Human Security Radar^{TM}

A DISRUPTIVE TECHNOLOGY BREAKTHROUGH IN STANDOFF SUICIDE BOMBER DETECTION

Human Security Radar

Mass Transit Detection Devices with high capability of detection, better throughput, low life-cycle costs and low false alarm rate – all **without disrupting the people flow**.
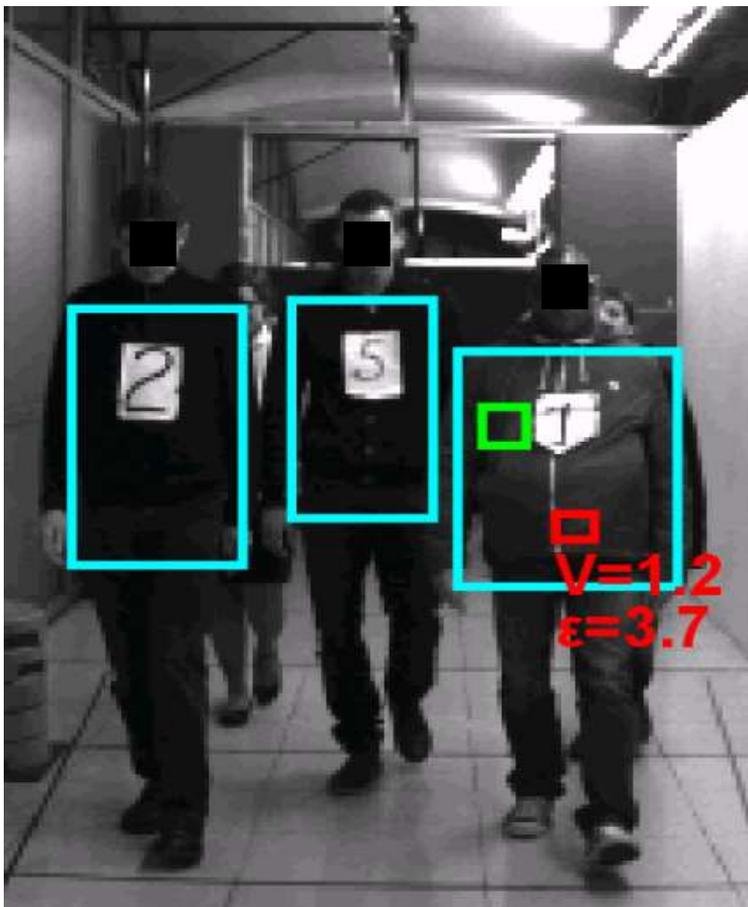
Human Security Radar^{TM} - a paradigm shift in Homeland security

Human Security Radar^{TM} - Extending the Security Perimeter

For the first time it is possible to automatically monitor and detect explosives in crowded public places, such as transport facilities, hotels, market squares, public buildings which have become today's targets. **Human Security Radar^{TM}** is the first device that can detect carriers of small-size improvised explosive devices (IEDs), automatically, in real time and without interfering in the people flow.

Human Security Radar™ - The First Suicide Bomber Detection Device for Mass Transit and Crowded Areas

The ultimate mission for modern security - is to provide safety in public places without interfering with the daily routines. This has been an insurmountable challenge for all anti-terrorist protection organizations, governmental or commercial. To make this possible requires a breakthrough innovation in the security sphere: high performance and throughput capacity, automatic decision-making, standoff detection, low cost, simple integration with existing security systems, privacy protection and electromagnetic compatibility.

APSTEC has been searching for such breakthrough innovation for 12 years while developing the AMW (Active Micro Waves) technology. The results are implemented in **Human Security Radar**™ - the first real Mass Transit Suicide Bomber Detection Device.

Human Security Radar™ - The Innovative System for Automatic Standoff Inspection of People and Luggage in Real Time

Human Security Radar™ combines high probability; automatic detection and low false alarm rate and **operates on the first line of defense**. It is a revolutionary human body standoff real-time scanner - with innovative stationary gantry design that captures 3D UHF-images with speed of 10-30 frames per second. The scanner provides high resolution and requires low maintenance costs due to its "no moving parts" design. It is fully automatic, requires no specially trained operator and has very low operating costs.

