



BORDER SECURITY

HOMELAND PROTECTION

AIRPORT & SEAPORT SECURITY

www.tudor-tech.ch

TUDOR SCAN ML64 ROBOTIC SCANNING SYSTEM



The only scanner in the world fully remote operated by a single operator from a safe distance, ensuring total protection against ionizing radiation



The increasing growth of terrorist activities, contraband and illegal transportation drives the demand for high performance security systems. Special attention needs to be paid to the area of international cargo transport that is usually the preferred vector for the contraband with weapons, radioactive and explosive materials, narcotics and other forbidden material, easy to be hidden inside large volume of goods. The daily increasing volume of transported cargo makes it impossible to physically inspect all suspicious transports.

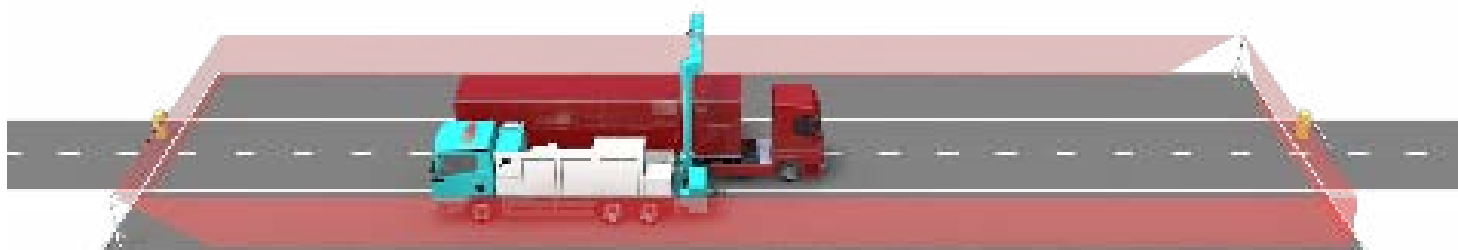
TUDOR SCAN TECH's award winning technology provides a safe, reliable and optimized solution in terms of throughput of more than 200 scanned long vehicles / hour.

TUDOR SCAN's internationally patented remote operation principle is a unique feature with positive impact on operation costs, making it the only mobile scanner that guarantees zero professional radiation exposure for its operators and total protection against incidents caused by dangerous cargo or terrorist attempts targeting security checkpoints.

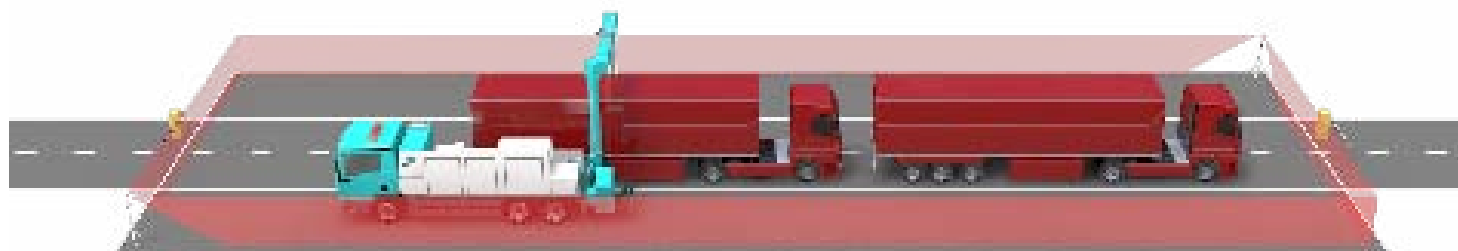
Having gathered a consistent amount of international awards including The World Intellectual Property Organisation „Invention of the year“ award, MB Telecom's proven concept has received international validation both from the scientific community and from security professionals on all continents.

MOBILITY is a key aspect in today's border security with ever increasing threats, with fast paced changes in the rules and standards of security and safety.

