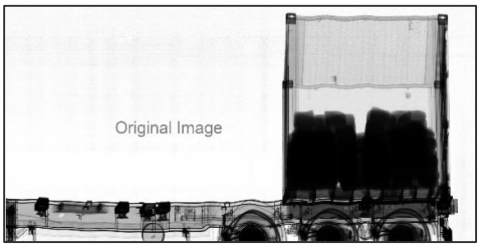
The augmented X-Ray technology offers the ability to carry out X Ray **frequency adaptation** to the speed of the scanned vehicle. An image processing algorithm uses the detector data captured to determine (in real time) the speed of the cargo and automatically adjusts the accelerator frequency such that the dose received is always constant. The key benefits being that the size of the radiation safety zone remains unchanged and optimized, whatever the speed of the screened vehicle. Contrary to standard installations, it removes the need for an external sensor for measuring vehicle speed and therefore eliminates the potential failure or inaccuracy of such a sensor.

In addition, it offers enhanced material discrimination including chemical discrimination of materials despite overlaps. Material Discrimination is based on averaged information. For example, a superimposition (overlap) of Iron (blue) and plastic (orange) appears like Aluminium (green). This new more efficient and advanced material discrimination provides capabilities to differentiate a green zone made of overlapping metal and organic material from green only materials. This is achieved by "de-overlapping" or "removing objects" and allowing the operator to focus their attention on clearer image information of the objects inside the container.

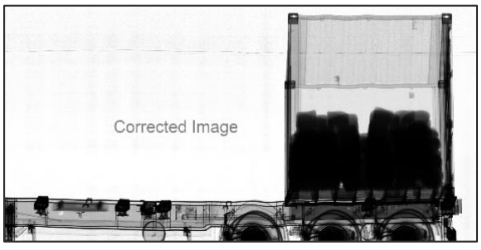
Using material suppression (as a consequence of de-overlapping) it is possible to suppress steel (such as container walls) for improved material identification at first sight, (organics appear darker and high-density materials lighter).

Another benefit provided via the augmented X-Ray technology is the correction of boom movement artefacts in mobile mode. It is a well-known fact that, (especially on uneven ground), oscillations of the scanner boom generate waves in the images that can have a detrimental impact on image analysis by the operator. With the additional data captured, and using a dedicated algorithm, it is possible to dramatically reduce the impact of these oscillations, as shown in the images below, (Original Image and Corrected Image).

Uncorrected Artefacts

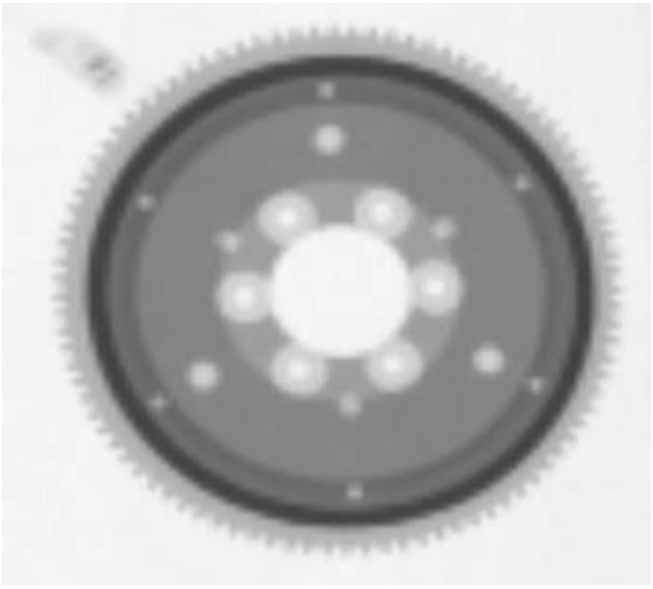


Corrected Artefacts

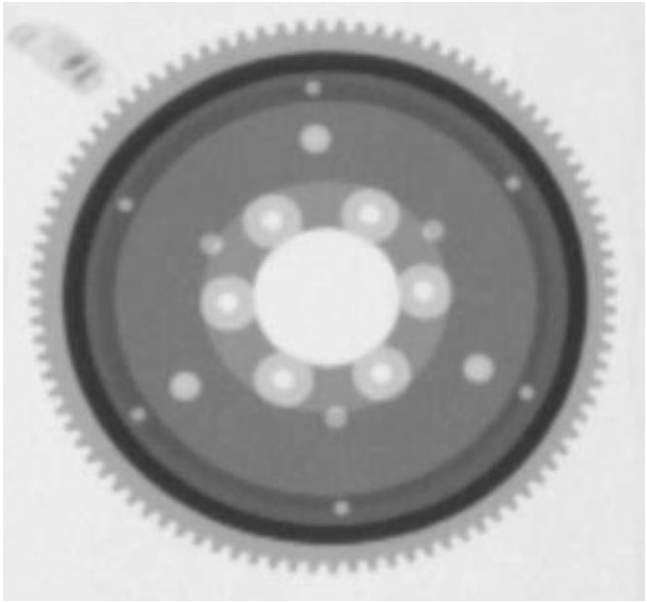


We would be very pleased to discuss/present the numerous benefits of this augmented X-Ray technology with you should this be of interest. Here are some image comparisons, clearly demonstrating the image improvement, (standard transmission X-Ray images vs augmented technology images).

