

Hospital CBRNE Preparedness – Are we Ready?

CBRNE Newsletter Terrorism

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Original Papers

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D.R.A.M.S. Early Warning System

Huge areas explosives' protection

By BG (ret'd) Konstantinos E. Stomatias

As Improvised Explosive Devices (IEDs) deliver a disproportional effect and high collateral damage, have become the signature weapon of international terrorism. In order to reduce major threat to political stability worldwide Kyklotron Ltd R & D section develops D.R.A.M.S. (**D**etect, **l**ocalize & **R**ecords **t**Argets in **r**eal **t**i**M**e, **S**ystem) early warning system. Main part of this system is the KYKLOTRON E series sensors. KYKLOTRON E and INS series sensors offer remotely finding and localization of any known explosive from sort and long distance. Explosive detection based on the Magnetic tuned phenomenon, a tech that detects all common nitrogen based explosives (including ammunition).

Kyklotron Ltd is constantly adopting and improving new technologies to meet both the customer needs and new security challenges. Kyklotron Ltd serves the international market with products and solutions that have the highest accuracy, aiming at applications in both civil defense and military security. In order to meet the needs of our customers we are continually striving to bring to our distributors the best products and services.

In Kyklotron Ltd we study, design and develop Early Warning Systems. Our multi-censoring, microelectronic, real time systems can detect and locate most material structures. We also research and develop systems for safety, defense, counter terrorism & health. Kyklotron Ltd was established in Cyprus, EU, at 10/11/2010 (registration number IE 275416, VAT number: 10275416J).

Our Vision is to design & develop prototypes, worldwide technological products, that will promote the culture and the environment. Our specialization on those scientific fields guarantees the constant improvement of the team's operation and the satisfaction of any customer needs. Over the past few years our research has been focused on the design and manufacturing of state - of -the - art W.M.T.S (Wave - shooting Magnetic Tuned Systems) or mostly new as KYKLOTRON TECHNOLOGY.

Designed to perform a quick and efficient survey of any material structure in distances from 0 to > 20,000 meters, is able to set aside all similar substances. By using DRAMS, a Kyklotron's Ltd registered patent GR20070100067/2008-09-19 method, targets located are transformed to geographical Information.



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KYKLOTRON E3 S sensor in case

KYKLOTRON E3 L sensor

System's environment

DRAMS is a fully C4ISR system, giving to chief of operations the ability to remotely control and monitoring operations in real time and could:

- “Clean” an area (city – railway station – port – airport – bus station – building – camp etc) from explosives.
- Protect an area on 24 hours basis (city – railway station – port – airport – bus station – building – camp etc) from explosives.
- Search, detect and locate commercial or non-commercial (hand-made) explosives, IDE's, any trap that embedded explosives, any military ammunition in ground, on a range over 20,000 meters, or even underground and deep into the water or sea.

DRAMS have integrated elements to be magnetic tuned with every pre - tuned material structure as explosives, drugs and others. By using the magnetic tuned phenomenon for tuned materials with a high sensitivity, the KYKLOTRON E3 S sensors can detect from short distances 0 -500 meters every pre - tuned material. It makes the device able to ignore any known attempts to disguise the substance or target or hiding and identification of that substance or substances. In ideal conditions range reach over 6,000 m for amounts about 10 kg dynamite or 100kg of AMFO or other kind of explosives or drugs.

DRAMS detect and localize explosives in long distances. The KYKLOTRON E sensors accurately detects mines, weapons, RPG'S, stinger missiles, explosive systems, mortar shells, nuclear projectiles, projectiles, antitank weapons, hashish, cocaine, heroin, amphetamine, ecstasy etc. The system detects explosives in distances ranging from few meters to several kilometers, depending on the quantity of explosives, in a sector of 360 degrees and in depths more than 8 meters under soil, water or in the sea.

DRAMS detect explosives in open terrain, behind walls, barriers, buildings, hills, inside vehicles and metal containers, etc. KYKLOTRON E3 is a system that can be used at Operations Level. KYKLOTRON Ltd's advanced KYKLOTRON E3 technology is the only system that exists today that accurately detects explosives in long distances > 20,000 meters.

KYKLOTRON E sensors are the ultimate tool for “cleaning” large areas fast. KYKLOTRON E sensor sends to a Computer Map the direction and location where the Explosives or are located. Cosmetics, glycerine products, salts, metals and “dirty” environment do not influence the accuracy of explosives detection. Electromagnetic transmission and radiation does not interfere and does not affect the operation and accuracy of the KYKLOTRON E sensors.

DRAMS is using a unique KYKLOTRON's explosives localization PATENED technology and method based on the magnetic attraction (coupling) created by particular explosive structures when energized by low power electromagnetic waves, emitted by the KYKLOTRON E sensor antenna.

Note that KYKLOTRON E sensors works independent from parapet buildings or any kind of barriers, under water or on ground surface.

Kyklotron Ltd E Sensors & Tech in materials detection

Materials detection based on the [Magnetic tuned phenomenon](#), a tech that detects all common nitrogen based explosives (including ammunition), potassium chlorine- based explosives and liquid explosives from a distance from 5 to > 20.000 meters. [VMTS](#) tech [certified](#) by 4 patents, owned by Kyklotron Ltd.

1. GR1004926 /2005-06-30

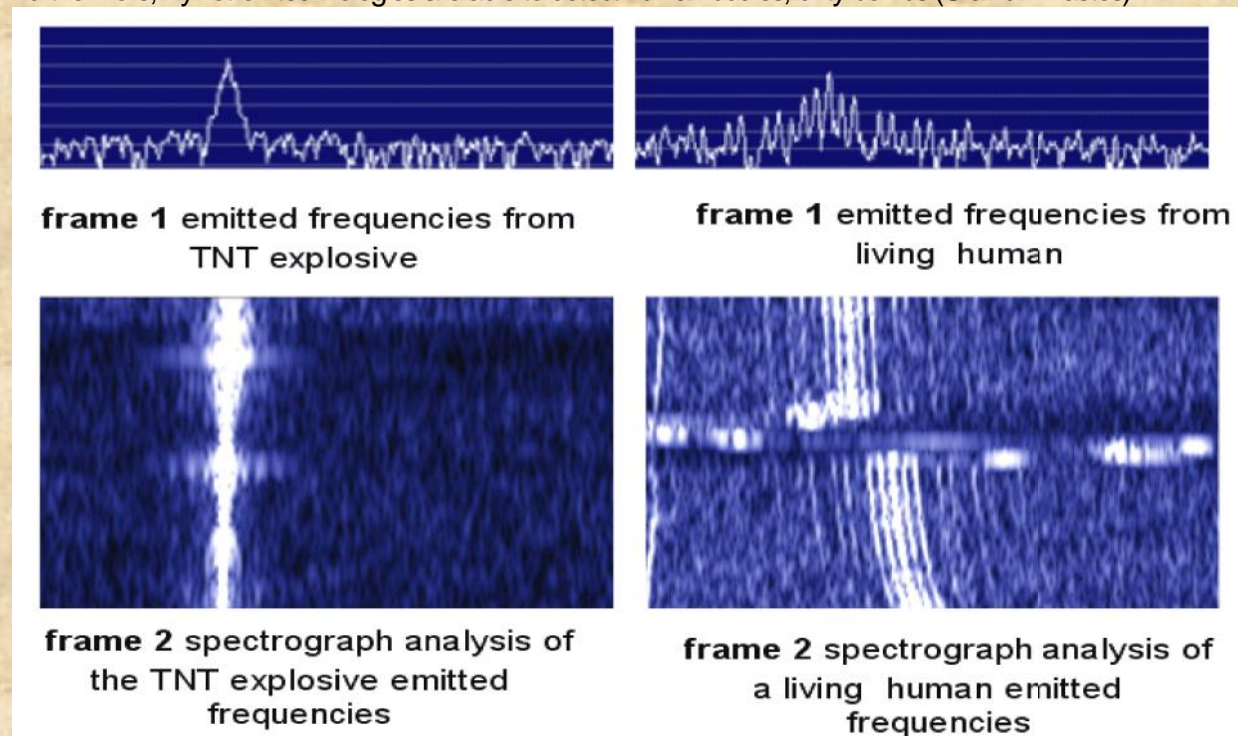
IPC: G01N23/20; G01N23/20; (IPC1-7): G01N23/20r



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2. GR1005224 /2006-06-13 IPC:G01V3/12;G01N23/20;G01S17/66 (+3)
3. GR20060100352 /2008-02-05 IPC: G01V3/12; G01N23/20; G01S17/66; (+3)
4. GR20070100067/2008-09-19 IPC: G01V3/14; G01V3/14 EC: G01V3/14

Furthermore, Kyklotron technologies are able to detect human bodies, dirty bombs (Uranium wastes).



WMTS Technological background

WMTS is the tech that KYKLOTRON engines realized. Explosives detection based on the Magnetic tuned phenomenon, a tech that detects all common nitrogen based explosives (including ammunition) from a distance from 5 to > 20,000 meters.

KYKLOTRON E sensors:

- Have Alternating Electromagnetic Signals that create Magnetic Fields.
- Have antenna rotated by the user holding the system, creating Angular Momentum.
- Depending on the creating Magnetic Fields, different types of Explosives and humans can be detected.
- When the user is trying to move the antenna out of the direction (line) of the explosive, magnetic tune is experienced and detection is achieved.

KYKLOTRON E3 detector's operation is based on the ATTRACTION created by the particular explosive substance on the antenna of the system. This phenomenon is based on the magnetic tune phenomenon between the explosive and the KYKLOTRON E3 system's antenna. When trying to take out the antenna from the magnetic field, the user experiences difficulty. Magnetic Tune is experienced on the antenna. The magnetic tune is detected. When antenna stops and points to a direction the user knows that detection is done.

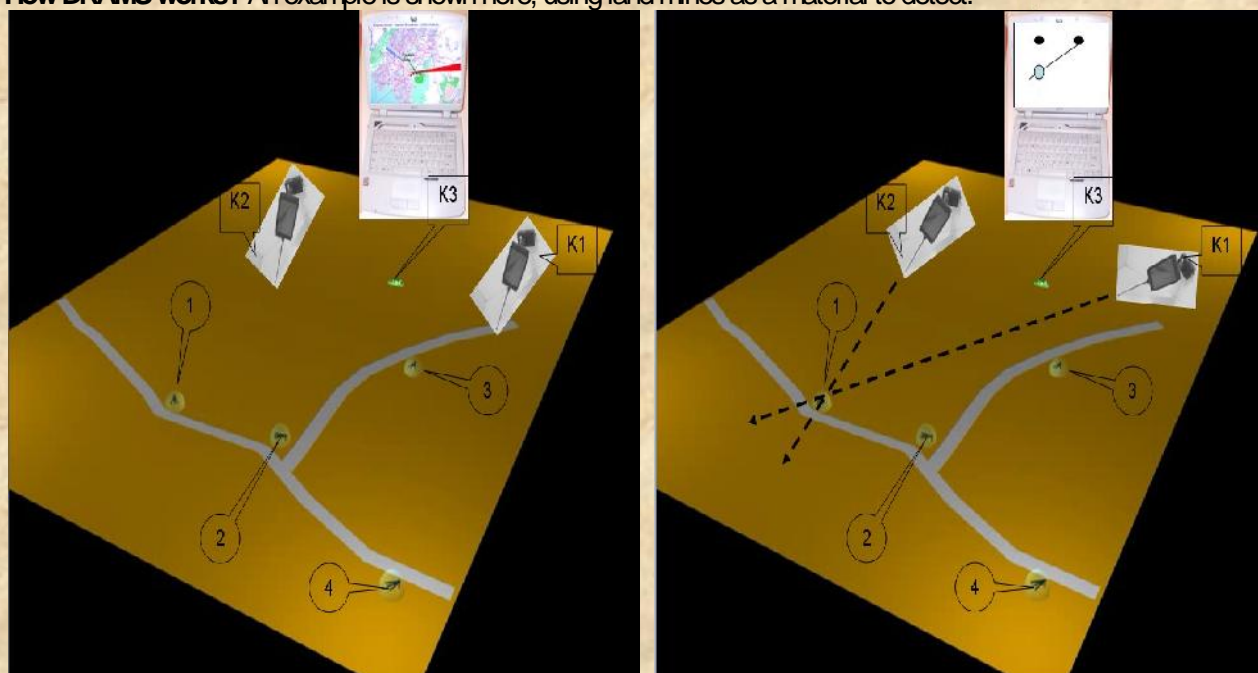


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Measurements with the KYKLOTRON E3 sensor have to be taken from two points for locating the explosives. From the first point, measurement gives the direction (line) where explosives are located. From the second point, measurement (line) gives the location that explosives are located. The location is where the second measurement line, crosses the first measurement line. From a third point, measurement (line) confirms the location of the explosives.

The lines of direction from the three (or more) measurement points must be projected on a Map environment (GIS system depending on coordinates and not on map pixels) for better understanding of what is detected. Known location areas of Military bases, or places that explosives installed already shown on the Map can be excluded from the search.

How DRAMS works? An example is shown here, using land mines as a material to detect.



