



BORDER SECURITY

HOMELAND PROTECTION

AIRPORT & SEAPORT SECURITY

[www.tudor-tech.ch](http://www.tudor-tech.ch)

# TUDOR SCAN 1MC 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.operators.

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.

It is the most technologically advanced gamma scanner available in the world market with impressive image analysis capabilities that ensure the highest productivity for cargo inspection applications without compromising the safety and security of the operators.

TUDOR SCAN 1MC'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.

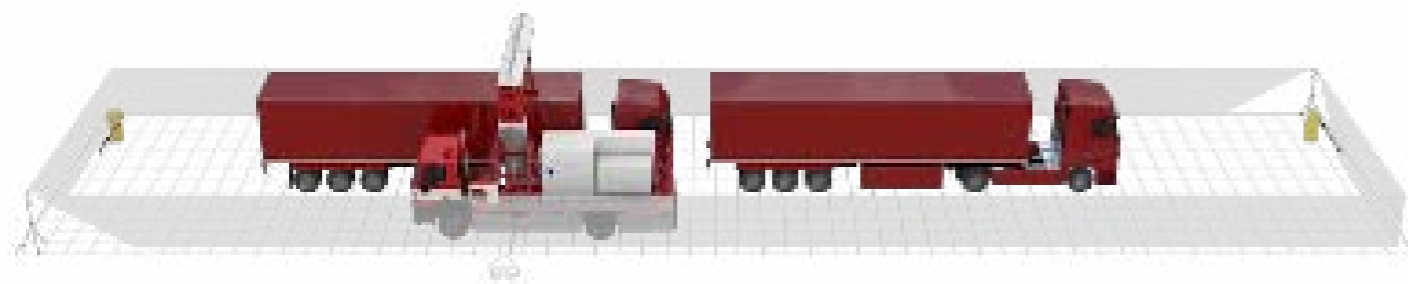


MOBILITY is a key aspect in today's border security with ever increasing threats, with fast paced changes in the rules and standards of security and safety.

ROBOSCAN is a highly versatile mobile imaging system, allowing 3 operating modes:



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



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



3. Fixed portal scanner (the inspected vehicles can be driven by their driver in order to be fully scanned at low speed of 5 to 15 km/hour that generates an optimized solution in terms of throughput of more than 200 long vehicles/hour).

### Maximum Safety

TUDOR SCAN 1MC 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 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 1MC is that it doesn't need a driver to control the truck's movement (drive direction, sense, steering, brakes, vehicle'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 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 voice.

The radiation source is deployed and stored with fully automated sequences. It is designed to provide a safe, reliable and constant source of gamma-rays, (1.27 MeV) turned On/Off by a pneumatic fail safe actuator. Compared with linear accelerator technology, the Gamma-ray technology offers fast, reliable, and safe operation, providing at the same time the advantage of at least 4 times lower total cost of operation for a life time of 10 years.



### 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.

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.



### Mobility / Versatility

All the components of the unit are assembled on a light truck chassis, resulting in an extremely versatile and mobile robotized scanning system. The lightweight vehicle can access any type of road and can easily reach checkpoints with poor road infrastructure.

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.



Mobile Scanning Unit (MSU)



A lightweight, highly versatile scanner, fully operated from a safe distance. All the computers and imaging electronics are powered from the vehicle's engine resulting in great fuel efficiency and low operating costs. While in transport mode it can be driven on any type of road due to its low weight of approximately 13 tons. Several vehicle manufacturer options are available depending on local conditions.



Imaging Subsystem



Using the latest innovations in transmission imaging and in-house developed electronics, Roboscan 1MC is the first mobile scanner to combine the reliability of isotope-based systems with the functionality of material separation.

Ultra-fast sampling electronics and highly sensitive detector arrays ensure the best possible imaging performance even in drive-through scanning. All the hardware and electronics are mounted in stainless steel modular housings for durability and fast service intervention.

Remote Operation Subsystem

Unique feature on the market, remote operation is the defintory feature of Roboscan. 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 Roboscan 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



Roboscan 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 gestured based interface.

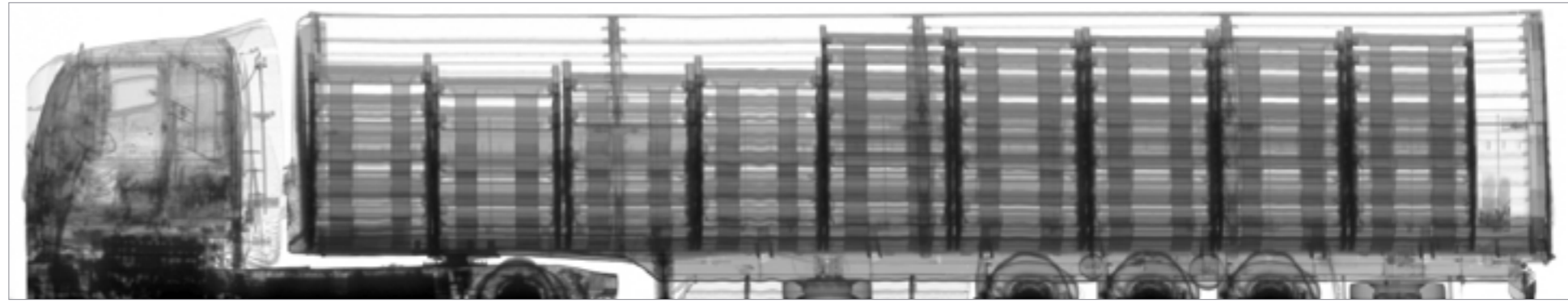


The operator can see at a glance the current state of the system and has easy access to all the parameters that determine the throughput and image quality. All the operations are logged for review or subsequent training.



