

# **TECHNICAL PROPOSAL**

**M-SCAN** Mobile Trailer-based X-ray Truck/Vehicle and Container Scanning System



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## 1. INTRODUCTION

**M-SCAN Mobile Trailer-based X-ray Truck/Vehicle and Container Scanning System** is designed to optimize security checks at ports, airports, border crossings, Government facilities. It reduces the need for manual inspection of complete trucks (cabin included), containers and vehicles by verifying manifests and checking for threats such as explosives, narcotics, weapons of mass destruction (WMDs) and contraband.

- Inspects loaded trucks, containers and vehicles at ports, airports, border crossings and Government facilities
- High throughput of up to 25 trucks per hour in mobile mode and up to 150 trucks per hour in portal mode.
- Steel Penetration up to 360mm at 9MeV
- Small footprint
- Advanced imaging technology provides a high-performance imaging capability with organic/ inorganic material discrimination and colorization in a single scan



#### **2. SYSTEM HIGHLIGHTS**

- The crew works remotely: High anti-terrorist security of the crew and the database
- It is possible to use several M-SCANs on one site (no need to build new inspection sites);
- One operator can manage several M-SCANs => no need to increase the staff with an increase in the number of the systems
- Doesn't need a special persmission to travel on public roads of any categories
- Load per axle is less than 6 tons
- Operators' automated workplaces can be placed anywhere
- Low cost of operation, low energy consumption

The equipment has been tested in accordance with the standards: ANSI N 43.17-2009 (portal mode) ANSI N42.46-2008 IEC 62523:2010



#### **3. SPACE AND DIMENSIONS**

#### **3.1.** BASIC DESIGN OF THE SYSTEM



M-SCAN is mounted on the chassis of a self-propelled trailer and has the ability to move with the help of a towing vehicle.

The dimensions of the complex in the transport position allow to move along public roads without interference, to be transported on a railway platform or on board of a transport airplane.

#### **3.2. PLACEMENT OPTIONS**

Inspection of vehicles using M-SCAN is carried out on a special site sized 40x40m (restricted access area according to radiation safety standards).

The operator is recommended to be located in convenient places at the site boundaries, or to equip one of the existing premises at the checkpoint, in order to reduce the effects of radiation and to provide the antiterrorist protection of the crew.



#### STANDARD PLACEMENT



#### **MULTI-SYSTEM PLACEMENT**



M-SCAN allows the use of multiple scanning modules operating simultaneously on one site.

All M-SCANs can be controlled from a single operator module, which significantly reduces the number of personnel involved.

42, Volgogradsky prospekt,	www.tsnk.ru
109316	info@tsnk.ru
Moscow Russia	tel./fax: (495)228-1828



#### 4. DESCRIPTION AND PRINCIPLES OF OPERATION

#### 4.1. Scanning modes

Scanning can be performed in two modes:

- Mobile mode the System moves along the inspected vehicle which stays
   still
- **Portal mode** the System stays still, the inspected vehicle moves independently

## MOBILE MODE SCANNING



#### PORTAL MODE SCANNING





#### 4.2. General sequesnce of the inspection procedure

The driver of the vehicle being inspected stops the vehicle at the entrance to the inspection area and waits for permission to enter the inspection area.



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#### **5. SCANNING ANGLE ADJUSTMENT**

M-SCAN allows to adjust the angle of the scanning  $\pm 7$  degrees to the direction perpendicular to the motion direction.

This allows to make previously not visible zones, such as the front and the rear walls of a container or a vehicle, clear and accessible for inspection.



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# 5.1. Examples of X-RAY images







# 6. SPECIFICATIONS

4-9 MeV
The M-SCAN moves while the object does
not, or it can be the opposite according to
requirements
340
1.2 at 100mm of steel
1.2
40m(L) x 40m(l)
Less than 5µSv/scan
Yes
Trailer
Less than 20 tons
N/A
10630x2542x3395
24 or 12m/min - 36m/min available in option
• Passage of the trucks in stationary mode
up to 7km/ 4mph
N/A
10630x7500x5150
5150
4600
4350
Less than 20min (average 15min)
Up to 25 trucks per hour (typical 20) in
mobile mode and up to 150 (typical 120) in
pass through mode*
1 image operator and 1 traffic marshal
-40°C to +50°C
-40°C to +60°C
Up to 95%
20 kVA in average



	Image analysis station System control station database workstation CCTV server	
Image analysis tools	Contrast and edge enhancement, filters, marks and annotations, histogram equalization, review of stored images and manifest data for comparison, image conversion to standard formats, objects measurement	
Database workstation type	SQL database	
Data storage	200,000 images as standard	
Data archiving	DVD burner (standard)	
Printer/Scanner	Color laser printer	

Radiation protection safety	
CCTV	6 Cameras + 3 intercom radios
Markings Regulations	3-color safety light + siren
Radiation protection	Compliant with WHO, ICRP 103-2007, EU
	& US regulations Security perimeter zone
	defined by infrared mark

Health & security					
Dose in the environment	Average boundary	<0,5µSv/h	<1mSv/an	at	the
Dose rate in operator cabin	Backgrou	nd level			
Options					
Automatic radiation portal monitor					
Additional image analysis workstation	on				
		1			

Connection to Centralized Image analysis Center \* Typical values - values may differ depending on freight and scanning conditions.

