

Creating  
a safer world

# SMART BORDERS DRIVEN BY SMART TECHNOLOGIES

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## STRIKE THE BALANCE BETWEEN SECURITY AND FACILITATION



We live in an interconnected world as the world is more and more globalized and digitalized from economy and technology. But meanwhile, the interconnections between people and countries are escalating the volumes and complexity of transit traffic and cross-border trade. How can we maintain fast flow of goods, people and transport, whilst ensuring the safety and legality of them? This is a constant challenge for Customs and border management officials around the world.



## SMART INSPECTION TECHNOLOGIES ARE HERE AND NOW



Today, governments and businesses across the world are using technology to reshape, reimagine, and transform how our society works and communicates. In the face of this rapid and pervasive change, the only option is to adapt or be left behind. Emerging technologies can help Customs and border management officials not only tackle near-term challenges, but also lay the foundations for a sustainable future of continuous innovation and improvement. Ultimately, citizens want better services, reliable security and seamless travel and trade experiences. Now's the time to break through the technology frontier and harness the full power of innovation.

NUCTECH provides the customized solutions suitable for any entrances and checkpoints at ports, land borders and airports targeting to different demands from Customs and border management officials. The most advanced imaging technologies owned and innovated by NUCTECH are ranged from X-ray Interlaced Dual-Energy imaging technology, X-ray CT imaging technology, neutron imaging technology to muon imaging technology. These state-of-the-art inspection technologies and methods, combined with our intelligent image analysis system based on big data and AI algorithm, enable us delivering unparalleled image quality, providing reliable analysis results, highlighting concealed objects. All these improvements contribute to the border control and management and assist Customs and border management organizations in increasing traffic-flows and facilitating trade-flows.



X-ray Computed Tomography (CT) can visualize interior features within solid objects and obtain digital information on their 3-D geometries and properties. The Rotating CT technology application in cargo/vehicle security marks a significant breakthrough in redefining security standards and in offering better user experience. This method showcases interior structure of particular parts for one whole object and further analyzes the composition of suspicious material, which can offer more comprehensive data, deliver a clear, more rounded view, and set a superior standard in imaging.



The NUCTECH™ FG9000DT Cargo/Vehicle CT Inspection System is the cargo /vehicle inspection system that combines Computer Tomography (CT) and traditional Digital Radiography (DR) technology. The Inspection System can perform dual-view DR scanning to generate two conventional scanning images in orthogonal directions. In addition, it can also carry out CT scanning on suspicious area of the cargo/vehicle for detailed inspections, hence reducing the need of manual unpacking of the cargo/vehicle.

### CT SCANNING

The Inspection System mounts two sets of transmission imaging devices on a sliding ring orthogonally. CT scanning can be achieved by the rotation of sliding ring, and CT scanning image is then generated through the reconstruction algorithms.

### ANGLE-ADJUSTABLE DR SCANNING

Through rotation of the sliding ring to a desired angle then the movement of the cargo, the Inspection System can perform dual view (orthogonal) DR scanning at that angle of the cargo. The angle can be changed as desired.

### HIGH PERFORMANCE

The Inspection System adopts high performance Interlaced Dual-energy Electron Linear Accelerators and detectors to generate high quality scanning images.



### MATERIAL DISCRIMINATION

The Inspection System adopts Dual-energy Imaging Technology to discriminate organic, inorganic, mixed, and heavy metal materials. Different materials are marked with specific colors, which helps in identifying the contrabands and dangerous goods concealed among cargoes or hidden in the vehicle.

### MULTI-FUNCTION INTEGRATION

The Inspection System can be integrated with various auxiliary devices including License Plate Recognition (LPR) system, Container Code Recognition (CCR) system, Under Vehicle Surveillance System (UVSS) and Radioactivity Monitor (RM), etc., hence providing comprehensive information of the goods under inspection.

### RELIABLE RADIATION SAFETY

The Inspection System is designed with the safety of public and operators as paramount importance. It is equipped with safety devices including CCTV, PA, safety interlocks, etc. All the radiation protection criteria are met and in conformity with the relevant standards recommended by international organizations such as IAEA, ICRP and WHO.

### APPLICATION



Border



Seaport



Land Crossing



Checkpoint



Advanced air mobility (AAM) is gaining traction and has the potential to transform how we move goods. In the meantime, as the high-speed development of fully automated terminal, intelligent air-track system has been initiated and is stepping into operation. Containers, like urban transportation, have not only been run on the ground, but also run in the air-track, which will greatly improve transportation efficiency for goods at port.