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.

Wood pallets – standard view



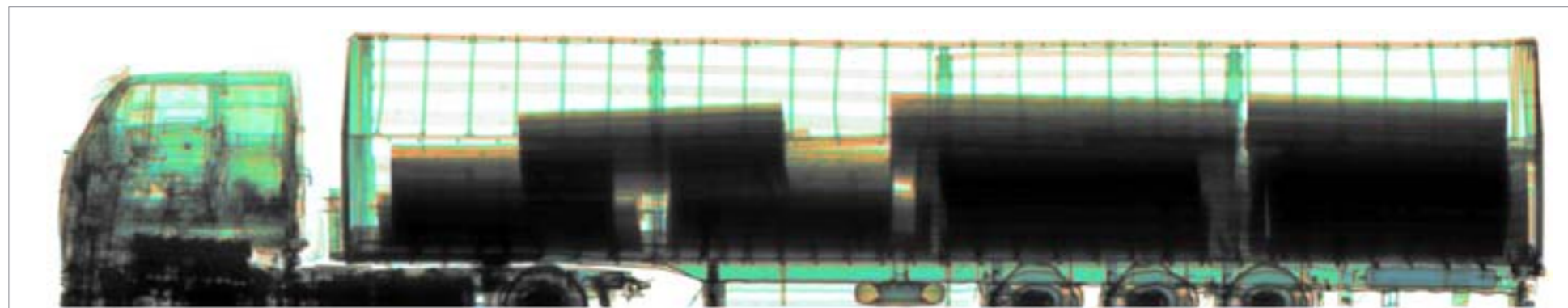
Road tanker – standard view



Rubber tyres – material separation view



Timber – 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 centres. The standard pelican-case provides core functionality and efficient operation in military environments with minimal effort from the crew.

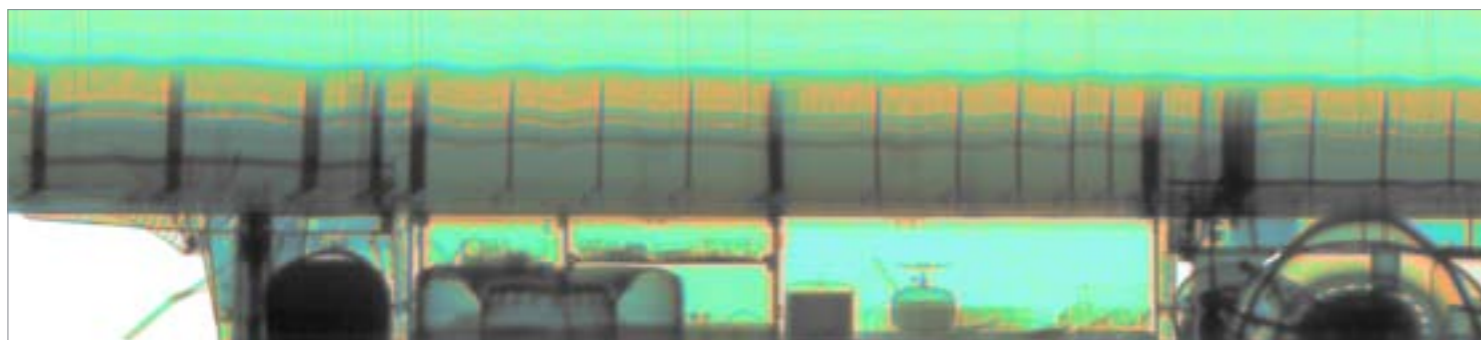
A towable MCC is the perfect solution for semi-permanent scanning locations providing an autonomous & comfortable climate-controlled environment for the operator.

For cases requiring more flexibility, a separate van can be supplied for operation of Roboscan 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.

### Dual-energy & high resolution imaging

As a first for cargo & vehicle screening systems, Roboscan combines the advantages of material separation with the reliability of natural isotope imaging systems and takes image resolution to an impressive 1.5 mm.

The material separation feature provides extra information for the operators than 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.

Roboscan 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
Penetration:	180 mm in steel
Image resolution:	standard 4 mm steel object visible / 1,5 mm object visible with the high-resolution & dual-energy option
Level of radiation for the operator:	natural level, no professional exposure
Dose of radiation to the inspected vehicle:	less than 0.01 mSv / scan;
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:	2-axle, 13.5 t GVM; Computer-managed speed, steering and braking during the scanning process; Left or right hand drive; Various manufacturer models depending on specific local conditions;
Dimensions (LxWxH):	8.8 m x 2.5 m x 3.6 m (transport mode)
Environmental:	Euro-6 compliant / Euro-3 for Africa
Fuel consumption:	Less than 5l/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:	Continuous, sequential, or 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:	Continuously variable inside the range 0.15 – 1.0 m/sec. or 10 to 15 km/hour in drive through mode;
Safety features:	Warning lights and audible alarm indicating „Radiation on” status;
Operation:	Exterior lighting for night time operation;
Relative Humidity:	Digital video surveillance subsystem, allowing the operator to monitor the scanning area; Between - 15°C and + 45°C; optional extreme conditions kit available on request; 10-95% (non - condensing)



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## SUISSE

c/o Parc Technologique de Saint-Imier  
7, rue de la Serre, CH-2610  
Saint-Imier, Canton de Berne - Suisse  
Tel.: +41 799 06 80 14  
e-mail: [office@tudor-tech.ch](mailto:office@tudor-tech.ch)

## ROMANIA

Calea Bucureștilor 3A,  
Otopeni 075100, Ilfov, România  
Tel: +40 (21) 350 40 57, +40 (21) 350 40 55  
Fax: +40 (21) 350 15 80  
Email: [office@mbtechnology.ro](mailto:office@mbtechnology.ro)