Design sets new standards for security and efficiency

Advanced real-time detection algorithms produce automatic threat detection

✓ Standoff detection of threat materials;
✓ Automatic Threat Recognition (ATR);
✓ Real-time operation;
✓ Non-cooperative passenger screening;
✓ No privacy issues;
✓ Covert or open installation;
✓ Multiple target detection;
✓ Integrated video tracking;
✓ Integration with other security systems.

✓ Decision making is operator independent. Training and experience of the operator is not crucial;

✓ Can be easily modified to detect different kinds of threats.
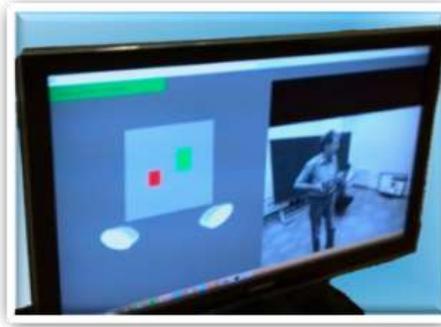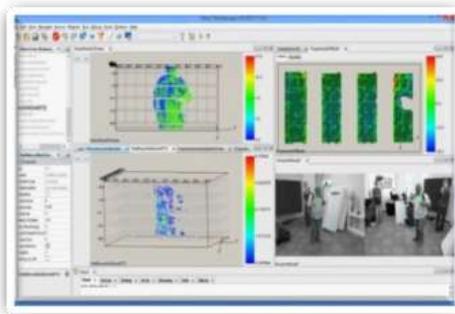
| Fast algorithms for advanced UHF-image reconstruction and explosives detection | Image processing - up to 30 frames per second | High detection probability and low false alarm rate | Simultaneous inspection of several targets | Video tracking capability | Photo of suspicious person transmitted together with alarm signal |

| Flexible configuration to fit into any security architecture | Capable of combining system and workstation into one operational unit | Real time operation without interfering with the people flow | Easily integrated into any security infrastructure, including video tracking systems | Meets IEEE C95.1–2005 (Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz) |

How does it work?

Human Security Radar[TM] (HSR) provides standoff real-time automatic detection of suicide bombers with an IED hidden on the body under clothing or in a backpack. HSR operates by sending centimeter range microwaves towards the moving targets, detecting scattered and transmitted waves afterwards. Data analysis is carried out in real time by high-speed GPUs to obtain the image of the hidden object and receive information about its volume and dielectric properties – to distinguish between common object and explosive. This information is then used to automatically assign threat level to the detected 'anomaly' - all without operator's involvement.
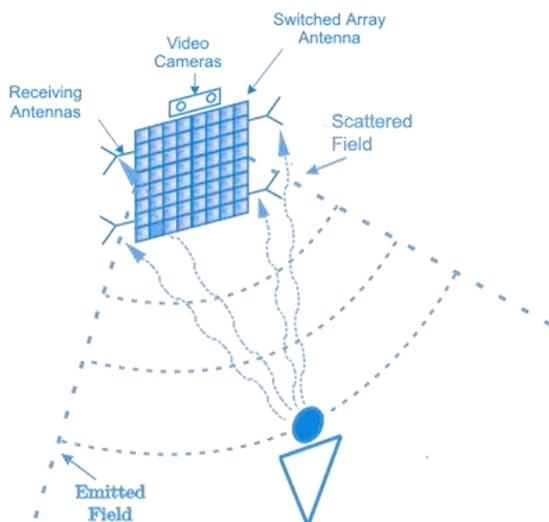
Optical stereo video system points out the suspicious volume to gives an automatic alert in real time. Further data analysis includes reconstruction of 3D video image of the investigated zone and targets within this zone. This imaging is synchronized with 3D microwave imaging.