Compliance	with	ANSI N 43.17-2009 (portal mode)
standards		ANSI N42.46-2008
		IEC 62523:2010 GOST 12.2.091-2012
		GOST R 51522.2.1-2011
		SanPin 2.6.2523-09 (NRB-99/2009)
		SP 2.6.1.2612-10 (OSPORB-99/2010)
		SanPin 2.6.3488-17

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## 7. CERTIFICATION

CERTIFICATE OF COMPLIANCE			
No ROSS RU AM05 H04229			
Valid from 28.02.2019	СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р		
To 27.02.2022	ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГІ		
No. 0459338			
CERTIFYING BODY			
RA RU 11AM05	Nº POCC RU.AM05.H04229		
Certifying body LLC "Center of certification and	Срок действия с 29.07.2019 по 28.07.2022		
expertise "Tverex". Address: 141006. RUSSIA.	№ U459338 ОРГАН ПО СЕРТИФИКАШИИ ВА.В. 11АМ05		
Mosckovskava oblast. Mytischi, Olimplivsky	Орган по сертификации продукции ООО "Центр сертификации и экспертизы "Тверьзкс". А прес: 141006. РОССИ		
ave., 43bld1, Telephone +7-925-636-1225	Московская область, г. Мытиция, пр-т Олимпийский, владение 43, стр. 1. Телефон +7-925-636-1225, адрес электронной почты: оs-tverex@vandex.ru		
Email os-tverex@vandex.ru	ПРОЛУКЦИЯ МОБИЛЬНЫЙ ЛОСМОТРОВЫЙ КОМПЛЕКС НА		
PRODUCT:	ПРИЦЕПЕ «М-СКАН 9032», ТУ ДНК.412125.002. Серийный выпуск.		
Complies with the requirements of the folliwing	20.31.00		
regulatory documents:			
GOST 12.2.091-2012	COOTBETCTBYET TPEEOBAHUSM HOPMATUBHEN AOKYMEHTOB		
GOST R 51522.2.1-2011	СП 2.6.1.2612-10 (ОСПОРБ-99/2010), СанПин 2.6.1.3488-17 9022 19 000 0		
SanPin 2.6.2523-09 (NRB-99/2009)			
SP 2.6.1.2612-10 (OSPORB-99/2010)			
SanPin 2.6.3488-17	ИЗГОТОВИТЕЛЬ ООО «диагностика-м». ОГРН: 1037739045552. Адрес: 105118, РОССИЯ, г. Москва, 5-я ул Соколиной Горы, дом 22, телефон/факс: 8 (495) 228-18-28.		
MANUFACTURER			
LLC Diagnostika-M	СЕРТИФИКАТ ВЫДАН ООО «Диагностика-М». ОГРН: 1037739045552. Адрес: 105118, РОССИЯ, г. Мон 5-я ул. Соколиной Горы, дом 22, телефон/факс: 8 (495) 228-18- 28.		
LLC Diagnostika-M			
OGRN 1037739045552 Address 105118	НА ОСНОВАНИИ Протокол испытаний № 001/D-29/07/19 от 29.07.2019 года, выданный Испытательной		
RUSSIA, Moscow, 5 <sup>th</sup> Sokolonov Gorv st., 22 tel.	лаоораториеи "Орион" ООО "Вега" (аттестат аккредитации РОСС RU.31578.04ОЛНО.ИЛ09)		
8 (495) 228-18-28			
CERTIFIED			
LLC Diagnostika-M	АОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Маркировка пролукции знаком соответствия		
OGRN 1037739045552 Address 105118	производится по ГОСТ Р 50460-92. Место нанесения знака соответствия на упаковке и/или в сопроводительной документации.		
RUSSIA, Moscow, 5 <sup>th</sup> Sokolonoy Gory st., 22 tel.	Схема сертификации: 3		
8 (495) 228-18-28	М.Т. Сланин м.Т. Саланин иншала, фамисия		
REFERENCE	Эксперт А.Ю. Батюков		
Test protocol No. 001-D-29/07/19 dtd	Сертификат не применяется при обязательной сертификации		
29.07.2019, issued by "Orion" Test laboratory of	<ol> <li>All 2013/One. Microso, 2016; do:</li></ol>		
the Limited Liability Company "Vega"			
(accreditation certificate ROSS			
RU.31578.04OLN0.IL09)			
ADDITIONAL INFORMATION			
Marking of the product is carried our upon GOST			
R 50460-92. Placement of the compliance mark			
is the package or the documentation.			
Sercification scheme: 3c			
Head of the body A.A.Belyanin			
Expert A.Y.Batyukov			
Not applicable for mandatory certification			