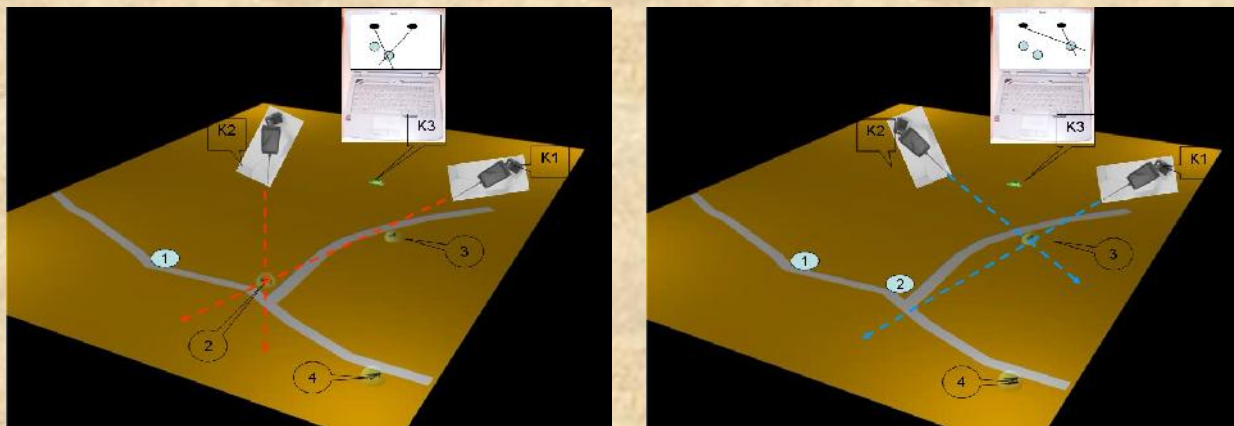
Using DRAMS method, a typical plan includes 2 Kyklotron E3 systems (K1 - K2) , controlled by a (computer) **controller server** (K3). 4 Land mines (1,2,3,4) are buried in depth in the sand (above left figure). The two Kyklotron E3 users are detecting at the same time from different positions. When target detected users pressing a virtual button and the crossing lines (black color for the first effort) direction mapped onto the DRAMS **control server**. The exact point of land mine 1 is recorded at DRAMS digital database. Precisely longitude and latitude of the mine are known. (above, right picture).

The two Kyklotron E3 users are detecting a new target now. When the new target detected users pressing a virtual button and the crossing lines (red color for the second effort) direction mapped onto the DRAMS **control server**. The exact point of land mine 2 is recorded at DRAMS digital database. Precisely longitude and latitude of the 2nd mine are known. (below, left figure). The two Kyklotron E3 systems users are detecting for a new target. When a new target detected users pressing a virtual button and the crossing lines (blue color for the third effort) direction mapped

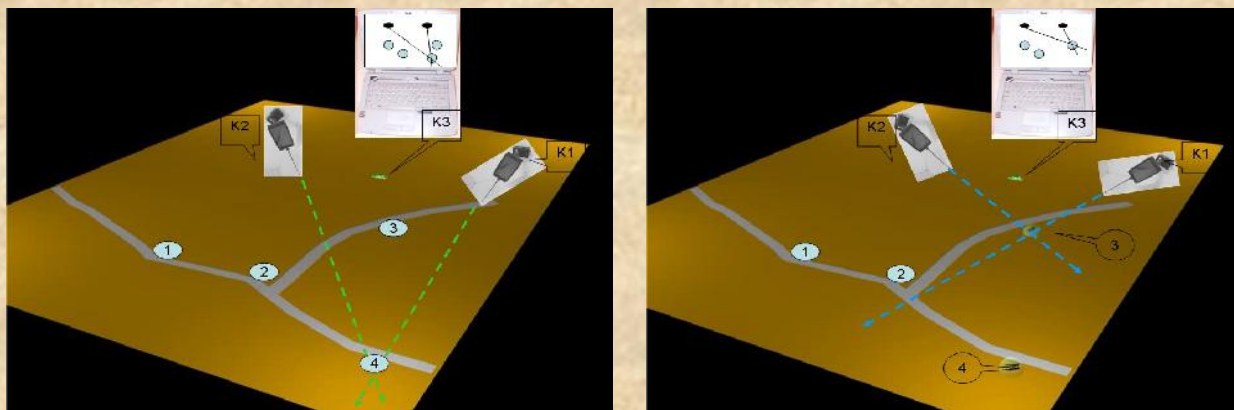


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onto the DRAMS computer server. The exact point of land mine 3 is recorded at DRAMS digital database. Precisely longitude and latitude of the 3rd mine are known (below right picture).



Two Kyklotron E3 users are detecting for a new target. When a new target detected users pressing a virtual button and the crossing lines (green color for the forth effort) direction mapped onto the DRAMS controller server. The exact point of land mine 4 is recorded at DRAMS digital database. Precisely longitude and latitude of the 4th mine are known.



Using this simply method all land mines are recorded in accuracy and the demining phase is only a matter of time.

NMR, [NQR](#) and paramagnetism, are three of today's relative to magnetic tuned phenomena. A quadrupole or quadrapole is one of a sequence of configurations of—for example—electric charge or current, or gravitational mass that can exist in ideal form, but it is usually just part of a [multipole expansion](#) of a more complex structure reflecting various orders of complexity. Nuclear quadrupole resonance spectroscopy or NQR is a [chemical analysis](#) technique related to nuclear magnetic resonance ([NMR](#)). In NMR, nuclei with [spin](#) 1/2 have a magnetic dipole moment so that their energies are split by a magnetic field, allowing resonance absorption of energy related to the difference between the ground state energy and the excited state. In NQR, on the other hand, nuclei with spin 1, such as ¹⁴N, ³⁵Cl and ⁶³Cu, also have an electric [quadrupole](#) moment so that their energies are split by an electric field gradient, created by the electronic bonds in the local environment. Since unlike NMR, NQR is done in an environment without a static (or DC) magnetic field, it is sometimes called "[zero field NMR](#)". Many NQR transition frequencies depend strongly upon temperature. Any nucleus with more than one unpaired nuclear particle (protons or neutrons) will have a charge distribution which results in an electric quadruple moment. Allowed nuclear energy levels are shifted unequally due to the



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interaction of the nuclear charge with an electric field gradient supplied by the non-uniform distribution electron density (e.g. from bonding electrons) and/or surrounding ions.

The NQR effect results when transitions are induced between these nuclear levels by an externally applied [radio frequency](#) (RF) magnetic field. The technique is very sensitive to the nature and symmetry of the bonding around the nucleus. The energy level shifts are much larger than the chemical shifts measured in NMR. Due to symmetry, the shifts become averaged to zero in the liquid phase, so NQR spectra can only be measured for solids. There are several research groups around the world currently working on ways to use NQR to detect explosives. Units designed to detect landmines and explosives concealed in luggage have been tested. A detection system consists of a radio frequency (RF) power source, a coil to produce the magnetic excitation field and a detector circuit which monitors for a RF NQR response coming from the explosive component of the object. Another practical use for NQR is measuring the water/gas/oil coming out of an [oil well](#) in real-time. This particular technique allows local or remote monitoring of the extraction process, calculation of the well's remaining capacity and the water/detergents ratio the input pump must send to efficiently extract oil. The strong temperature dependence of NQR's frequency allows making a precise temperature sensor with a [resolution](#) of 10⁻⁴ °C.

D.R.A.M.S. methodology (Detection and Recording Automatically by a Magnetic tuned System)

By the use of **DRAMS**, a Kyklotron's Ltd registered patent * GR20070100067/2008-09-19 method, targets located and represented on a Geographical Information System environment. **DRAMS** is a fully [C4ISR system](#), giving to chief



of operations the ability to remotely control and monitoring operations in real time and could **PROTECT** an area (city – railway station – port – airport – bus station – building – camp etc) in minimum time from commercial or non-commercial (**hand-made**) explosives, **IDE's**, boobytra-ps, improvised incendiaries, mines, any **trap that embedded explosives**, any **military ammunition** in ground, on a range over 20,000 meters, or even underground and deep into the water or sea.

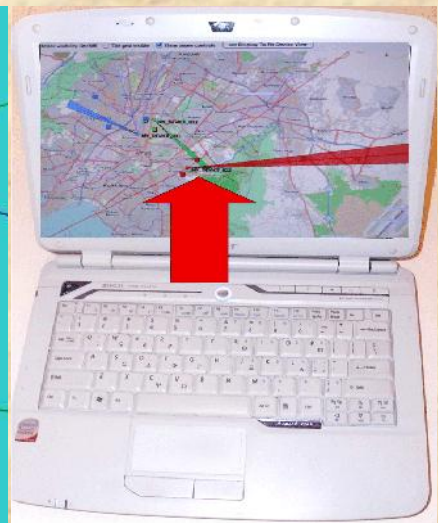
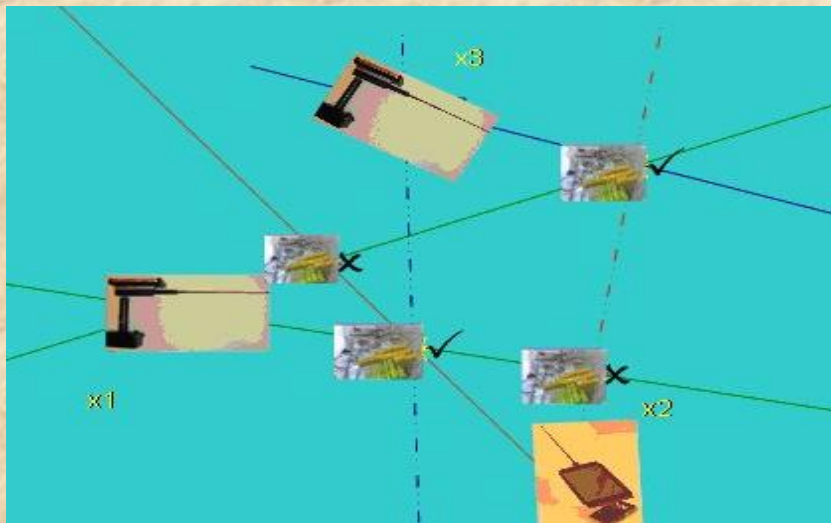
DRAMS is an operational (strategic or tactical) system (using two or more users mobile, immobile or combination, shown as yellow and blue humans on the next picture) detecting and electronically recording on a computer the precise specific localization of distinguishable explosives from long distance (over 20.000 meters). The exact point (shown as a blue circle on the next picture) of located explosives on the ground or surface of sea, in real time recorded in a digital geographic background (GIS) data base, on KYKLOTRON E3 screen (shown as the cross of the two green lines on the next picture).

DRAMS makes the invisible follow-up and by distance digital recording of



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various terrorism teams and enemies moves possible! The use of DRAMS can solve most nowadays serious problems as that of automatic recording of minefields, suspect spaces of scatter extemporary explosive systems, not note down minefields and many others. Also can detect and automatic record (geographical coordinates taking automatically from a GPS) sea mines, radiological-chemical-nuclear-biological explosive structures, dangerous substances, narcotics from long distances, even living humans underground, up to 25 meters into the ground. Users of DRAMS do not enter in a minefield to note down the exactly position of land mines, working regionally in the perimeter, digital recording mines with safety to a limit of 20.000 meters of the frond end of minefield. One or more KYKLOTRON E3 systems (1, 2, 3 or more users mobile – immobile (on foot) or combination mobile and immobile users) scanning a territory searching for distinguishable explosives from long distance (over 20,000 meters). As an example see next pictures. x1, x2, x3 are 3 users scanning using KYKLOTRON E3 system the area to be protected (included in the 4 red lines). x1, x2, x3 users scanning continuously inside the protected area (included in red lines). The direction each user (X1, x2, x3) pointing by the antenna of KYKLOTRON E3 system writing as a color line on a territory digital map in DRAMS system. x1, x2, x3 users cannot see other users antenna direction (this means that antenna attracted from one target, explosives as an example) , but a super user – C4ISR controller - can see every antenna direction and KYKLOTRON E3 users on his computer screen, on a digital map.



This because “a”, “b”, “c”, “d” users of KYKLOTRON E3 systems are connected in a 3G VPN (or other connective tech) communication network. Every user knows what he and other users are searching for. In every user computer screen appeared the point that he stands and the line that his system antenna points. The exact point of located explosive on the ground or surface of sea in real time recorded in a digital Geographical Information System (GIS) data base. A typical DRAMS module (user →controller - >coordinator & headquarters) is shown in figure below.