The NUCTECH™ SR6000 Skyrail Container Inspection System is the world's first air-track intelligent container inspection system. The system is tailor-made in accordance with the process of air-track intelligent transport system and create an unprecedented in-transit container control solution on air to fully-automated port operation.

The system adopts the latest Interlaced Dual-energy Imaging Technology (IDE Technology) to realize the function of distinguishing materials, which is helpful to improve the analysis and identification of images and can perform 100% non-intrusive inspection of containers.

#### INNOVATIVE SCANNING METHOD

Different from traditional scanning method on the ground, the system creates the brand-new air scanning method for the first time. The system integrates all the requested scanning functions in a big box in air to enable the scanning and transport of containers operate smoothly and continuously.

#### HIGH QUALITY SCANNING IMAGE

The N system adopts a new generation of accelerator, detectors, electronics components and optimized structure design, which improves the penetration capability and the quality of the scanning images greatly. The excellent image quality and high penetration characteristics enable easier detection of suspicious goods in fully loaded containers and vehicles.



### MATERIAL DISCRIMINATION

The system adopts Dual-energy Imaging Technology to discriminate organic, inorganic and mixed materials. Different materials are marked with specific colors, which helps in identifying the contraband and dangerous goods concealed among cargoes or hidden in the vehicle.

### HIGH THROUGHPUT

The system adopts a fast-through inspection mode, the skyrail logistic system will carry the container through the scanning system while complete scanning automatically, the maximum allowed transportation speed is 30km/h or higher.

### AUTOMATIC SPEED ADAPTING

The NUCTECH™ SR6000 Skyrail system adopts latest generation of LINAC, the X-ray pulse frequency will be adjusted in accordance with the scanning speed, to realized a speed/frequency self-adapting, resulting in consistent scanning image quality without image distortion.

### MULTI-FUNCTION INTEGRATION

The system can be integrated with various auxiliary devices including License Plate Recognition (LPR) System, Container Code Recognition (CCR)System and Radioactivity Monitor (RM), etc., hence providing comprehensive information of the goods under inspection.

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### APPLICATION



Seaport



As the world becomes more digitalized, we recognize that immobility can limit opportunities, possibilities and development for businesses. Intelligent mobility is becoming the new approach to connecting people, places and services. In regards to security, it will provide ways for security systems to self-regulate and self-control their moves by using applications and services that can process real-time conditions and share instantaneous information about objects inspected and create an easier, more efficient and more eco-friendly solution; beyond traditional, infrastructure-heavy ways.



The NUCTECH™ MR6000DE Cargo/Vehicle Inspection System is a smart cargo/vehicle scanning robot with innovative structure design and advanced controlling technology. Foldable structure design enables the system to be transported as a whole, and to be relocated and deployed rapidly, with no need to undertake complicated installation or debugging process. This makes the inspection operation super easy and enjoyable.

Adopting intelligent wheel-driving technology, the system is capable of accurate path control and realizing multiple operation modes, e.g. double-side scanning, multi-row scanning, which enables the system to fit multiple scanning scenarios and can be flexibly utilized at port, land border, airport or other places.

### TECHNOLOGY

- Interlaced Dual-Energy Imaging (IDE)
- Smart trajectory control
- BDNS & GPS access
- Support EDI declaration and multiple network interfaces
- Radioactivity Monitor (RM)
- License Plate Recognition System (LPR)
- Container Code Recognition System (CCR)

### FUNCTION

- Stretchable & foldable
- Optional typical scan mode and drive-through(DT) mode
- Self-shielding function
- Work well in harsh weather conditions
- Meet the safety standards and requirements of WHO, IAEA and ICRP