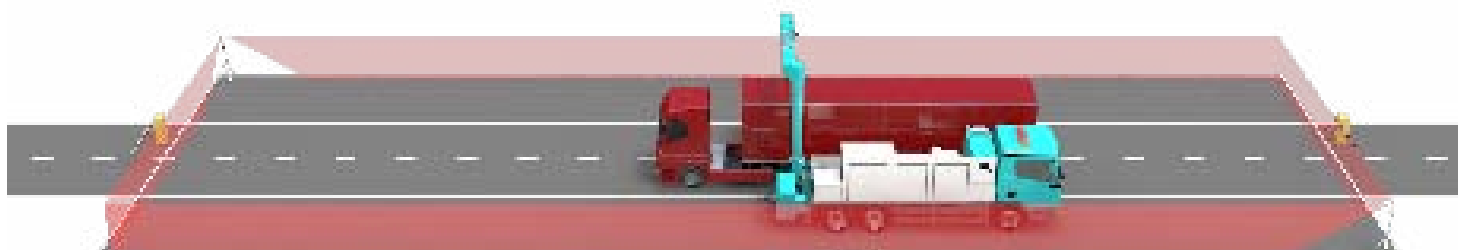
TUDOR SCAN ML64 is a highly versatile mobile imaging system, allowing 3 operating modes:



1. One by one scanning of stationary vehicles (optimized solution in terms of penetration and image);



2. Sequential scanning of a number of vehicles placed in a line for a higher throughput;



3. Drive through scanning in portal mode (the inspected vehicles can be driven by their driver in order to be fully scanned at low speed of 10 to 15 km/hour that generates an optimized solution in terms of throughput of more than 200 long vehicles/hour).

Maximum Safety

TUDOR SCAN ML64 fully eliminates the risk of professional or accidental exposure to ionizing radiation by controlling all scanning processes from a Mobile Control Centre (MCC) that can be supplied in various configurations. The MCC is placed safely outside the exclusion area during scanning and is carried by the Mobile Scanning Unit (MSU) in transport mode.

The operation fully automated, interactive and extremely simple, based on the principle of touching intuitive icons and displaying permanently the status of the system, as well as the sequence in progress. The boom is automatically deployed in just a few minutes by simply touching an intuitive icon on the operator interface.

The essential difference between all competitor systems and TUDOR SCAN ML64 is that it doesn't need a driver to control the truck's movement (direction, sense, brakes, engine's parameters etc.) These functions are managed by a "driverless" subsystem that controls all the commands and parameters of the truck. In scan mode the operator initiates the scan procedure just by touching the corresponding

Intuitive Operation

The 3D interface of the application is very intuitive, indicating at each step the correct course of action, and not leaving room for mistake. It will only allow inputs that are expected by the system at that moment.

The system runs self-test sequences on start-up, providing real-time status information of all subsystems. The operators command the conversion of the Mobile Scanning Unit from "Scan mode" to "Transport Mode" by simply touching the appropriate icon.

The command and control software application is displayed on two monitors and manages the mobile unit's movement, video surveillance, perimeter protection, barriers' remote operation and the automation of the scanning process.

Mobility / Versatility

All the components of the unit are assembled on a truck chassis, resulting in an extremely versatile and mobile robotized scanning system.

It is EURO-6 (EURO-3 for Africa) compliant and powers the whole scanning system. The end user can choose between several worldwide truck manufacturers, according to local support and service facilities.

virtual button, on the touch screen display, inside the MCU and the process is executed in a fully automated sequence, providing to the operator real time data by graphic animation and sound signals.

TUDOR SCAN ML64 uses a high-resolution transmission imaging system comprising in-house designed electronics and a dual-energy 6/4 MeV Linear Accelerator (LINAC) that is able to handle the most difficult situations and very high density cargo.

Compared with any competitor product, TUDOR SCAN ML64 offers fast, reliable, and safe operation, providing at the same time the advantage of at least 2 times lower total cost of operation for a life time of 10 years.



All commands and status of the sub-systems are registered in a "black-box" file. The service menu and the content of the "Black-box" can be remotely administrated and interrogated by supervisors.