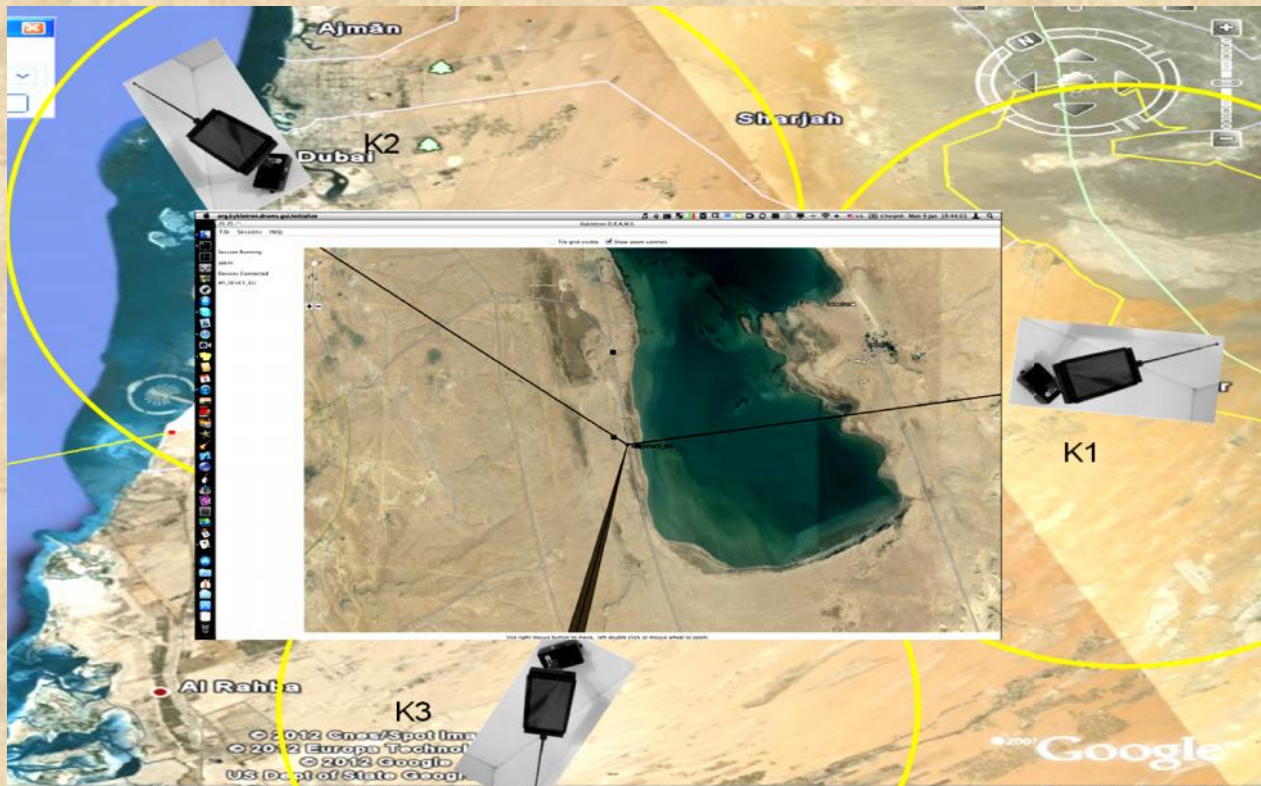
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The same icon transmitted by a common 3G (or any other communication system private or military or common) network to any other computer installed in a command and control center, or at any other computer existing in a vehicle, or a mobile command and control center. This real time, tactical picture, on a big wall screen of a command and control center, turns KYKLOTRON E3 system to a full C4ISR system.

The exact point of located explosive on the ground or surface of sea in real time recorded in a digital Geographical Information System (GIS) data base. At the same icon transmitted by a common 3G (or any other communication system private or military or common) network to any other computer installed in a command and control center, or at any other computer existing in a car or a mobile command and control center. This real time, tactical picture, can easily represent on a big screen of a command and control center, making KYKLOTRON E3 system a full C4ISR system.

When using the KYKLOTRON E3 system to detect explosives it is not clear if a small quantity of explosive is detected nearby or if a bigger quantity is detected further away. In order to detect that, different measurements have to be taken from different angles of detection. The points where at least 2 lines are crossing is where explosive is located.

The points where the measurements (Angles of Detection) will be performed must be carefully chosen. Every Angle of Detection must be further examined from different locations, and from different angles of detection, in order to have at least 2 lines crossing. This way the location of the explosive is specified.



DRAMS system using 3 KYKLOTRON E sensors (k1,- 2,-3) for 360 degrees protection area. At the center of figure, a vision of the DRAMS controller computer screen. Controller is shown and the three lines – antennas of K1-K2-K3 sensors users (black lines) on screen. Controller coordinates and controls the 3 users of the system.



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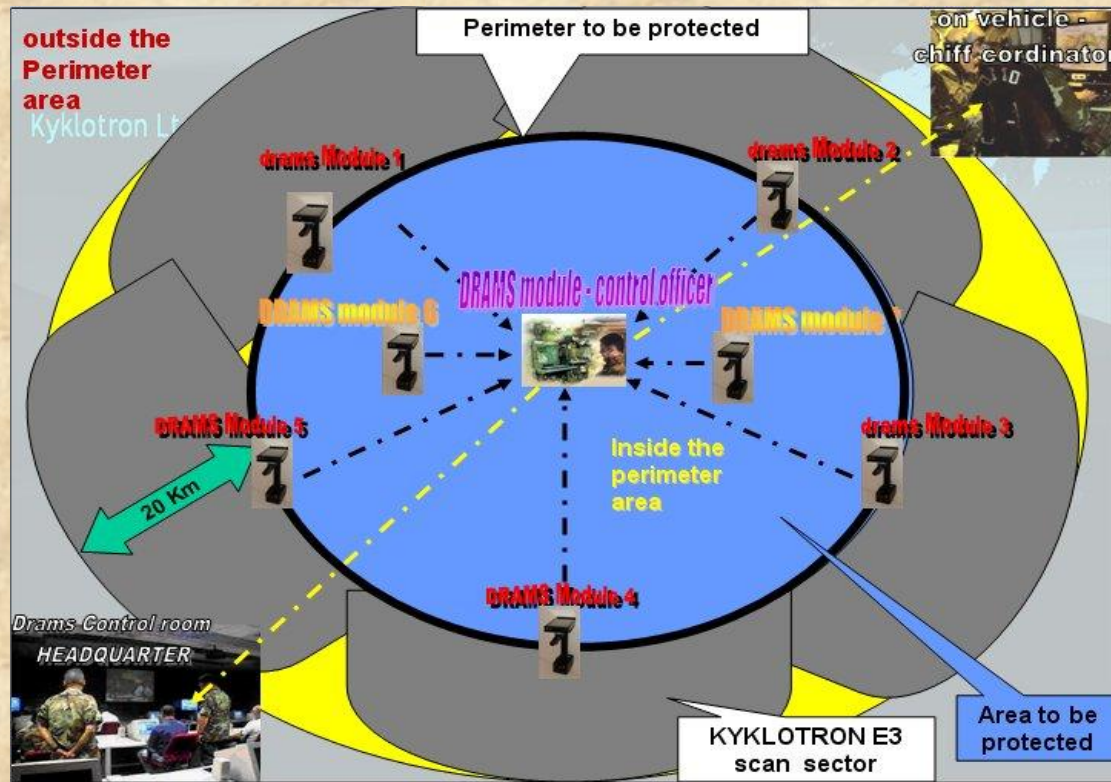
All these are better visualized, organized and planed with KYKLOTRON ltd's DRAMS software environment while using the KYKLOTRON E3 system. The KYKLOTRON E3 system sends the Position of where the measurements are taken as well as the Angles of Detection to the DRAMS software. The DRAMS software plots on a map environment the Position of where the measurements are taken and the angles of Detection from that point. After taking measurements from different Positions, the locations where 2 or more lines are crossing are seen on the Map.

When using the KYKLOTRON E3 system to detect explosives it is not clear if a small quantity of explosive is detected nearby or if a bigger quantity is detected further away. In order to detect that, different measurements have to be taken from different angles of detection. The points where at least 2 lines are crossing is where explosive is located.

The points where the measurements (Angles of Detection) will be performed must be carefully chosen. Every Angle of Detection must be further examined from different locations, and from different angles of detection, in order to have at least 2 lines crossing. This way the location of the explosive is specified.

All these are better visualized, organized and planed with DRAMS software, an environment while using the KYKLOTRON E3 system. The KYKLOTRON E3 system sends the Position of where the measurements are taken as well as the Angles of Detection to the DRAMS Software. The DRAMS software plots on a map environment the Position of where the measurements are taken and the angles of Detection from that point. After taking measurements from different Positions, the locations where 2 or more lines are crossing are seen on the Map.

Every KYKLOTRON E3 system (S or L TYPE) is interfaced with a computer, using embedded GPS (Global Positioning System) and embedded sensors (Magnetometer and magnetic Compass). There is also a Computer server (laptop or tower, or desktop) for the C4ISR super user that controls the KYKLOTRON E3 users available. KYKLOTRON E3 systems communicate with the C4ISR super user's Computer (server). When the KYKLOTRON



E3 system detects explosive, then the Angle of

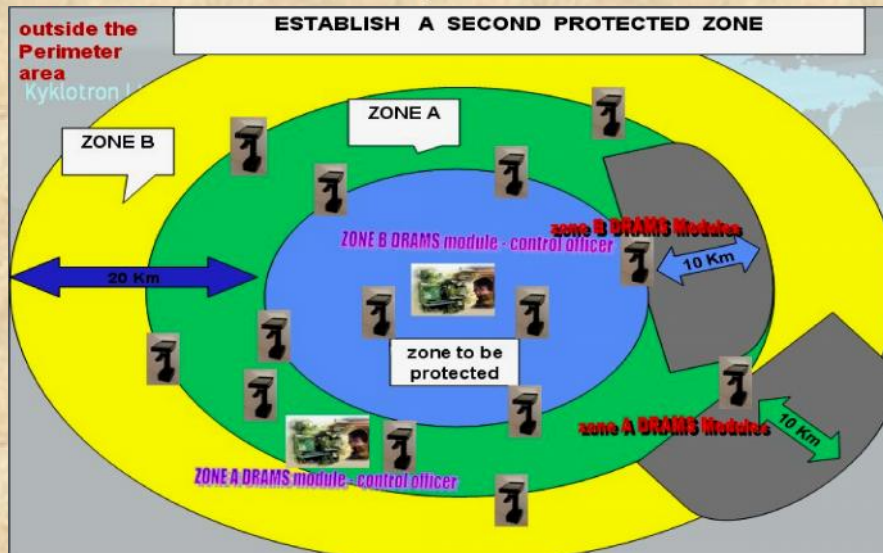
DRAMS Modules Operation in action

Detection is sent from the compass of the System to



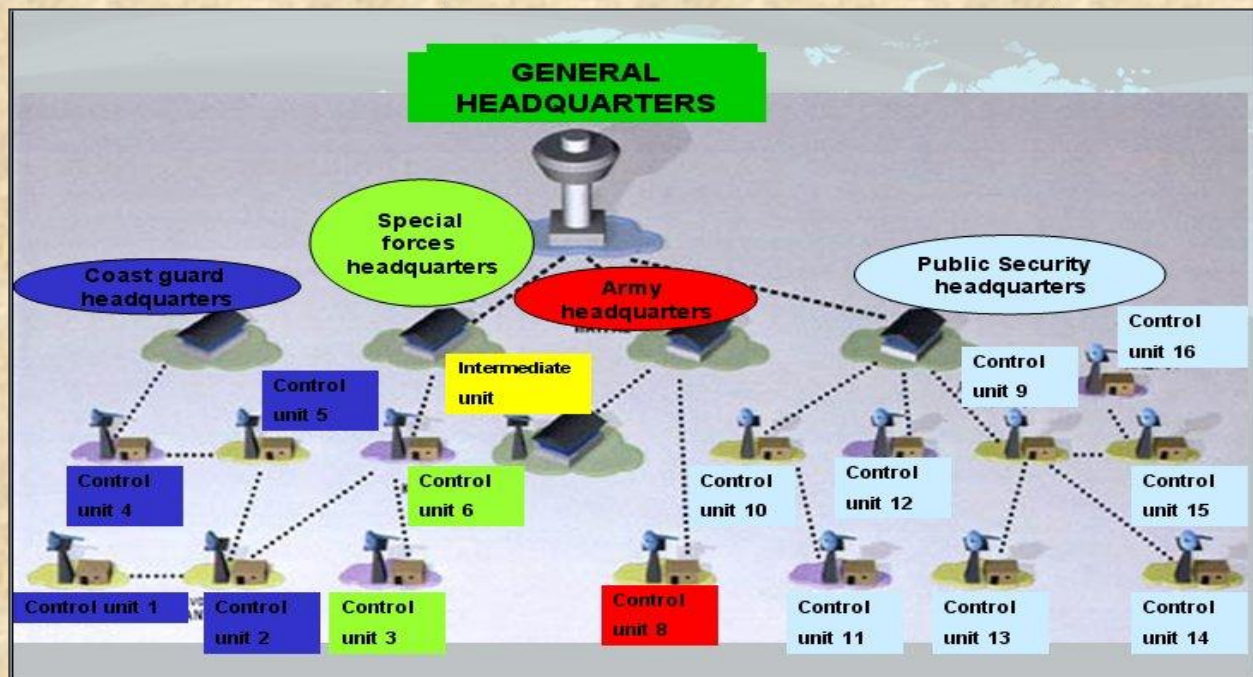
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the Computer through the communications channel. The computer which is located on the system, and has the GPS connected to it, plots the line from the current Position (given by the GPS) towards the angle of Detection sent by the compass of the system.