### APPLICATION



Border



Seaport



Land Crossing

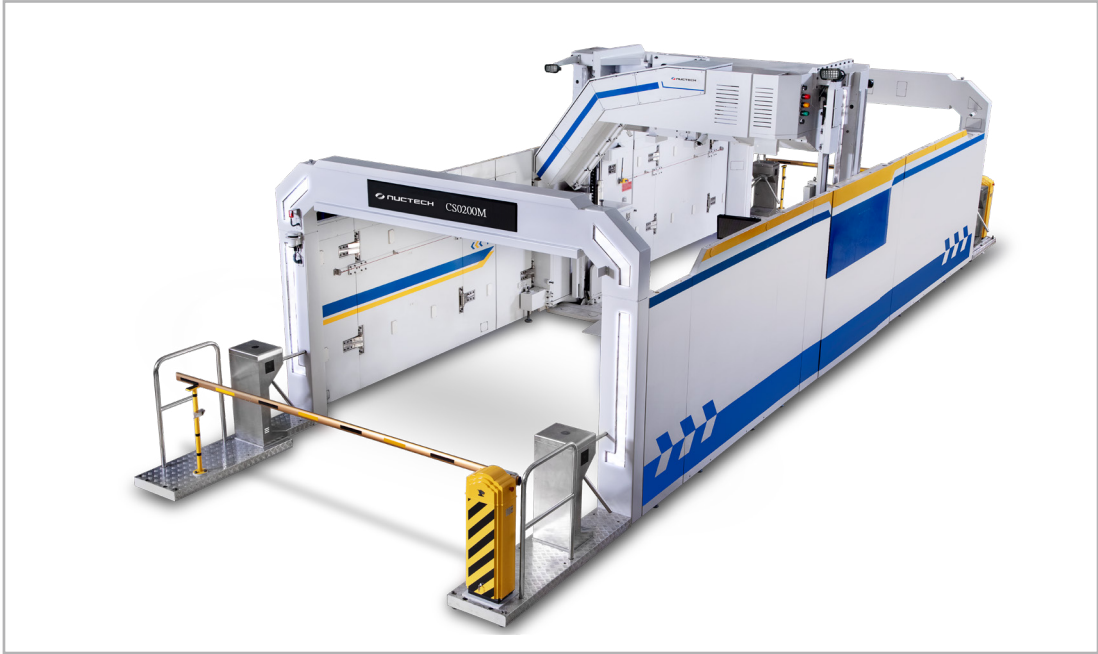


Checkpoint





A revolution is underway in industrial imaging. High resolution and multi-view imaging is the looming needs and future trend of x-ray imaging technology, which will increasingly replace older ones to provide fewer artifacts and noise-reduced x-ray images, further construct a continuous and dynamic imaging view. The innovation of distributed x-ray source is exactly the result of being driven by application requiring high throughput, more quantitative, precise and accurate imaging data .



The NUCTECH™ CS0200M Passenger Car Inspection System is an innovative multi-view inspection system by adopting distributed x-ray source (multi-beam x-ray sources) technology. The system can be flexibly deployed at checkpoints, border crossings and entries for large-scale event.

The system emits x-ray beams from multiple positions without physical movement and provides 6 scanning images from different angles simultaneously, eventually generating a continuous and dynamic transmission image, which facilitates operators to identify concealed contraband and dangerous goods more rapidly, accurately and precisely through a brand-new way of image data conversion and presence, from 2D to 3D.

**TECHNOLOGY**

- Distributed x-ray sources technology (DXT)
- Multi-view imaging in conveyor scanning mode
- Dual-view imaging in drive-through scanning mode
- Support EDI declaration and multiple network interfaces
- Radioactivity Monitor (RM)
- License Plate Recognition System (LPR)
- Under Vehicle Surveillance System (UVSS)
- Automatic alert to abnormal objects

**FUNCTION**

- Optional conveyor mode and drive-through mode
- Rapid deployment within 24 hours
- Self-shielding function
- Work well in harsh weather conditions
- Meet the safety standards and requirements of WHO, IAEA and ICRP

**APPLICATION**



Border



Seaport



Land Crossing



Checkpoint



Small-scale cross-border trade is playing a fundamental role in contributing to economy growth in developing areas. While creating huge economic value of imports and exports and social value of solidarity and stability, more and more contraband and smuggled goods have been found with the flow of goods. This has become a major challenge for Customs, border agencies and law enforcement departments.



The NUCTECH™ MB1500S Cargo/Vehicle Inspection System is a self-drive small-scale cargo/vehicle inspection system, specially designed for satisfying the security inspection requirements of border market.

Based on advanced dual-energy imaging technology, the compact system can easily discriminate organic, inorganic and mixture materials marked by specified colors. With the self-shielding, wheel-driving and wheel-guiding technologies, the system can be rapidly deployed and relocated with no need of civil work.