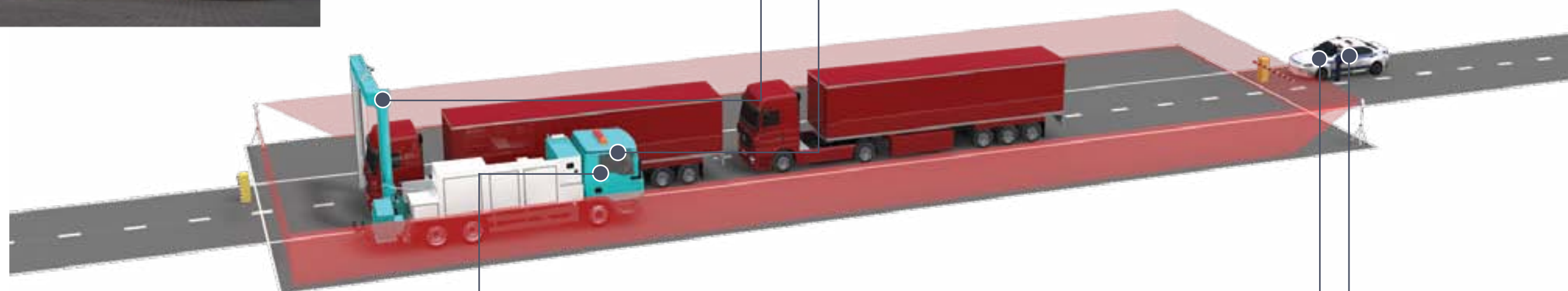


Mobile Scanning Unit (MSU)



A lightweight, highly versatile scanner fully operated from a safe distance.

TUDOR SCAN ML64 offers best-in-class fuel economy both in transport and in operation due to its low weight of approximately 20 tons.



Imaging Subsystem



The dual-energy imaging provides organic / inorganic material separation for fast identification of threats such as explosives or other IED components. It also gives the operator an important tool to identify other dangerous items such as weapons or contraband.

Ultra-fast sampling electronics and highly sensitive detector arrays ensure the best possible imaging performance even in drive-through scanning.

Remote Operation Subsystem

Unique feature on the market, remote operation is the defining feature of TUDOR SCAN ML64. It ensures total radiation safety for the operators and unprecedented protection from terrorist explosion of scanned vehicles.

The MCC is permanently connected to the MSU through advanced and redundant state-of-the-art encrypted wireless communication technologies through which all commands and data are safely transferred.

When integrated into advanced Integrated Border Management systems TUDOR SCAN ML64 can also be operated through a secured internet connection from anywhere in the world or supervised in real-time for prevention of corrupt practices.



Mobile Control Centre

TUDOR SCAN is operated away from the scanned vehicle without human presence in the exclusion area and at a safe distance from a possible terrorist detonation.

The operator is provided with a touch-based interface that controls the scanner's movement and ensures fast image analysis through multiple enhancement tools. All commands are given through the operating interface and performed by the scanner through automated processes that replace the traditional driver.

Depending on customer requirements, the MCC is available as a rugged pelican-case, a towable caravan, a dedicated vehicle or an office container for permanent sites.



Software

The system runs self-test sequences on start-up, providing real-time status information of all subsystems. The operators command the conversion of the Mobile Scanning Unit from "Scan mode" to "Transport Mode" by simply touching the appropriate icon.

The 3D interface of the application is very intuitive, indicating at each step the correct course of action and leaving no room for mistake. It will only allow inputs that are expected by the system at that moment. The operator can apply different filters and processing algorithms in order to improve the penetration or image quality just by touching intuitive icons on the Graphic User interface.

The image is processed in a proprietary format and can be exported to bmp or jpeg format.



A versatile graphical user interface allows the operator to remotely control all aspects of the scanner operation from a safe distance. The traditional driver is replaced by autonomous robotic systems that ensure the system is operated safely at all times.



The system is able to acquire textual and image data that describes the items being scanned and the operator can classify large amounts of data thanks to an intuitive gesture based interface.