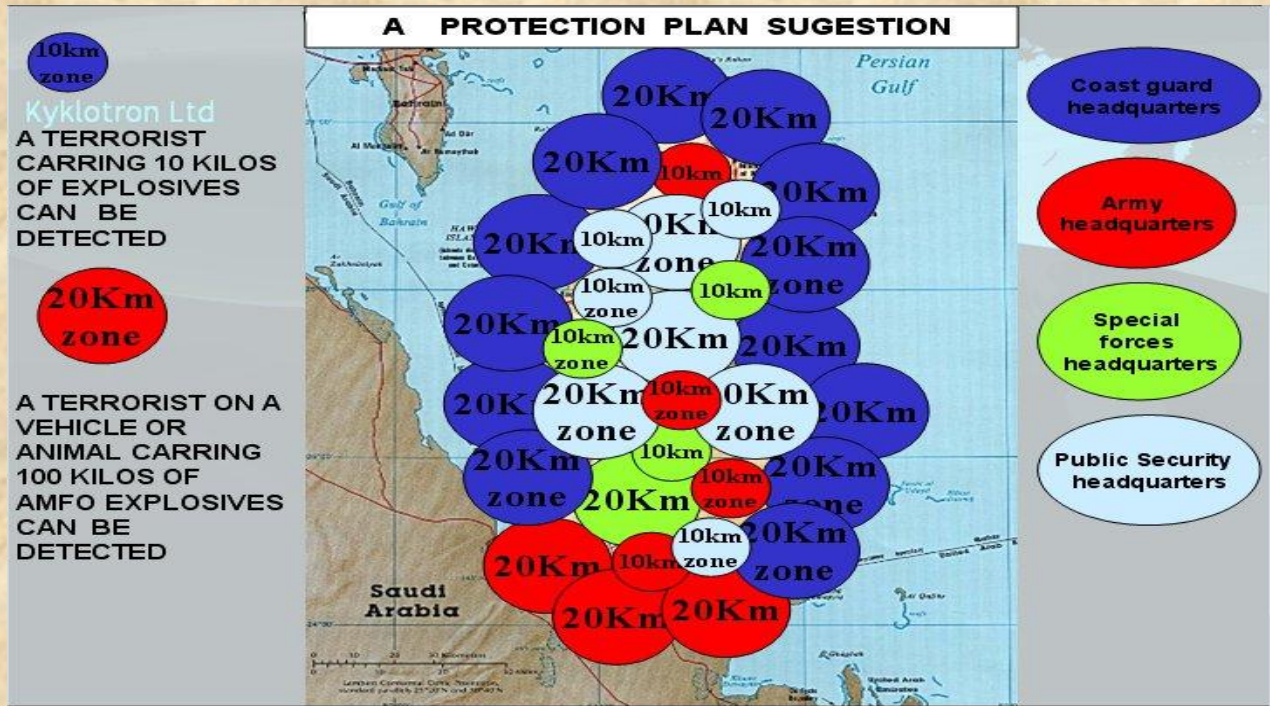
Increasing the PROTECTION safety levels. Creating one zone (B) plus.

Like all typical C4ISR systems, DRAMS system makes possible the command, control and administration, in real time, from one or more electronic command and control INTERACTIVE centers, under a modern graphic representation environment of all in use electronic sensors (military, civil administration, rescue, civil protection, other) by adding a number of modern real time technological KYKLOTRON E sensors, the technology and patent rights we represent worldwide.

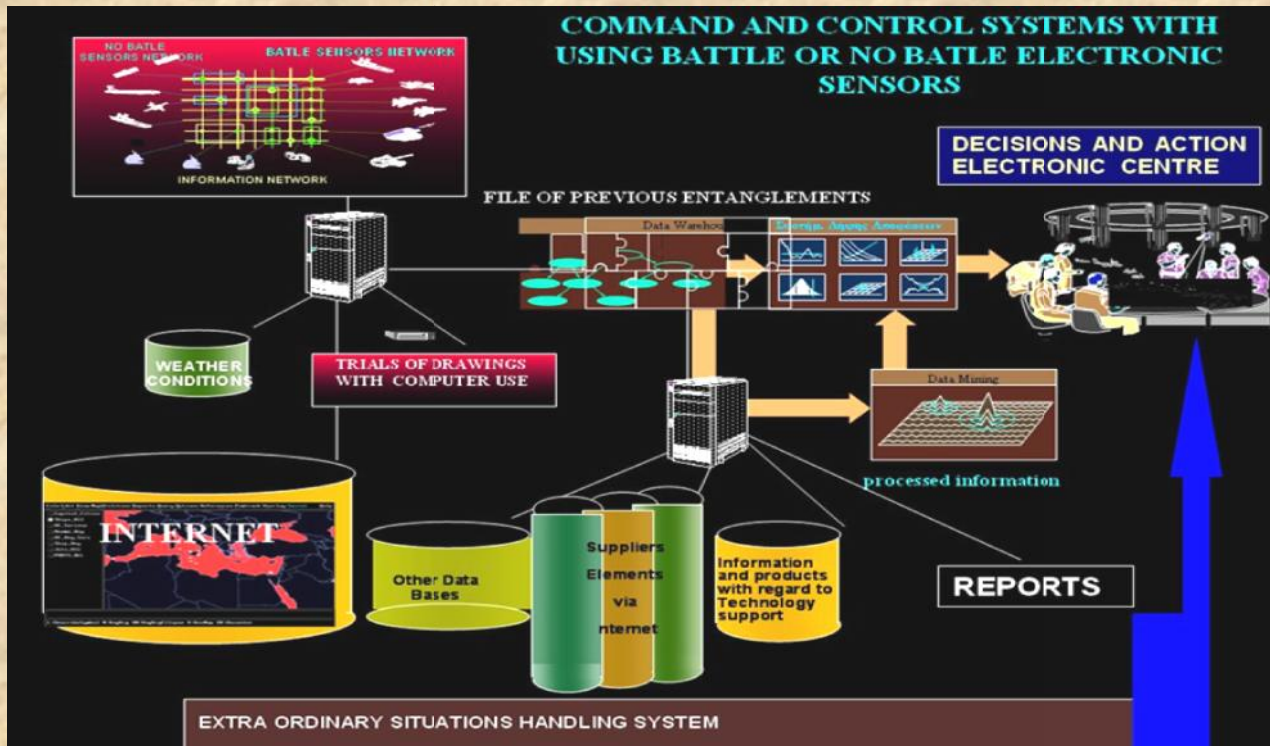


DRAMS hierarchy among: Chef of operation -headquarters – controllers -users





An all country protection simple plan suggestion



DRAMS command & control using computers and communication, a C4ISR based model



Product Family



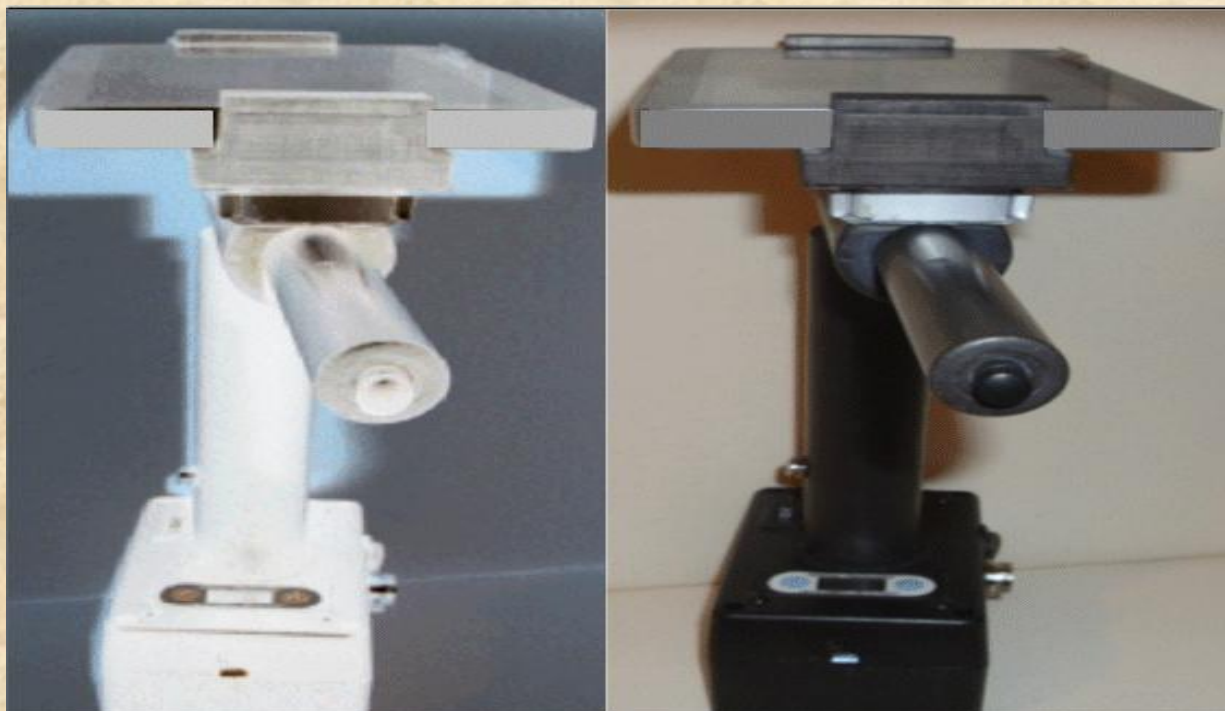
Kyklotron L E3 SENSOR for Long Distance Remote Detection & Localization of Explosives

Designed to do a quick and efficient survey of material structures in distances from 0 to > 20,000 meters, setting aside every similar substance. KYKLOTRON 'LE3' uses DRAMS (a Kyklotron's Ltd registered patent) method to locate the target and represent the explosive location on a GIS (Geographical Information System) environment. DRAMS is a fully C4ISR system, giving to director of

operations the ability to remotely control and monitoring operations in real time.

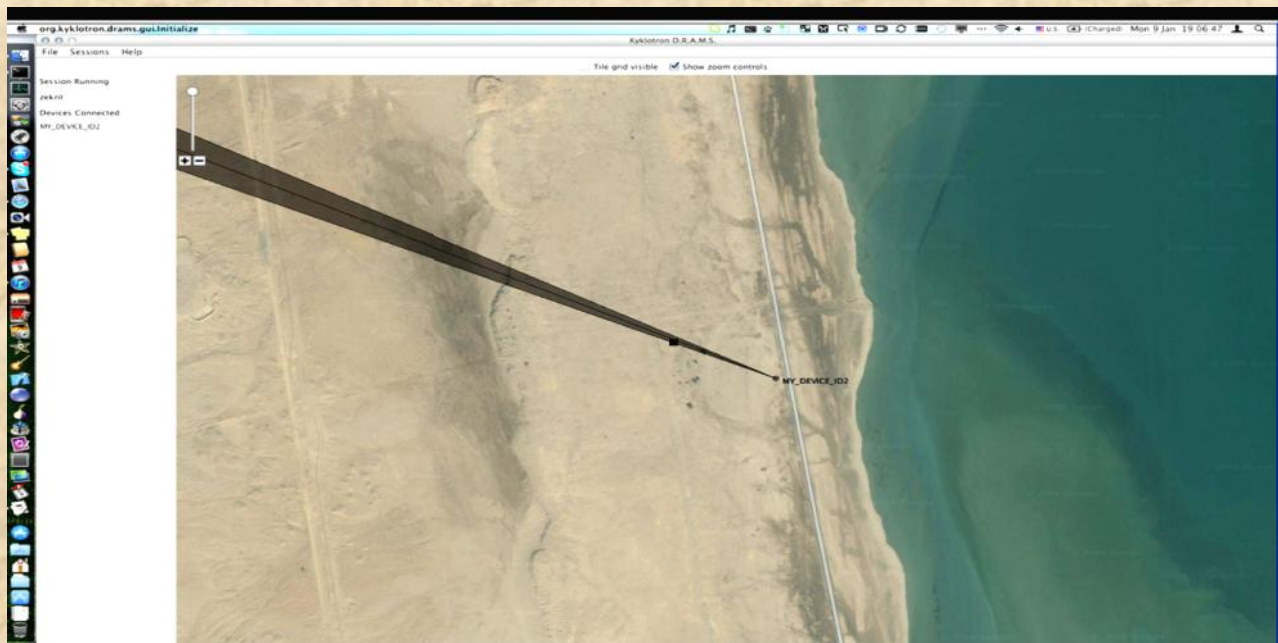
Kyklotron S E3 SENSOR for Sort Distance Remote Detection & Localization of Explosives

Apart from a portable device that uses low voltage electric power as power source. The device has integrated elements to be magnetic tuned with every pre-tuned explosives, drugs and others. Detects, with a high sensitivity, from short distances (5 - 500 meters) and under ideal conditions, from > 2,000 m and for amounts about 10 kg. Pin point capabilities. (left figure).





Kyklotron E4 SENSOR for Medium Distance Remote Detection & Localization of Explosives



Marking a Target on DRAMS Control Server screen (black rectangular). This screen shoot is from REAL BLIND TEST in a Gulf country, Jan 2012. This server runs DRAMS software for server on Mac OS environment



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Apart from a portable device that uses low voltage electric power as power source. The device has integrated elements to be magnetic tuned with every pre-tuned explosives, **BUT NOT BULLETS**, drugs and others. Detects with a high sensitivity from short distances 5 - 800 meters and under ideal conditions > 2000 m for amounts about 10 kg. Pin point capabilities. Ideal for VIP protection (right figure).

KYKLOTRON .E3 SENSOR Technical Data

Detection Method: Magnetic tuned phenomenon ^{**}(QNR)

Sensitivity: Below Trace level. [Fingerprint] (in the picogram range.)

Selectivity: < 1% typical false positive rate (this is mainly due to the inability to visibly see or trace-detector sampling, unable to analyze.)