**TECHNOLOGY**

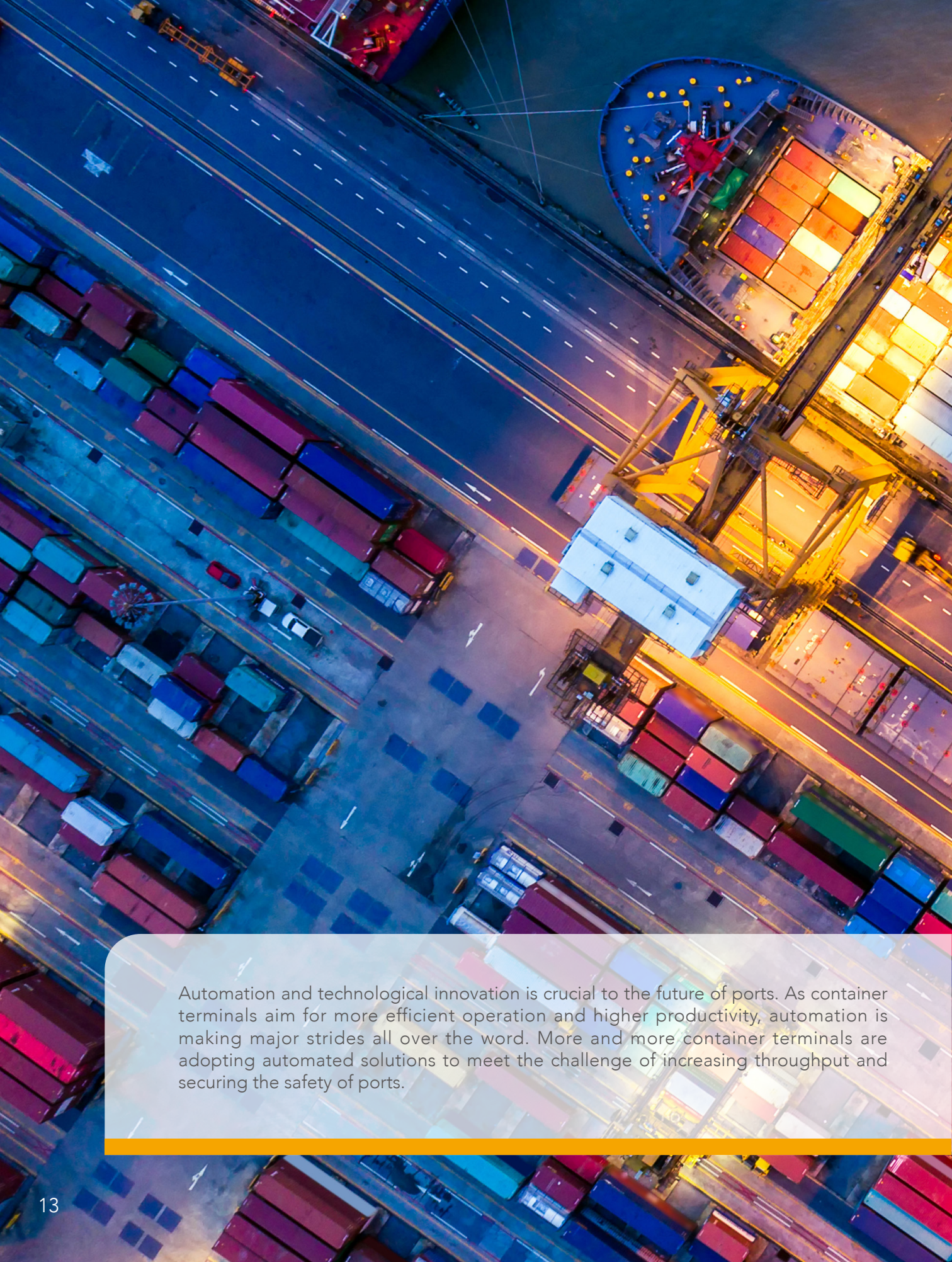
- Interlaced Dual-Energy Imaging (IDE)
- Optional GPS/laser guiding technology
- Support EDI declaration and multiple network interfaces
- Radioactivity Monitor (RM)
- License Plate Recognition System (LPR)

**FUNCTION**

- Stretchable and foldable
- Work well in harsh weather conditions
- Meet the safety standards and requirements of WHO, IAEA and ICRP

**APPLICATION**





Automation and technological innovation is crucial to the future of ports. As container terminals aim for more efficient operation and higher productivity, automation is making major strides all over the world. More and more container terminals are adopting automated solutions to meet the challenge of increasing throughput and securing the safety of ports.



The NUCTECH™ MT6000A Cargo/Vehicle Inspection System is an ideal security solution for the inspection of cargo containers at container terminals. The inspection system, with intelligent navigation and positioning function, can be deployed flexibly in the AGV operation area. By interfacing with the Terminal Operating System (TOS), the system can cooperate and be managed together with AGV inside the terminals. It inspects moving cargoes in coordination with AGV movement.

The system utilizes intelligent inspection throughout the security check process and can complete transfer, deployment, detection, data exchange and analysis by remote control, which can greatly improve inspection efficiency and overall inspection rate.