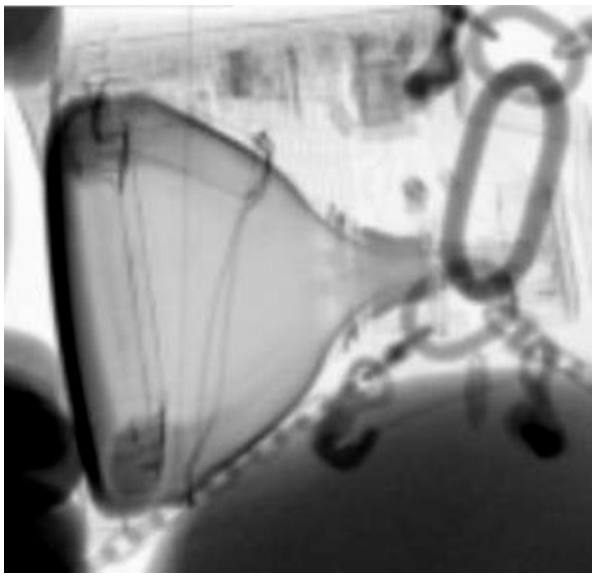
Standard X-Ray image



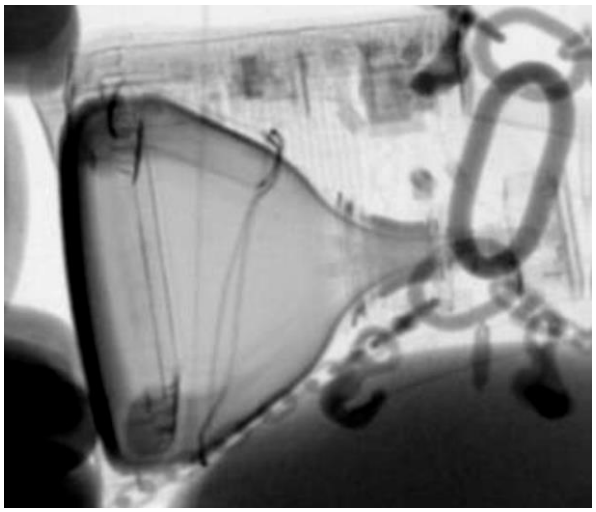
Augmented X-Ray image



Standard X-Ray image

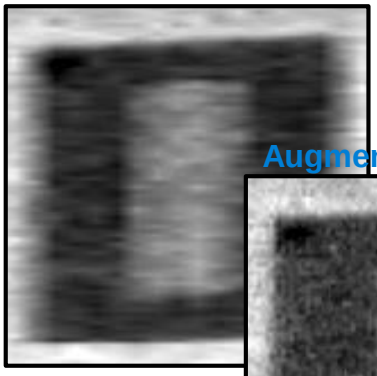


Augmented X-Ray image

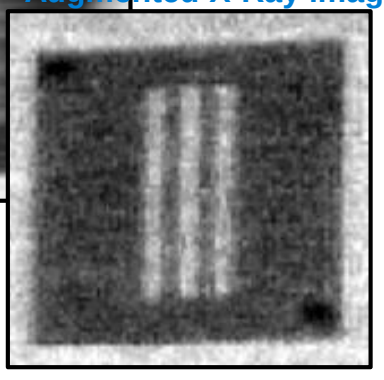


Below is an image comparison at high speed of an IEC resolution object (4.5 mm) with the standard or conventional X-Ray image above and the augmented X-Ray image below:

Standard X-Ray image



Augmented X-Ray image



The table below provides example data on the performance improvements as a result of the new augmented X-Ray technology for our mobile systems. These are based on recognised SD image quality standards:

@24m/min	HCVM (V3) 20mm DAC	HCVM XT/XL 5mm DAC	HCVM XT/XL Augmented DAC
Penetration	32cm	34cm	Up to 37cm
Resolution (H/V mm)	8/5	4/4	3/2.5
Wire in Air (H/V mm)	1.5/2.5	1.5/2	1.2/1.2
Contrast Behind 10cm	1.5%	1.5%	Less than 0.6%

Please note that the HCVM V3 mobile system included above is the previous iteration of the HCVM XT and XL systems which replaced it in our portfolio (2019). For more information on the above performances, please contact Smiths Detection.

The new augmented X-Ray technology is compatible with our Automatic Threat Recognition (ATR) suite of iCMORE, Artificial Intelligence (AI) algorithms. Please contact Smiths Detection for more information.

MORE TO COME

Keep in touch to learn more about upcoming features and updates.

GET IN TOUCH

If you would like to know more about our new augmented X-Ray technology for Cargo Inspection Systems, or any of our products and how we help make the world a safer place, you can get in touch by visiting us at:

www.smithsdetection.com