The synchronization between 3D video and microwave images allows automatic transmission of the alert signal in real time with photo and coordinates of the suspicious person, and location of the hidden suspicious objects found on the body to security officers and first responders. The resolution of the system is sufficient to detect potentially hazardous objects on human body, without violating any privacy issues.

What is the detection area?

Detection area is defined by the architecture of the inspection area, the client's requirements and the chosen configuration. Portal configuration designated for passage up to 3 meters, provides a detections distance – up to 10 meters.

How many persons can be inspect simultaneously?

Number of inspected individuals (targets) depends on how dense the people flow is inside the inspected area. To provide required detection probability level: 3-5 targets in close vicinity of the system - in **real time** without slowing down the people flow.

When does Human Security Radar™ send an alarm signal?

The moment the system detects a dangerous object on the body of an inspected individual. Accumulated level of alarms can initiate different consecutive devices or technologies.

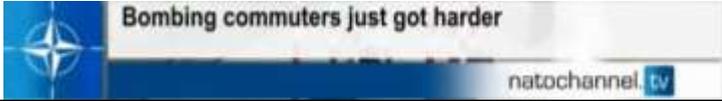## How is Human Security Radar™ integrated with existing video tracking and surveillance systems?

For system integration with other external devices we use protocol over TCP/IP with XML data format. The protocol is used to send information about dangerous level and location of the detected object, to forward picture of this object inside the inspection area and to get information about system status.

Why is Human Security Radar™ technology and design cost-effective?

- Fewer machines and higher throughput allowing handling a given quantity of people and volume of bags/backpacks.

- Decision-making doesn't require an operator. One operator controls dozen of devices, reacting only if one of the systems sent an alarm signal.

- The system can be integrated inline with the existing IED detecting systems network without additional costly modifications or reconfiguration.

- Designed for easy installation, operation and maintenance. Can be modified according to the existing architecture of the public facility.

- It is possible to adjust false alarm parameters for different scenarios, thus, effectively nullifying false alarm rate.

Innovation and experience bring us to leadership in standoff detection.

2007	APSTEC was given a special commendation by NATO Committee "Science for Peace and Security" as the most promising enterprise having high commercial and export potential
2009	APSTEC's Award Winning technology was named to be the next generation of security solutions for body carried IED detection
2010-2012	APSTEC was a key-player in "Stand-Off Detection of Suicide Bombers and Mobile Objects (STANDEX)" – NATO (ESM-Emerging Security Challenges Division) international project
2011-2013	APSTEC is assigned by Technical Support Working Group (USA) international project "ADVANCED MULTI-ANTENNA IMAGING RADAR SUICIDE BOMBER DETECTION"
2013	APSTEC technology and device tested live in a subway station in a European capital within STANDEX Big City Trials Project as the world's first technology for remote, real-time detection of explosives.
2014-2016	First version of **Human Security Radar**^{TM} ready 2014 and is extensively tested during 2015. 2016 HSR is officially launched and ready for market.

Human Security Radar

Stationary Gantry Design	Yes
Width of free passage for passengers	1-3 m
Standoff inspection	≤10 m
Automatic decision making	yes
Real-time inspection	yes
Speed of people movement	up to 6 km/h
Simultaneously inspected	up to 5 individuals
High resolution 3D video images	
Modular design	
High resolution 3D UHF images	
Industry Highest Mean Time Between Failure (MTBF)	yes
On Board GUI Diagnostics Tools	
STP Compliant	yes
Meets IEEE C95.1–2005	yes
Power supply	1,5 kWt/220V/50Hz
Integration with other security systems, including video tracking	yes
Capable of multiplexing	yes
Flexible system configuration,	yes
Probability of IED detection	high
False alarm	low and adjustable
Covert inspection	on demand
Speed of analysis	up to 30 frames/s
Detection of weapons	under development
Automatic localization of concealed objects	yes
Capability to automatically determine TNT-equivalent mass and volume of concealed	yes
Built-in 3D video tracking	yes
Sends video image and coordinates of potential threat to security officers and first responders in real-time	yes

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