Detection/Reaction Time: Less than 6 - 10 Seconds for a 180 degrees sector

Setup Time: Depends on the magnetic fields neutralize process. Less than 1 minute after this process.

Environmental: for **Kyklotron SE3:** Operating temperature -40°C to +60°C (-40°F to +140°F) [extrem temperatures tested in refrigerated and oven-type environments].

For Kyklotron LE3: Operating temperature -10°C to +50°C [limitations exist for the computer system for the GIS environment of DRAMS.

Power: 12 volt power supply. Car charger is available. External power supply is available too (heavy duty missions).

Signal Processing: Magnetic tuned attraction (NQR) input to moving directional antenna. Detection at 180 degrees across user's body.

Calibration: Not normally required. For accuracy user tests equipment prior to use by detecting a sample of the material.

Detection Modes: Magnetic tuned ^{**}

Materials to Detect: (Pre-tuned) any metal structure, any non metal structure, living humans,

dead humans, animals, clear watery, magnetic vacuum, Ammunitions- explosives- shells drivers- gun bullets – used ammunitions- Fireworks - incandescent lights, black powder explosives, plastic explosives: C4, C1, PEA1, PEA2, C2, C5, PEA5. CHINESE, RUSSIAN AND CZECK SEMTEX, AMFO, RDNX, TNT, PeTN, DYNAMITE, Nitrogelsreen, Nitro glycerin, Bakrik Acid, Tetrick, Hexogen (RDX), Aktogen, Mud Explosives, Water gel explosives, Emulsified explosives, Chlorite \ Alberchlorite, Rubber Explosives, Neptrojandin, DNT. OTHER OBJECTS: human body (or bodies under rubble), Dirty Bombs (Uranium wastes)

Additional materials available. Must order, and give us a sample to pre-tune. Contact Kyklotron Ltd for further information.

Does not detect and does not get confused with:

- o Cosmetics, glycerine, etc
- o Traces of material, on the air, in the water, on the ground or on clothes

Areas of operation for the KYKLOTRON 'E3' system

Plain fields, underground, underwater, inside cages, airports and customhouses, public foundations, border crossings, security of open areas, military foundations, shipyards and ports, embassies, armed forces, VIP escort, police and general security, nuclear stations,



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wildlife protection, search and rescue operations, events that require strict security measures, etc.

KYKLOTRON .E3 appliance is self-contained energy package and does not require external power.

Sensor additional materials (Cards, radionic search capabilities etc) : no required

Warranty: 2 year limited warranty on hardware only. 2 year limited warranty on DRAMS software. 1 year electronic media support.

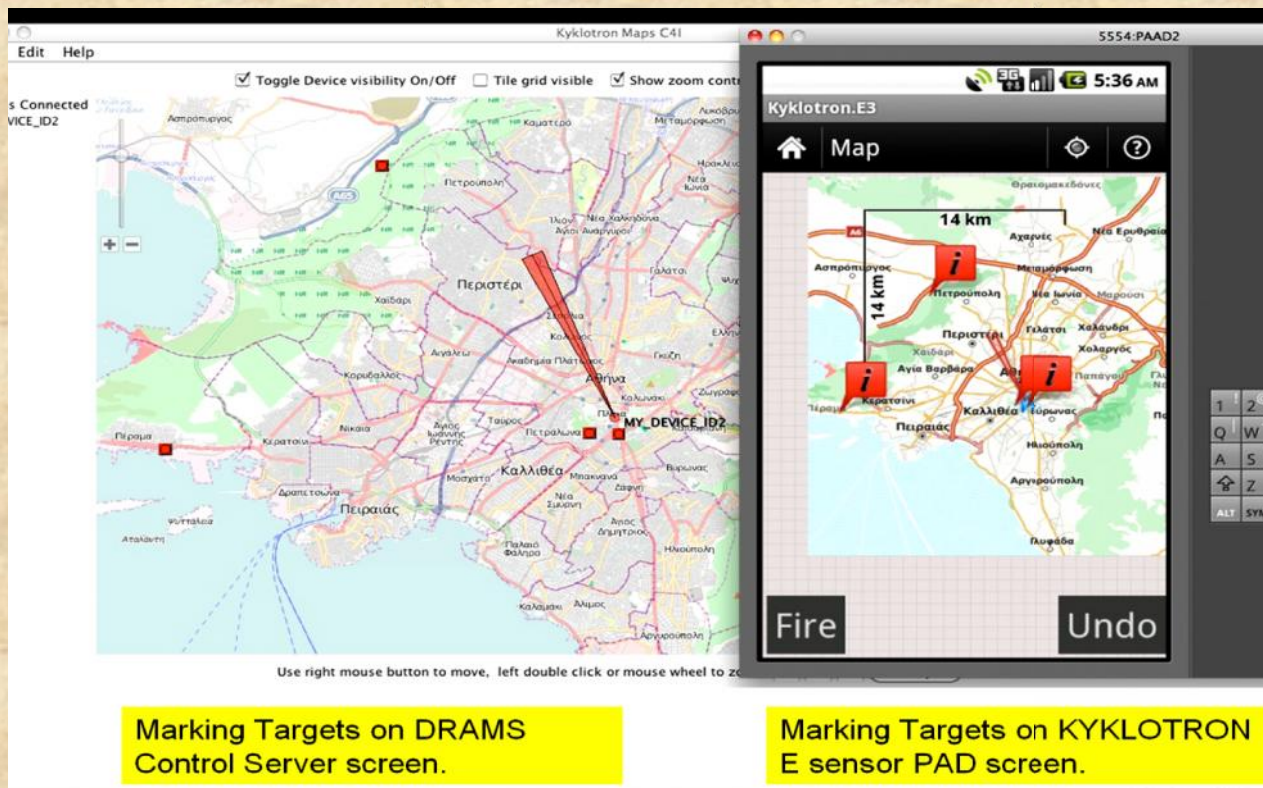
Detection Range (in tests)

Ground level: 0 to > 20.000 meters (tests carried out in various conditions with no clear line-of-sight. Especially in places on earth that magnetic fields are powerful as in Greece, Europe)

- From Aircraft: Up to 6000 meters (4+ miles)
- Under Water: Up to 50 meters (150+ feet)
- Underground: Up to 25 meters (75 + feet)

Operational Benefits

- **Enables an aggressive policy against terrorists:** Security Forces do not have to wait for terrorists to target and destruct. Instead, they could go after them!
- **Gives the ability to neutralize AREAS from explosives:** DRAMS could be a very useful tool to “clean” (detect and



Marking Targets on DRAMS Control Server screen.

Marking Targets on KYKLOTRON E sensor PAD screen.



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localize in order to remove) an area (city – railway station – port – airport – bus station – building – camp etc) from explosives.

- **Activates tactics for huge area PROTECTION from explosives:** DRAMS provides tactical and operational advantages via 24hrs monitoring for explosives, drugs and other materials or substances be movements. Petroleum or gas pipelines could be safer than ever.
- **Provides new possibilities to overcome old control tactics:** By using DRAMS Security Forces can establish modern tactics avoiding static control methods that terrorists know how to overcome. Security Forces don't have to expect terrorists hidden behind the mound. DRAMS give the ability to build an **electronic fence** over huge areas over of a 20.000 m diameter. Static check points are now history.
- **Unique tactical surprise advantage opportunities to security forces:** By employing DRAMS Security Forces can easily locate and arrest terrorists in their nest before they could be able to prepare and to use their murderous explosive cargo.
- **Precision in detection:** The KYKLOTRON E system is not just capable of detecting explosives but can also get a very precise fix on the target. This is achieved by combining its advanced embedded computer architecture and GIS software. The system's communication is based on a fully incorporated C4ISR system.
- **Simultaneous Detection of Multiple Types of Explosives:** DRAMS complex, low-power, electronic architecture can be programmed to effectively detect multiple substances in a single scan by using magnetic attraction. No additional substances or materials are needed for the system to opera
- **Advanced Architecture:** The KYKLOTRON E sensors are consisted of advanced embedded electronic systems. The device does not act on its own in any case and the WMTS technology is not associated in any way with techniques like "radionics" or "radiothesia".
- **Maintenance Free:** Unlike most detection systems, that require a constant supply of various parts, components and consumables (e.g. sample traps, cotton-gloves, cleaning agents etc.) the KYKLOTRON E system can be fully maintained by its Operator and requires no on-going maintenance service contracts.
- **Certification:** The WMTS (Wave Shooting Magnetic Tuned Systems) technology developed by Kyklotron Ltd. is certified by 4 Reserved Patents owned by the company.
- **Effective Detection of target materials in difficult conditions:** Without the need of special programming and time consuming procedures, the KYKLOTRON E system is designed in such way that will ignore all substance materials that could be used to "hide" the target materials (such as Lead) and jam the detection. It will focus on the real target only, even if the target is completely covered by such concealing materials.
- **Long Distance and Accuracy:** The KYKLOTRON E system can accurately detect and track down explosives at distances from five (5) up to twenty thousand (20,000) meters which makes it unique for its type.
- **Working Environment Flexibility:** As its technology is based on Magnetic fields, the KYKLOTRON E system can operate in any kind of environment, indoors and outdoors. Its advanced detection capabilities will not be limited by walls, buildings, rocks, or any other natural or artificial obstructions. In fact, obstructions are very likely to enhance its detection effectiveness due to natural effects caused by magnetism and thus providing you the most efficient and guaranteed detection method there is. All common nitrogen based explosives, including ammunition and liquid state explosives WILL be tracked down accurately from long distances.
- **Warranty:** For your ease of mind, DRAMS system comes with a two year limited warranty.

According to the American law 2007 on the Constitution of Application of 9 September Committee, from July 2012 will be obligatory the 100% scanning of all containers that is used for exports in the USA with marine transports before their loading in boat in port of foreigner. The European Union does not forecast the application of such meter. But why does react Europe for the meters of control in the harbors? By the use of KYKLOTRON E3 sensors, will not exist technical and organizational difficulty, which will have as result important cost from likely restriction of transactions of the European Union, or other countries that export in the USA. On the contrary will exist explicit profit regarding the safety of ports and boats and persons more generally.



Evaluation

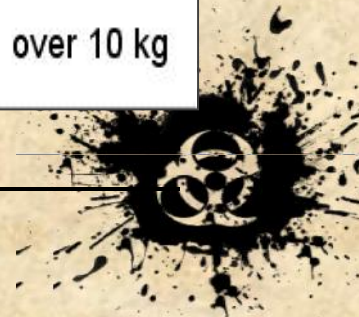
Performance

Detection Range (in tests)

- Ground level: 0 to > 20,000 meters (tests carried out in various conditions with no clear line-of-sight. Especially in areas that magnetic fields are powerful as in Greece, EU)
- From Aircraft: Up to 6,000 meters (+4 miles)
- Under Water: Up to 50 meters (+150 feet)
- Underground: Up to 25 meters (+75 feet)

KYKLOTRON E3 L DETECTION RANGE in TESTS

	- 100 M -		Weight over 50 gr (TNT)
	1000 M		Weight over 350 gr
	1500 M		Weight over 1/2 kg
	> 2000 M		Weight over 1 kg
	> 20000 M		Weight over 10 kg



Detection capabilities of KYKLOTRON E3 SENSORS

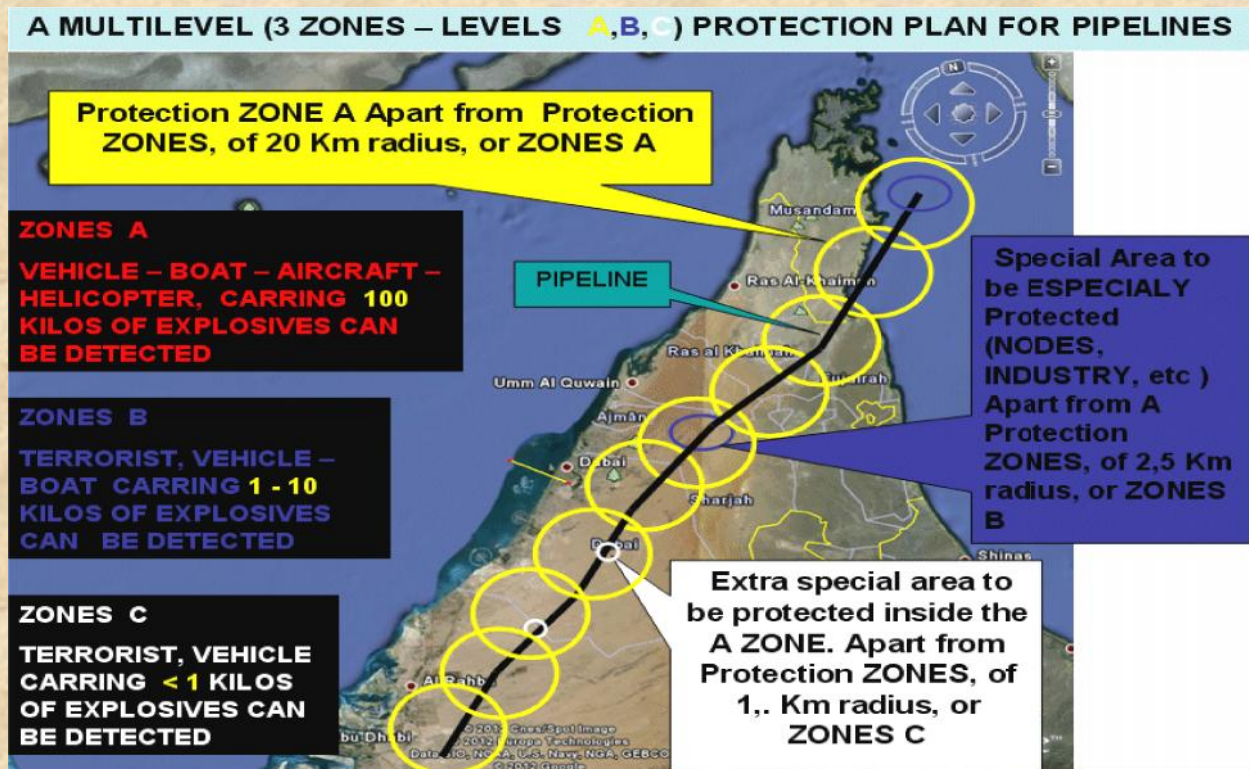
Explosive system detection capability (Yes No)	KYKLOTRON E3
False tuned to minerals	N
False tuned to trees & roots	N
False tuned to chalcopyrite minerals	N
False tuned to magnetic fields	N
Cell phones reflection jamming	N
Parapets, walls, building, etc independent detection	Y
Pin point detection	Y
Localize target	Y
Localize target and represent on GIS map	Y
Harmless to human health (x rays , etc)	N
C4ISR capabilities	Y
Communication using Wi-Fi	Y
Communication using Bluetooth	Y
Communication using cell phone	Y
GPS embedded on search device	Y
Magnetic compass embedded	Y