## 8. ACCESSORIES AND SPARES

#	Name of spare parts	Cat.No	Note		
1	Four-axle self-propelled trailer				
1.1	Jack, 25t	MS-T-D-001			
1.2	Mounting (cobra), 665 mm	MS-T-D-002			
1.3	Cylinder wrench for unscrewing wheel nuts	MS-T-D-003			
1.4	Spacer for holding the breather when working on the site	MS-T-D-004			
1.5	Emergency stop sign	MS-T-D-005			
1.6	Hose for pumping wheels	MS-T-D-006			
1.7	Pressure gauge for wheel inflation	MS-T-D-007			
1.8	Filter element for hydraulic drive	MS-T-D-008			
1.9	Slings (Tightening belt for fastening cargo 4m, 0,4/0,8 t ring ROMEK 25.04.1.k 200000005539)	MS-T-D-009			
1.10	Hardener and paint for coloring chips and scratches	MS-T-D-010			
1.11	Pneumatic hose 1 meter, diameter 8mm for repair	MS-T-D-011			
1.12	Pneumatic hose 1 meter, diameter 12mm for repair	MS-T-D-012			
2	Diesel Generator Set (DGS)				
2.1	Oil filter	MS-DG-D-001	MD162326		
2.2	Fuel filter	MS-DG-D-002	3446200300		
2.3	Alternator drive belt	MS-DG-D-003	330170335		
2.4	Air cleaner	MS-DG-D-004	1319257		
2.5	Fuel filter	MS-DG-D-005	FSK28676		
2.6	Oil for DGS	MS-DG-D-006	Shell Rimula 5W30 (20 I)		
2.7	Set of car fuses "Standard" in a plastic box 100pcs.	MS-DG-D-007	80-7024		
2.8	Toolbox	MS-DG-D-008	ALK-8023F		
2.9	Lever pipe wrench 90°, 3"	MS-DG-D-009	GARWIN GR-PWR030		
2.10	Manual wrench with mechanical gearbox, 310 mm, 1:69, 4800 Nm, heads 32, 33 mm	MS-DG-D-010	GARWIN GR-LS4800L		
2.11	Professional plunger syringe for one hand 345 atm., 500 cm3, hose	MS-DG-D-011	GROZ GR43020 - G5F/B		
2.12	Synthetic grease	MS-DG-D-012	Shell Gadus S5 V100 2		
2.13	Brake circuit repair kit	MS-DG-D-013	TRUCK- DCASE/9000+6000		
2.14	Radial pressure gauge	MS-DG-D-014	RGC-M63-R-160-T2		
2.15	Radial pressure gauge	MS-DG-D-015	RGC-M63-R-400-T2		
2.16	Microshlang	MS-DG-D-016	L 500 (M16x2-1/4)		
3	Betatron				
3.1	Accelerator chamber with injection unit	MS-B-D-001	0936, 0962		
3.2	CN Controller Board	MS-B-D-002			
3.3	Supply voltage board PW	MS-B-D-003			
3.4	SN synchronization card	MS-B-D-004			
3.5	Fuse L=20 mm 3.15 A	MS-B-D-005			
3.6	Fuse L=20 mm 1.0 A	MS-B-D-006			
3.7	Fuse L=20 mm 2,0 A	MS-B-D-007			



3.8	Fuse L=20 mm 12,5 A	MS-B-D-008	
3.9	Key for removing printed circuit boards	MS-B-D-009	
3.10	Key for tightening the poles	MS-B-D-010	
3.11	Repair cable for PCB connection	MS-B-D-011	
3.12	Optical isolation board	MS-B-D-012	DNAP-0038
4	Linear Detector		
4.1	Detector module assembly	MS-L-D-001	DNAP-0041
4.2	Motion Controller Assembly (Synchronizer)	MS-L-D-002	DNAP-0050
4.3	Data Collection Controller Board	MS-L-D-003	DNAP-0005
4.5	Cross board main	MS-L-D-004	DNAP-0036
4.6	Approval fee	MS-L-D-005	DNAP-0037
4.7	Set of loops	MS-L-D-006	
4.8	Optical splitter board	MS-L-D-007	DNAP-0056
5	Automated control system		
5.1	Emergency stop button	MS-ACS-D-001	ES21-SA10D1
5.2	Radar sensor	MS-ACS-D-002	QT50RF-EU-AFHQ
5.3	Photoelectric collision sensor	MS-ACS-D-003	DS35-B15821