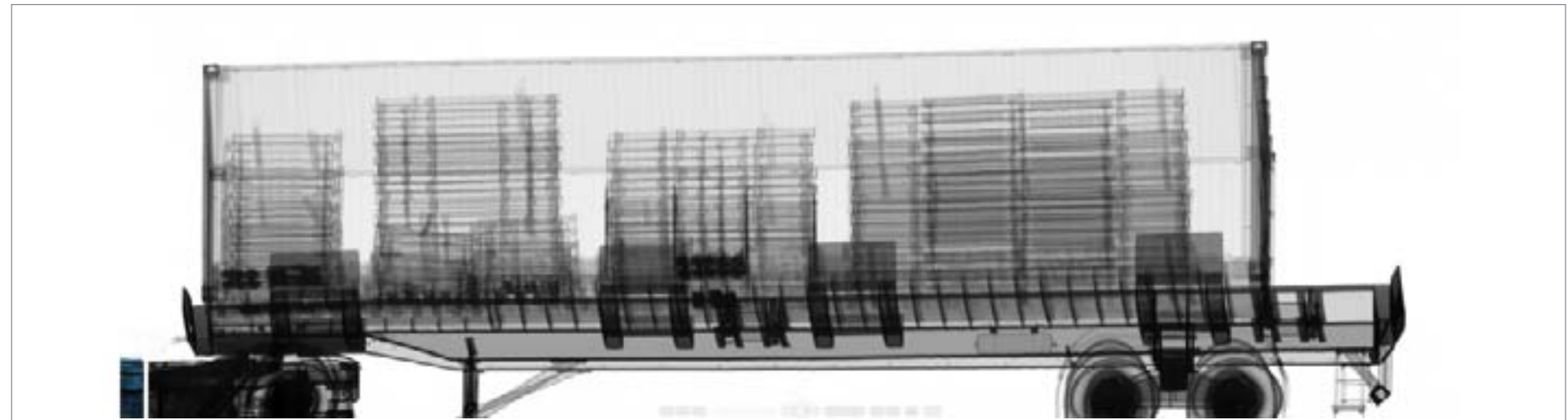


The operator can see at a glance the current state of the system and has easy access to all the parameters that determine the throughput and image quality. All the operations are logged for review or subsequent training.

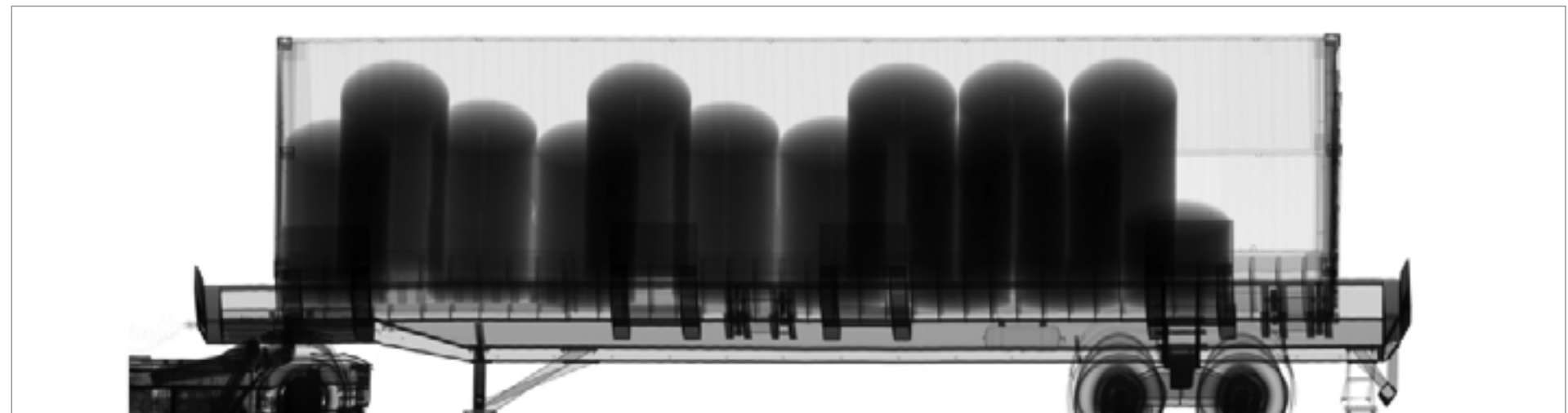


A touch based interface is used to explore the high resolution radiographic image. The operator can apply standard and custom image enhancement operations, can perform measurements and can review the parameters of the system at the time the image was taken. The image can be annotated and saved for review or printed.