**TECHNOLOGY**

- Interlaced Dual-Energy Imaging (IDE)
- Intelligent remoting system
- Support EDI declaration and multiple network interfaces
- Radioactivity Monitor (RM)
- Container Code Recognition System (CCR)

**FUNCTION**

- Drive-Through (DT) mode
- Stretchable and foldable
- Work well in harsh weather conditions
- Meet the safety standards and requirements of WHO, IAEA and ICRP

**APPLICATION**



Seaport



The NUCTECH™ Mobile Container/Vehicle Inspection System, an innovative mobile X-ray inspection system, can provide excellent screening features such as organic/inorganic material discrimination, fast-scan and radioactivity monitoring. MT Series combines elegant design and modern appearance with flexible maneuverability and rapid deployment.

#### FEATURES

- Unique mobile security solution with excellent flexibility and adaptability
- High performance autonomous intelligent system with compact modular design
- Advanced IDE and fast-scan technologies



The NUCTECH™ Fast-Scan Container/Vehicle Inspection System is a unique high throughput drive-through portal X-ray inspection system, which is an ideal free-flow security solution for inspecting cargo containers, empty containers, container trucks at seaports, border crossings, airports etc.

#### FEATURES

- Secured vehicle drive-through mode and non-distortion image at high speed
- Compact modular design improves system relocatability
- Advanced IDE technology and seamless integration with CCR, LPR, RFID and etc.



The NUCTECH™ Relocatable Container/Vehicle Inspection System, a modularized equipment easy for transferring and reassembling, adopts a high energy Electron Linear Accelerator as the radiation source. The relocatable system, with an excellent performance, is the most efficient and cost effective security solution for cargo/vehicle inspection at seaports, border crossings, airports etc.

#### FEATURES

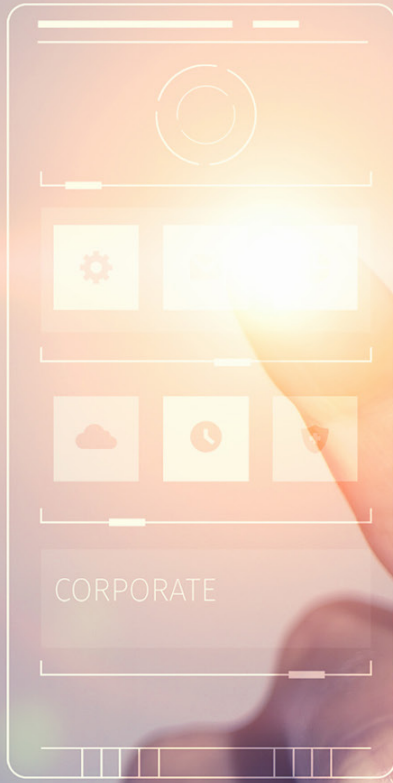
- Most efficient and cost-effective security solution with excellent performance and small footprint
- Unique architecture design for convenient relocation and reliable self-shielding
- Advanced IDE and optional integration with backscatter technology



The NUCTECH™ Railway Cargo/Vehicle Inspection System is an ideal solution for non-intrusive and rapid inspection of railroad vehicles at a fixed railway station or border crossing. RF Series can inspect railcars at speeds up to 30km/h (60km/h optional) without any image distortion.

#### FEATURES

- Secured drive-through railway security solution
- Automatic image separating technology for individual wagon image
- Unique FS and IDE technologies for better material discrimination



# AI Border Imaging

## AI Enabled Threat Recognition System

AI is becoming a powerful member of the border workforce when securing cross-border trade. Because of its ability of deep-learning and self-training, AI system can assist Customs and border management officials in making accurate judgements and critical decisions in a very short time. Today AI plays an indispensable role in affecting the movement of people and trade in border security management.

# wiscan

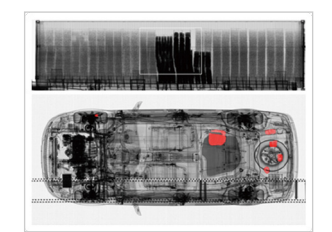
## WiLabel

WiLabel can classify X-ray scanned cargo image classification according to WCO specified HS code, which will assist the operators to easily identify the inspected cargo.



## WiSpot

WiSpot can detect hidden substances. It encompasses diffSpot for detecting contraband or smugglings among car components and foreignSpot for the detection of hidden materials in bulk cargos.



## WiClue

WiClue is a customizable module. Among this WiClue portfolio, you could find cigaClue, which can automatically pinpoint cigarettes; wasteClue, which annotates illegal waste materials; and even liquorClue that can locate the bottled liquor almost instantly.



## WiMapping

WiMapping is known as "image indexing". The scanned image or manifest data of similar cargo can be retrieved from a database for quick reference. Suspicious items can be highlighted based on the matching results of image comparison or test index.