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Needs cards or explosive material on board	N
Needs use of electrostatic gloves	N
Needs human energy to work	N
Detects explosive from 0-5 meters	Y
Detects explosive from 0-50 meters	Y
Detects explosive from 0-20.000 meters	Y
Detects explosive from 0 to > 20.000 meters	Y
Detects in search angle > 60 degrees	Y
Attracted from explosive that is opposite to the system	N
Can tuned in every distinguish material structure?	Y

DRAMS planning zones estimation for multiple level protection (3 protection levels)



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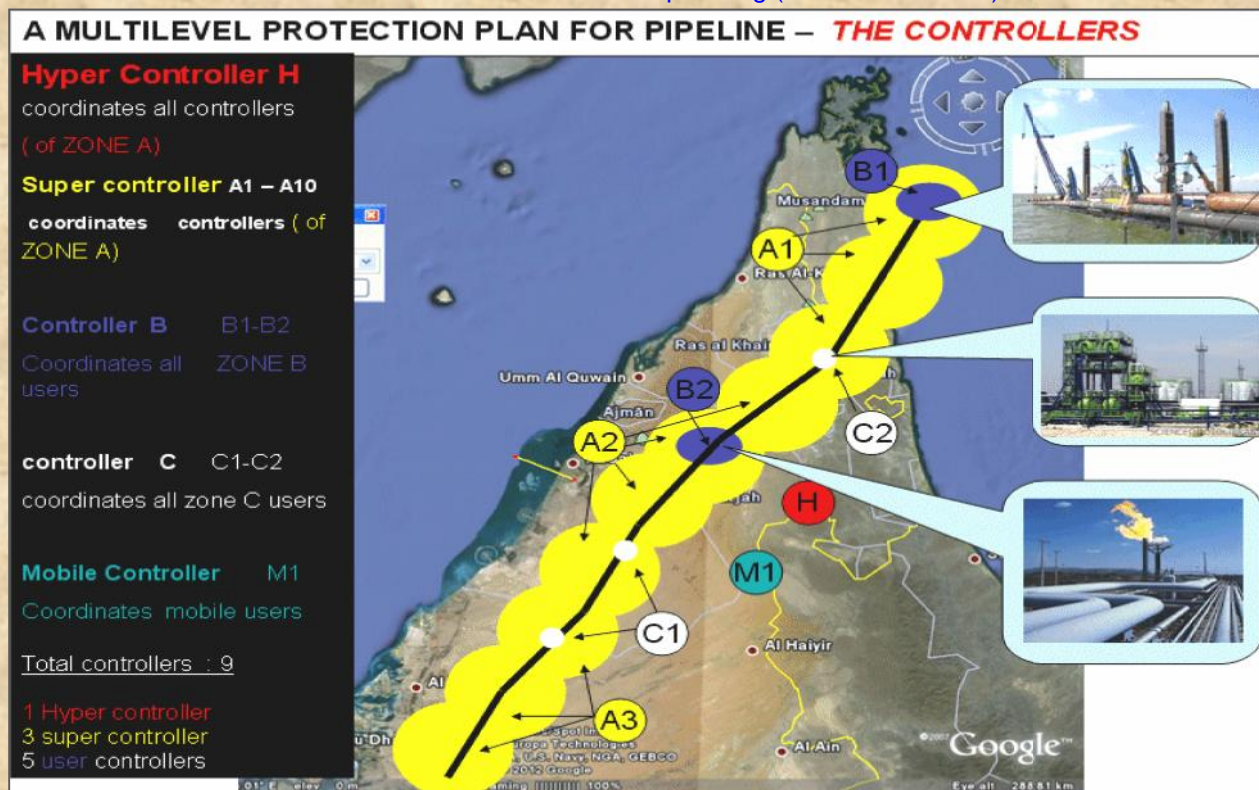
DRAMS CAPABILITIES IN MILITARY SECTION

DRAMS offer a new operational dimension to Army, Navy, Coast Guard, Public Security Forces, Customs etc. As a fully operational system, in integration with similar systems, provides the ability of a faster response and more accurate results against multiple threats today's unstable world.

Using DRAMS and KYKLOTRON E3 series sensors could detect, localize and automate record in a digital Geographical Information System Data Base:

- Guerillas and enemy commandos.
- Any kind of explosives and ammunitions (grenades , rockets , missiles – missiles against airplanes, anti tank missiles, air to surface missiles, air to air missiles, surface to surface missiles, etc - projectiles , bombs , dispensers , mines - land and sea mines - mortar shells, torpedoes, DEs, any kind of explosives, mixtures and traps, etc).
- Not exploded projectiles.
- Tank, BMP, combat vehicles of any kind and type, weapon systems, battle ships, submarines under water.
- Ammunition depots, barracks, battle positions and stations, underground bolt holes, underground hidden ammunitions, etc.
- Minefields (simple or electronic) in land or sea. DRAMS offers the operational ability to detect and localize a minefield from long distance (some kilometers) , to detect land or sea mines spread (not laid in a tactical plan or laid method.

DRAMS Controllers estimation planning (3 controller levels)



- DRAMS is a very good solution to the problem of long scale demining, mainly in sandy areas in the desert, where projects planned by these countries are cancelled due to the existing mines. Demining in desert is a very difficult operation for many reasons. KYKLOTRON E3 systems series are suitable for land mines detection and localization in huge areas, very fast and with



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100% accuracy. Seeking a reliable and fast way for the detection and localization of laid land mines, for long scale demining purposes, mainly in sandy areas in the desert. Especially in a huge area, DRAMS system could be a very fast detection method with 100% accuracy.

- DRAMS could protect any kind of pipelines (petroleum, gas, etc), industrial areas, radio, television and other communication stations by detecting explosives from distances > 20.000 m.
- Cancelled projects planned by several countries due to the existing land mines now can go on. Demining in the desert can be safely done using our technology and experience. Since sandstorms spread and bury land mines in depths that common metal detectors can't detect, KYKLOTRON E3 represents a reliable and fast way for the detection and localization of laid land mines, for long scale demining purposes, mainly in sandy areas in the desert. Especially in a huge area, DRAMS system could be a very fast detection method with 100% accuracy.

DRAMS capabilities in Security section

Using DRAMS could detect, localize and automate record in a digital Geographical Information System Data Base:

- Any human approaching carrying ammunitions or explosives
- Any kind of explosive matters or ammunitions (missiles against airplanes, anti tank missiles, air to surface missiles, air to air missiles, surface to surface missiles, etc, rockets, land and sea mines, mortar shells, projectile weapons, torpedoes, DE's, any kind of explosives, mixtures and traps, etc) ,
- Not exploded projectiles.
- Any kind of vehicle, boat, ship, helicopter, train, submarine under water etc that inside of it existed ammunitions or even bullets.

Perimeter to be protected : Is the area 1 km in front the perimeter area

Near Area to be protected : Is an area **in front of the perimeter area, so far enough** that if an explosive detected there, the task force has **enough time** to act and neutralized terrorists, before they could insert to the perimeter area.

Wide area protection : Is the area, far enough, that the task force has **enough time** to act and neutralized terrorists that moving with explosives on a car, a vehicle, a boat, a helicopter, before they could insert to **the near area to be protected**.

Defined the meaning of 'protection' areas in DRAMS method



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- Any type and kind of building, home, depot, barracks, stations, underground bolt holes, etc that ammunitions or bullets are been hidden, even they are under ground or under water.
- Places trapped with any kind of explosives (simple or electronic) in land or sea. DRAMS offers the operational ability to detect and localize a minefield from long distance (some kilometers) , to detect land or sea IDE's spread (not laid in a tactical plan or laid method.
- To protect large or huge areas from explosives , gas or petroleum pipelines, airports, financial centers etc.
- Narcotics, living or dead humans, and other pre-defined material structures.

Services

Kyklotron Ltd provides installation, testing, planning, consulting and supporting services for the DRAMS Early Warning System.

- DRAMS DEMONSTRATION & TEST PROCESSING
- Drams topology of the sensors and controllers scheduling
- Implement planning and topology schedule of DRAMS network
- 'Cleaning' areas procedures using DRAMS
- DRAMS MEANS & CONTROL SERVERS ESTIMATION PLANNING
- DRAMS installation schedule processing
- Multilevel training for users - controllers - chief of operation

Our primary goal is to guarantee high quality services, setting quality and quantity objectives.

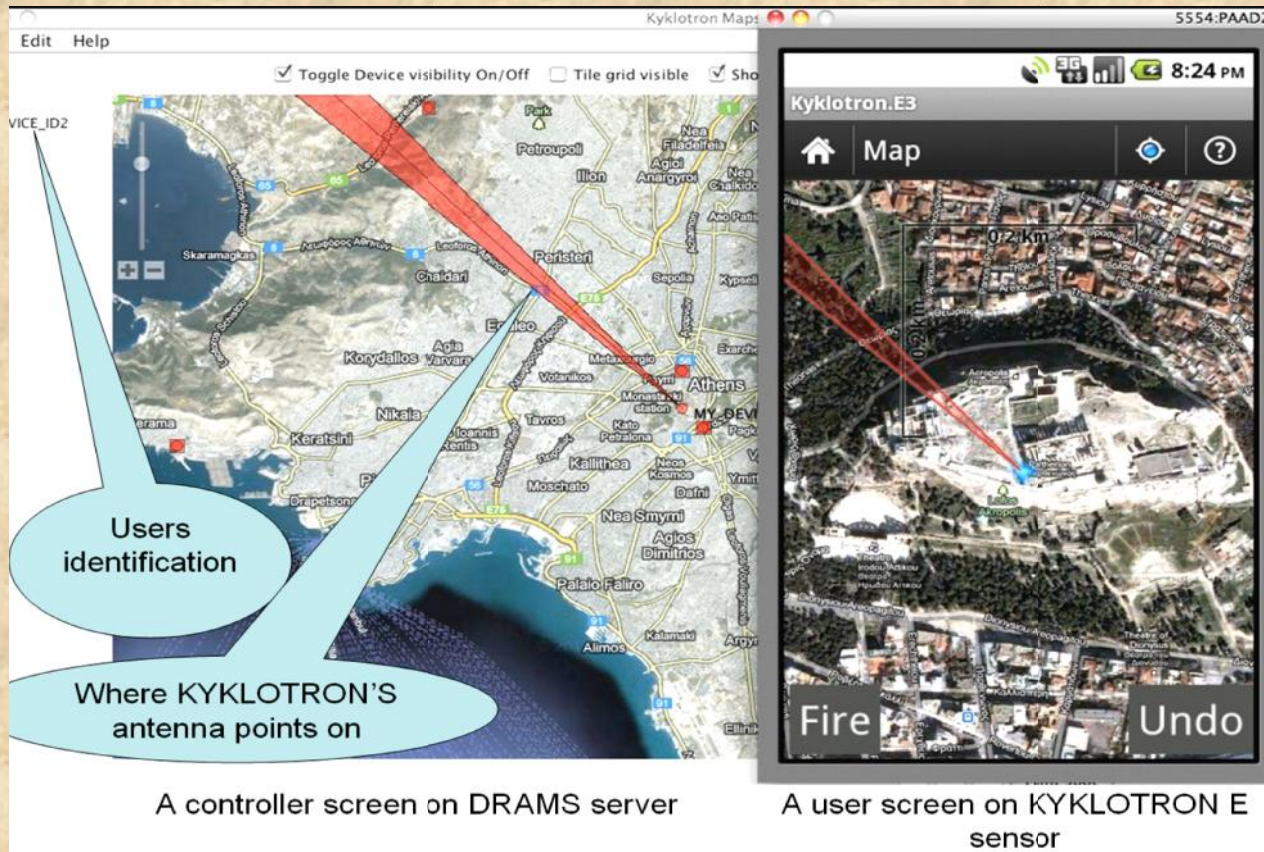


We provide services employing advanced systems of worldwide original technology, argued with patent and certified from the Greek Army, with the use of which we can detect and locate from long distances all the pre-tuned known distinguishable material structures, as: explosives, metal and



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non-metal structures, plastic-wooden-metal mines, vehicles, tanks, aquatic layers, arming systems, humans, narcotics, clear water etc.