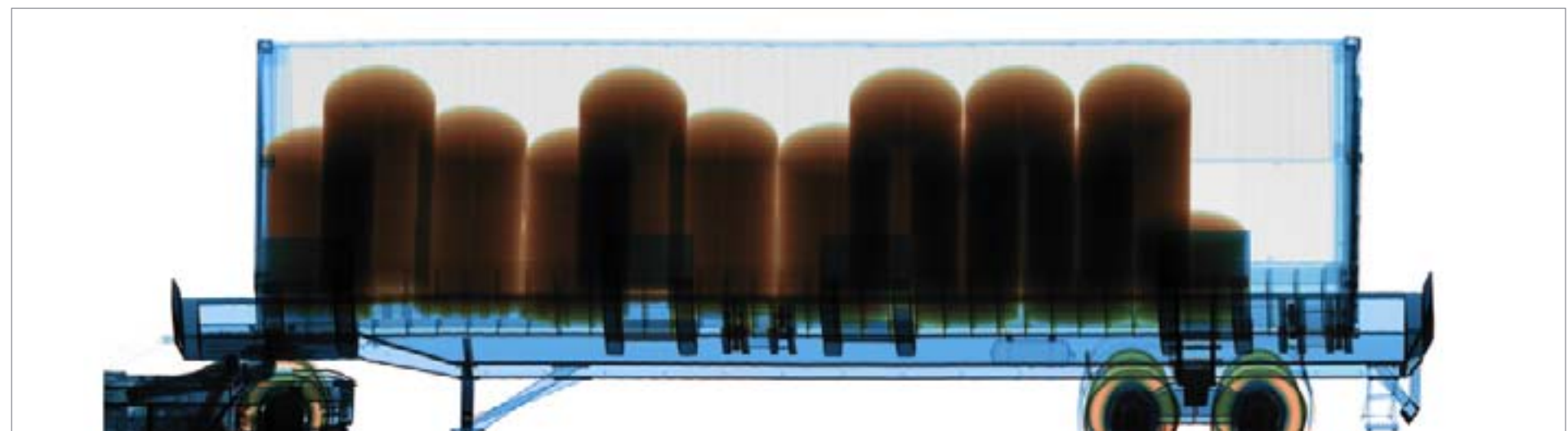
Construction accesories – standard view



Paper Rolls – standard view



Paper Rolls – material separation view



Customised Control Centres

Depending on the type of application and scanning site location, our customers may choose from three types of command centers. The standard pelican-case provides core functionality and efficient operation in military environments with minimal effort from the crew.

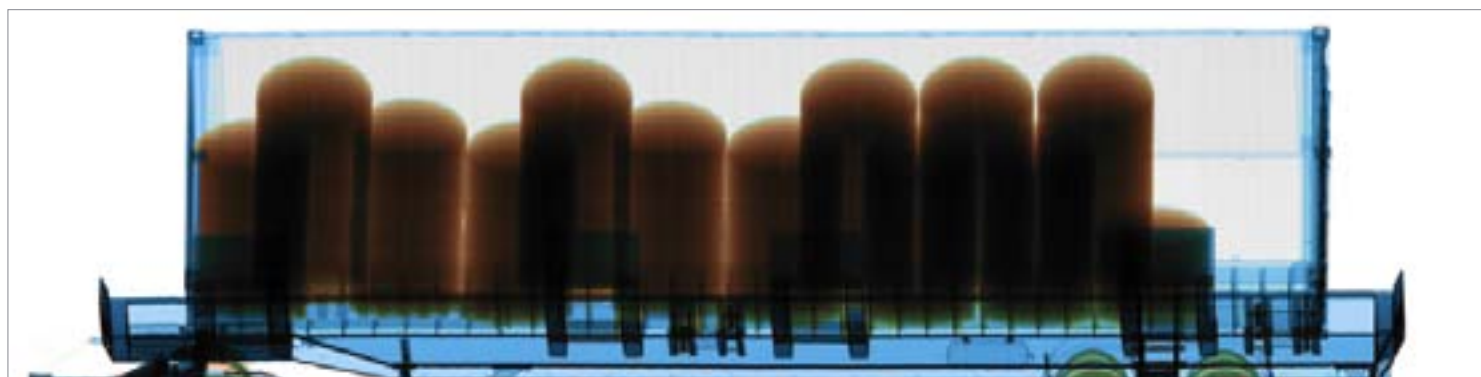
A towable MCC is the perfect solution for semi-permanent scanning locations providing an autonomous & comfortable climate-controlled environment for the operator.

Dual-energy & high resolution imaging

The Dual-Energy Linear Accelerator Unit produces a fan-shaped radiation beam that is carefully oriented in order to achieve the best possible image quality and to cover the entire scanned vehicle from the axles to its top without any image cut-off. The Linear Accelerator unit delivers two interlaced levels of energy – 6 and 4 MeV – in order to achieve material separation;

For cases requiring more flexibility, a separate van can be supplied for operation of TUDOR SCAN and for additional purposes such as a full mobile checkpoint with increased screening capabilities such as: radiation detection, baggage and parcel screening, explosives & narcotics trace detection, document analysis and mobile surveillance.

The material separation feature provides extra information for the operators that can easily evaluate the radiography and establish a more accurate threat level by knowing whether the suspect area is organic, light organic or inorganic. With most of explosives being organic, this feature is extremely useful in identifying bulk explosives and IEDs.



Command Centre Integration

Effective supervision of scanning activities and prevention of corrupt practices has always been a serious concern for border control authorities.

TUDOR SCAN ML64 scanners can be remotely supervised in real time from a central management location with or without knowledge of the operators and can even be operated from the supervisor console.

Romania's external European Union border already benefits from this advanced and unique feature as all cargo and vehicle scanners currently in operation are constantly monitored by the Integrated Border Management structure in the headquarters of the National Customs Authority.

Additional integration options include automatic traffic management systems, under-vehicle inspection, radiation detection and nuclear, chemical and biological detection capabilities.



Imaging performance

Principle of operation:	Transmission imaging
Energy:	6 / 4 MeV, interlaced
Scanning speed in one-by-one mode:	0.2 to 1 m/s
Scanning speed in drive-through mode:	5 to 15 km/h
Penetration:	320 mm in steel
Wire resolution in air:	1 mm
Contrast:	1% (1 mm steel sheet visible behind 100 mm of steel)
Material separation:	4 classes
Level of radiation for the operator:	natural level, no professional exposure
Dose of radiation to public outside the exclusion area:	max. 1 mSv/year;
Radiation Monitoring:	individual monitoring for each operator;
No human presence inside the exclusion area	

The Vehicle

Chassis:	3-axle, 20 t GVM Computer-managed speed, steering and braking during the scanning process Left or right hand drive Various manufacturers and models depending on specific local conditions
Dimensions (LxWxH):	10.5 m x 2.5 m x 4 m (transport mode)
Environmental:	Euro-6 compliant (Euro-3 for Africa)
Fuel consumption:	Less than 15l/h in scanning mode

Operating Features

Remote operation via secured wireless technology or via internet connection	
Scanning Frame dimensions:	4.5 m width x 4.7 m height; different dimensions available on request;
Time to deploy:	Maximum 5 minutes from arrival on site by automated process control;
Crew requirements:	1 operator/shift;
Vehicles inspection mode:	one by one of stationary vehicles, sequential, drive through in portal mode;
Throughput:	30 to 500 vehicles/containers/hour according to the length of each scanned object and scanning mode;
Scanning Speed:	variable within the range 0.2 – 1.0 m/sec. or 5 to 15 km/hour in drive through mode;
Warning lights and audible alarm indicating „Radiation on status“;	
Safety features:	Exterior lighting for night time operation;
Digital video surveillance subsystem, allowing the operator to monitor the scanning area;	
Operation:	Between - 10°C and + 40°C; optional extreme conditions kit available on request;
Relative Humidity:	5-95% (non - condensing).



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