DRAMS is a product made in compliance with the KYKLOTRON E series sensors. KYKLOTRON technology is characterized by high-security protection against interceptions as well as high-quality magnetic tuned phenomenon. This system was designed for a wide range of applications.

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Terrorist CBRE Threat Estimate and Medical Response – 2012 Olympic Games

By BG (ret'd) Ioannis Galatas, MD

Abstract

2012 is the year of the Olympic Games that will be held in London, UK. This mega sport event is a terrorist challenge especially now that Osama bin Laden is dead and his successor is struggling to regain "face" amongst Islamic extremists opposing West. New emerging threats such as CBRE agents' release in urban/megapolis environment must be taken seriously and state response must be fortified against this visible possibility. Medical/hospital CBRE defense and preparedness is of mandatory importance because medical consequences might last for months or years. A terrorist CBRE threat estimate is provided and an analysis of hospital preparedness is provided in order to assist first responders perform in a most effective way in order to minimize casualties and consequences. Following Japan's triple catastrophe nobody has the right to consider CBRN release as science fiction. It might happen to us as well! Tomorrow!

Introduction

The 2012 Summer Olympic Games, officially known as the Games of the XXX Olympiad or "London 2012 Olympic Games", are scheduled to take place in London, England, United Kingdom from 27 July to 12 August 2012. London will become the first city to officially host the modern Olympic Games three times, having previously done so in 1908 and in 1948. London was selected as the host city on 6 July 2005 during the 117th IOC Session in Singapore, defeating Moscow, New York City, Madrid and Paris after four rounds of voting.

This Summer Olympiad would be the first since Osama bin Laden was shot and killed (May 2, 2011), inside a private residential compound in Abbottabad, Pakistan, by U.S. Navy SEALs and CIA operatives in a covert operation ordered by United States President Barack Obama. Al-Qaeda acknowledged his death on May 6, 2011, vowing to retaliate.

In June 2011 al Qaeda has named a former deputy to Osama bin Laden as its new terror leader following bin Laden's death. Ayman al-Zawahiri (Huffington Post, 2011), the 60 yrs old Egyptian-born doctor, was identified in the statement as the group's new emir in a "new era" for al Qaeda – the group he helped found with bin Laden.

Same month, al-Zawahiri appeared in a video (Brian, 2011) in which he vowed to avenge bin Laden's death "blood for blood." In that video, he urged his followers to remember the 9/11 terror attacks, saying the attacks "destroyed the symbol of American economy in New York and the symbol of American military might in the Pentagon."

Al-Zawahiri was long believed to be a leading contender to take over al Qaeda, though it took the organization more than a month to announce the transition. Norman Benotman, a former al Qaeda member and close associate of al-Zawahiri's in the 1990s, told ABC News the delay is a sign there were likely disputes within al Qaeda over al-Zawahiri's leadership (Ferran, Jim Scitutto and Cole, 2011).

Taken into account this complex environment along with the importance of "face" in the Arabic world, it is obvious that something bigger need to be achieved in order to help al Qaeda take the lead again and regain "face" in their war against the crusaders and the infidels.

9/11 changed the world and initiated the official war against terrorism. This bloody land mark if needed to overcome has to be via a more qualitative or quantitative attack against the West. In that respect, quantity might be represented by simultaneous attacks in a megapolis environment while quality might be the result of CBR agents' release in the most populated area of a metropolitan city.



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One might wonder why has al-Qaeda not yet launched an attack with such weapons? There are three possible explanations for this lack of a CBRN attack: disruption, deterrence and, most disturbingly, patience.

An encouraging explanation is that al-Qaeda's efforts have thus far been disrupted through a combination of stepped-up counter-terrorist efforts after 9/11 and possibly the simple luck enjoyed by government authorities. Clearly, the al-Qaeda CBRN programs (dirty bomb [Wesley, 2006], ricin, cyanide [BBC, 2005]) that existed in Afghanistan under the Taliban were at least temporarily disrupted by the 2001 U.S.-led invasion and subsequent need to move to safer locales. According to this explanation, al-Qaeda's CBRN programs have yet to recover from this significant setback.

Another possible explanation for al-Qaeda's apparent restraint is the threat of massive retaliation. Although an intriguing possibility, the complications of deterrence theory may offer more questions than answers.

A final possibility is that al-Qaeda simply is waiting for the right time to launch a CBRN attack. Bin Laden has often been described as an exceedingly patient man, willing to wait for the right moment to act. Under this scenario, al-Qaeda is building its capabilities in anticipation of a great victory and will not rush to act just for the sake of acting. The planned attack on the New York City subway system with the "mubtakkar" improvised chemical device may be an example of such patience. Al-Zawahiri reportedly called off the attack because it was not an adequate follow-up to September 11 (Suskind, 2006). Al-Qaeda apparently wanted an even more devastating attack for its second wave. Given the carnage of 9/11, it is hard to imagine al-Qaeda wreaking even more havoc, but a CBRN attack—including the physical, psychological and economic impacts—could certainly fit the bill. It is possible that al-Qaeda's success with the September 11 attacks has set the bar too high for its current CBRN capabilities. Al-Qaeda may be concerned that a CBRN attack that "only" kills dozens of people would be perceived as a relative failure and demonstrate its weakened position relative to its pre-9/11 stature. The organization may prefer to wait until its CBRN capability has matured to the point where its chances of success are greater and its capability for destruction has increased (Dunn, 2005). Given the fact that there is no indication that al-Qaeda has abandoned its pursuit of CBRN weapons, the possibility of a patient al-Qaeda is a disturbing possibility worth remembering.

The future attack

The terrorist attack might be:

- (a) Overt, or
- (b) Covert

The latter might be the case in releasing of biological warfare agents without any prior warning given.

The attack might happen:

- (a) Before the games – in an effort to discourage national teams to participate, discourage tourists to travel to UK resulting in the postponement of the games.
- (b) During the games – thus take advantage of the global mass media coverage of the games, produce panic in both local and international populace, point out the inability of local government to prevent the attack, induce financial turmoil and finally postpone the games.
- (c) After the games – this might be the result of the release of a biological agent during the games that will become apparent after tourists (main target) have gone back to their countries spreading the disease (depending on the incubation time of the pathogen used). In this case the impact will be direct and indirect but mostly political against a strong nation that failed to protect the world from a catastrophe.

The attack will be directed against:

- (a) London;
- (b) Other Olympic Cities, or



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(c) Other cities or villages irrelevant to the games. The latter possess a very loud message “we do not care about your people at all”.

In London targets would be areas of mass gathering, financial importance or national significance such as:

- Olympic/Paralympic Village
- Olympic venues (Olympic Park and London venues, International Broadcast Centre/ Main Press Centre)
- London downtown/shopping malls & streets
- Airports (Heathrow, Gatwick, Stansted, Luton and City)
- Port of London and docks
- Major hotels
- Public transportation means (underground, buses, Eurostar, surface trains)
- Monuments/historic buildings & landmarks (i.e. Big Ben, Tower of London, Royal Albert Hall, Millennium Dome & Ring, The Shard)
- Areas of financial importance (i.e. Canary Warf)
- Bridges (i.e. Tower Bridge) and tunnels
- Critical infrastructures (i.e. hospitals)
- Business infrastructure (i.e. national/international banks, London Stock Exchange)

In other Olympic Cities (Kent, Coventry, Essex, Glasgow, Cardiff, Manchester, Newcastle-upon-Tyne, Dorset), targets would also be areas of mass gathering, transportation, financial importance or national significance. Same applies for cities/towns/villages not directly involved in the games.

The attack could be:

- A single conventional terrorist attack by a lonely wolf (Zee News, 2012) or group of terrorists;
- A multiple conventional terrorist attacks in a single city – similar to Mumbai, India (2008);
- A multiple conventional terrorist attack in more than one city. In that scenario, the first attack would aim to attract national first responders (including the military) while a second attack will follow against the main target that would be missing its defense elements been involved in supporting operations at the initial attack site.
- A CBRE attack in urban/megapolis environment. Chemicals are easy to obtain but require time due to surveillance measures and certain technical expertise is needed (available in imported terrorists with Iraq/Afghanistan combat experience). Biologicals are easy to produce/cultivate in the backyard but need a lot of experience and equipment to weaponize them for releasing over highly dense populated areas. Toxins can be easily produced but are of limited use if mass killing is the objective. A radioisotope is easy to find (import, steal, buy on the Internet) while explosives represent no problem although they require certain expertise if of not commercial origin (IEDs). In case of a dirty bomb (RDD), deaths will be few but the impact would be tremendous and very long lasting.
- A cyber-attack against financial/transportation/state infrastructure;
- A combination of CBRE and cyber-attack;
- A combination of conventional and cyber-attack.

Crowd behavior following a terrorist attack

After a conventional or CBRE attack in a populated area of the city, it is generally estimated that approximately 20% of those involved will stay in place because they will be either dead, or severely wounded or contaminated or both. The remaining 80% will flee to all possible directions. If they are not wounded or contaminated they will run to their houses by all means of transportation or on foot (Okumura et al., 1996). If they are slightly contaminated or wounded they will seek medical attention and will overwhelm ALL hospitals and clinics in the city. At the same period big numbers of “worried well” individuals will do the same



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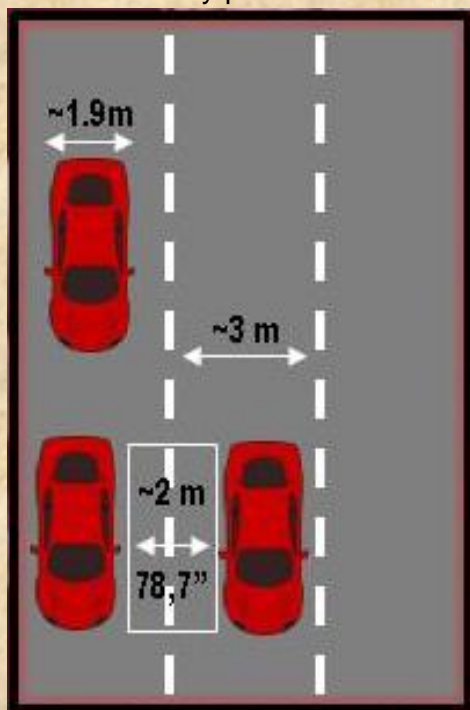
resulting in the collapse of the medical system that will not be able to cope with the huge amount of incomers. It is estimated that the contaminated vs. worried well ratio is about 1:5 (Stone, 2007).

State response

Soon after the attack ordinary first responders (e.g. police and fire service) will approach the incident site and make the initial assessment. If it is a CBRE attack, CBRNE first responders will take over and arrive at the hot zone looking for secondary devices, sampling and performing detection that will give an initial idea about the agent released.

There are four problems that will arise during the “Golden Hour” period:

- The victimization of ordinary first responders arriving in the hot zone. The “1-2-3 rule” (Figure 1) is a clever and easy procedure that can save lives (Rubens, 2009). In combination with “escape hoods” will keep responders safe and able to perform their duties.



- The traffic jam that will follow the public announcement of the attack will compromise any attempt of specialized first responders and their heavy trucks to arrive on time. There are two proposals in that direction: one takes advantage of the approximately 2 m space between cars in traffic lanes. In that space mini-vehicles can move freely and both personnel and equipment will arrive fast and on time (e.g. the Polaris HART vehicles). Israeli Magen David Adom (national emergency medical, disaster, ambulance and blood bank service) is using motorcycles to access disaster areas on time. Distribution of emergency stockpiles near to possible targets would be the second proposal and a good alternative to heavy traffic problems. Air transportation although difficult in urban environment can be done if scheduled and tested in advance.

- Urban canyons' behavior is the third problem. High buildings force air currents to behave in an unexpected way thus making planning and deployment of resources very difficult due to unpredictability of the movement of the

contaminated plume. Alternative solutions must be available in advance that will cover all possible wind changes and directions. For this author is proposing the “rule of 16” that is the main (4) plus secondary (4) wind directions multiplied by day/night (2) operations ($4+4*2 = 16$). In that way, for each and every target there will be 16 manuals that will list orders, duties and obligations in a specific target. It is a very laborious and time consuming process but if done it will save time and spirit during a chaotic environment especially during the initial phases of operations. You do not need to know the area, just start reading orders and distribute forces accumulating in the area.



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- Keep in mind that specialized CBRE first responders are operable for 20 minutes only. This is the time between donning and doffing their encapsulated personal protective gear. In that limited period of time they will enter hot zone, make an initial report on casualties and overall situation, perform detection, take samples (solid, liquid, air, tissues), look for secondary devices (aiming at first responders arriving at the



spot) and return to base. Responders in Level A do NOT: carry stretchers, provide first aids, walk (if they can ride) or carry equipment (if they can drag them). It is ridiculous to see Level A people carrying casualties from underground stations to surface or away from a shopping-mall! Perhaps it is very impressive for the media but it is very important during drills and exercises to follow the same SOPs as if it was a real incident. For those having a different opinion it is obvious that they have never been into personal protection equipment in their lives. Usually some of them are leading CBRNE planners or people in high places...

An alternative for the “Golden Hour” response

Since the majority of the involved populace will end up to hospitals it is clever to fortify them in order to be able to address the problem in the best way possible. Therefore, instead of going to the incident site (hot zone) and find nobody there waiting for them, the majority of CBRNE and ordinary first responders should rush to near-by hospitals and support local medical first receivers to take control of the mass incoming of casualties or worried well. If this is not done then soon hospitals will be contaminated as well and



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people will lose hope for survival. “Rule of 16” is particularly helpful and might make the difference in strategic planning.

At the hospital

Each and every hospital and clinic in London should have the following amenities in order to be able to manage casualties in the most effective and successful way:

Fence

If there is no hard fence around the hospital, crowd control is almost impossible. Depending on the location of the hospital a mobile fence might assist in crowd control. Of course a fence is not the ultimate obstacle that will lead all casualties in the main gate. Desperate people can jump over fences; something very often seen in very tall border fences. Always keep in mind that there is no reason to “*fortify the gate and weaken the windows*”. This means that all main and secondary entrances **and** windows on ground level should be able to withstand violations of any kind. Use special anti-vandal glasses or iron frames that will stop possible intruders from entering hospital’s premises.

Security personnel

Do not count on existing security personnel to control the incoming crowd. They need special training, special personal protecting equipment and sufficient people to do the job. Most probably they will withdraw inside the hospital and try to defend themselves there or flee away. Police forces need to take over as fast as possible; this means that police need to have personal protective equipment for its entire personnel involved in such operations.

CBRNE emergency plan

Emergency plans need to be short, flexible, updated, realistic and anthropocentric in nature. The latter should address the question: “*What would be MY reaction if I was involved in a real terrorist CBRNE incident?*” It would be ideal all hospital to have the same plan at national level with minor modifications depending on local peculiarities. Same plan means better interoperability in case a hospital asks for external support in order to respond effectively. Also it means same “language” that makes the overall situation a bit less chaotic.

Exercises/drills

Exercises test plans and could be table-top, field, local, trans-hospital, national, international, with other first responders, day or night drills. The latter is very important because there is a tendency to believe that the attack will happen only during day time... Exercises will enhance interoperability and establish a common operational language between all entities involved. It is interesting how Israelis are conducting hospital drills – there is one person in the country authorized to start an exercise of this kind. He visits the EMS of the hospital in the morning, asks for the doctor in charge and says one word only i.e. “*chemical*”. From that moment on, the EMS department of the hospital is in exercise status applying all relevant protocols and procedures. At 14:00 the exercise comes to an end. No preparation, no warning, no



alert tips. Just like real life!

preparation, no warning, no



Medical/nursing personnel

Medical and nursing personnel are the key players in every hospital emergency plan! Motivation is the most important element in recruiting the right people for the right job. A CBRN Response Unit with 7/24 shifts or deployed if needed is a matter of discussion and strategic decision. I favor the first proposal at least during the Olympiad. It is

2012: Lessons Learned?

- Fence?
- Secure ground entrances?
- Security personnel?
 - ▶ PPE, training?
- Medical personnel?
 - ▶ PPE, training?
 - ▶ Deployed or when needed?
- Morgue facilities?
 - ▶ Fixed or deployable?
- CBRN stockpile?
- Decontamination facilities?
 - ▶ Fixed or deployable?
 - ▶ Decon of sensitive equipment ?
- Sensitive Data Protection ?
- Interoperability of CBRN procedures & protocols?
- Compatibility of CBRN equipment ?

Hazard Symbol: A blue square with a white border containing three yellow circles with black symbols: a radiation symbol, a biohazard symbol, and a skull and crossbones symbol.

so different to have the shift in place when the evil happens instead of trying to gather all people involved but not all of them are present when needed.

Authorities must consider the fact that “medical/hospital CBRNE defense” is a whole new medical specialty with a lot of studying, no practical experience (other than the one from sarin release in Tokyo), a lot of physical training and the potential to work in a lethal environment.

We demand specialized medical/nursing personnel to acquire a second specialization for nothing? Motivation is important and smart motivation might force people to be actively involved. Do it for the country or the Queen is not enough – not today! Keep also in mind that during a real CBRE incident ALL medical specialties including those in the labs will be involved; so all of them need to have – at least – a theoretical contact with CBRE medical operations. Currently it seems that there is a gap between ambulance (HART Teams) and hospital personnel with the latter not been adequately prepared to deal with the problem. If you answer “no” to one or more of the questions given in Figure 4, it is proof that your hospital is not ready.

Establishments



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Decision for fixed decontamination facilities versus mobile/deployable facilities is again something that the hospital/national authorities will decide. Author favors fixed systems: they are there when needed, you open the doors provide power and water and you are ready to operate. This is especially important for hospitals that are neighboring venues or strategic facilities or infrastructures (i.e. tube stations). Deployable systems require time and even 20 min is a lot of time when casualties arrive at EMS within a very short period of time. If they are not available at all, collaboration with local fire service/station need to be established. "Water curtains" can be deployed in a fast and effective way and high volume/low pressure (60 psi) water will do the job. Radiation rooms (for victims with inner radio-contamination), isolation rooms with positive/negative pressure (for infectious/bioterrorism victims) and BSL-3 labs are important elements of the hospital's CBRE defense. It is reasonable that medical personnel not to be familiar with the kind of wounds IDEs or modern ammunition are producing. Relevant audiovisual sources can provide this knowledge and military medical personnel stationed in combat zones would be a valuable asset in passing their expertise and surgical knowledge to their civilian counterparts.

Equipment

Most of the things we are going to use are already in use in our daily routine. Some specialized equipment i.e. respirators with NBC filter able to operate in a contaminated environment, need to be bought while critical equipment usage protocols need to be established (e.g. when a respirator need to be removed in order to be applied in another victim with better chances to survive). Personal protective equipment is necessary for the mission and personnel involved should feel very comfortable with them. Usually levels B and C or powered air respirators (PAPR) are sufficient. It might be useful to experience Level A suits as well in order to have a personal feeling of the inside environment fellow first responders are experiencing. Protective equipment generate difficulties in personal (claustrophobia, diminished vision/hearing, heat shock) and professional level (loss of dexterity/feeling) that need to be addressed adequately in advance. Continuous acclimatization in personal protective gear is mandatory. If used only during one or two drills then always it will be like the first time plus the huge stress of the real event. Also various external environment exposures will help simulate real weather conditions during the games. What is the point to exercise only in (normal) low temperatures and then experience 30°C during the games? Communications are of utmost importance for the medical people. Even if London is jammed, medical people need to be able to communicate with each other and authorities. Finally, each hospital needs to maintain a stockpile of specialized medications (i.e. atropine, oximes) that will be administered in case of a real event. It would be ideal if all UK hospitals had the same CBRN equipment. In that way hospitals can support each other without any period of adjustment. You go there, take over "your" equipment, then start washing people or provide first aids. If you go from a fixed system to a container or a mobile system – during these critical moments – you will have no idea how to operate them and nobody to ask for. It seems that this not the case with Olympic Hospitals – they are given the budget and it is up to them to decide what to buy.



Morgue facilities

Morgue facilities represent a problem that needs to be addressed well in advance. Experience gained from London bombings (2005) is valuable but in case of CBR agents' release certain rules/protocols need to be established to prevent secondary human and soil contamination.

Restoration

Aftermath restoration procedures also need to be scheduled in advance. Hospitals need to continue to play their public role and patients need to regain confidence that the specific premises are clean and safe. Environmental control and safety are mandatory parameters that need to be addressed through the protocols established. But in order to be pragmatic we must keep in mind that during real CBRE operations protection of the environment is not the first priority. It can be done if casualties are few and situation is under control. If not, then we must improvise in an organized way i.e. connecting



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contaminated waste water pipes with central sewage system that will dissolve/neutralize contaminated waste to the highest degree.

Following the terrorist CBRE attack

It is very important to keep the CBRNE response structure active and in high alert. Exercises of various kinds will promote readiness and maintain acclimatization to protective equipment. Seminars and lectures will update knowledge and protocols and keep personnel's interest alive. Plans' updating and revision will incorporate solutions for the weak parts and gaps identified during real operations. Hospital CBRNE defense is like a foreign language – if you do not practice it often soon you will forget all about it!

State authorities must realize that a real terrorist event of any type might last a few hours and then end. On the other hand, medical consequences will last for weeks, months or even years – personal opinion of the writer following his training at the Military Hospital of Tehran (2003, preparation for the 2004 Olympic Games in Athens), where there is a small clinic within the hospital managing the chemical victims of the Iran-Iraq war of the 1980 when chemical warfare agents used from both sides. These victims (more than 20,000 active files at that time) were small children when their city or village was attacked and continue to suffer various medical conditions as adolescents or adults.

Discussion

Mega sport events have always been considered as attractive quality targets for terrorist activities. Three previous Olympiads have been stigmatized with terrorist incidents:

(a) **1972 Summer Olympics** in Munich, Bavaria, West Germany (Reeve, 2006): During the so-called Munich massacre, members of the Israeli Olympic team were taken hostage and eventually killed by the Palestinian group Black September. By the end of the ordeal, the kidnappers had killed eleven Israeli athletes and coaches and a West German police officer. Five of the eight members of Black September were killed by police officers during a failed rescue attempt. The three surviving kidnappers were captured, but later released by West Germany following the hijacking by Black September of a Lufthansa airliner. Israel responded to the killings with Operation Spring of Youth and Operation Wrath of God, during which Palestinians suspected of involvement in the massacre were systematically tracked down and killed by Israeli intelligence and Special Forces.

(b) **1996 Summer Olympics** in Atlanta, Georgia, United States of America (Dewan, 2005): The Centennial Olympic Park bombing was a terrorist bombing on July 27, the first of four committed by Eric Robert Rudolph. Two people died, and 111 were injured. Rudolph eluded capture and became a fugitive. After more than five years on the run, Rudolph was arrested on May 31, 2003, in Murphy, North Carolina. On April 8, 2005, the government announced Rudolph would plead guilty to all four bombings, including the Centennial Olympic Park attack. Rudolph is serving four life terms without the possibility of parole at ADX Florence supermax prison in Florence, Colorado.

(c) **2004 Summer Olympics** in Athens, Greece (BBC News, 2004): An ex-priest, Cornelius Horan, 57, originally from County Kerry in the Irish Republic but living in London, has been given a 12-month suspended sentence after ambushing the front-runner in the men's marathon in Athens. Horan, who was wearing a kilt and green beret, was arrested and taken to the General Police Division in Attica and held overnight. A police spokeswoman said: "*Religious obsession is being deemed as the cause of his actions.*" It was not the first stunt by the former priest, who last year disrupted the Silverstone Grand Prix by running across the track. Following that incident, he was given a two-month jail sentence for aggravated trespass.

Following 9/11 events, security forces focus equally to all conventional and asymmetric threats – CBRE included. During a mega sport event mass gathering areas are the hot spots in all defense and preparedness plans. A CBRE attack that is a combination of conventional and non-conventional means of destruction will surely attract mass media and pass the terrorists' message that "none is safe nowhere in this world". After all "...terrorism is aimed at people watching, not at the actual victims" (Jenkins, 1974) or as another authority on terrorism reminds that terrorism "is not about killing. It is a form of psychological warfare in which the killing of a small number of people convinces the rest of us that we are next in line" (Sprinzak, 1998).

Preparedness plans should be anthropocentric in basis and predict actions based on crowd behavior and not on theoretical aspects. In a recent international conference held in London, author



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asked the question “how long it will take your ambulances and specialized CBRE response crews to arrive at the incident site?” and got the response “15 minutes”. As if it was a normal daily emergency call to evacuate a heart attack victim. Military people use to say “that no plan stands in front of the enemy”. This is the best approach when planning to defeat extraordinary terrorist attacks such as those involving CBR agents’ release with or without explosives (CBRE). This is why author is strongly support the idea of the alternative proposal described above regarding operations during the “Golden Hour”. It is clever to support the final destinations of the victims involved in a CBRE incident – that are the hospitals, instead of rushing to the hot spot where only dead or without any chance of survival individuals will be left at the scene. At the same time governments spend huge amounts of money to equip and train first responders for operations that will last only a few hours forgetting that medical consequences will last for months or years. A different strategic approach that will enable responding forces to circle the incident cite will better control contamination, save lives, control panic and reassure populace that the situation is under control.

The medical/nursing community that represent the weakest link in all preparedness plans need to be addressed adequately and in an efficient way in order to motivate participation – at least in the critical specialties directly involved in CBRE terrorist incidents. Lack of relevant knowledge and specialized training produce fear and lack of confidence and discourage participation or promote superficial involvement that is not enough in case of real incident. Although preparation period for the 2012 Olympics is almost over, there are still 5 months to fill some gaps based on the remarks listed above.

Most probably Olympic Games in London will be successful and no real terrorist CBRE incident will happen. If this is the case, this article addresses also tomorrow – the day after the games. If all the preparation achieved during the last few years is left to fade and state infrastructure returns to the NBC era (Timmerman, 2003) of the past then a real incident in the coming years will be beyond an unpleasant surprise – will be a catastrophic surprise and no excuse will be available.

Proposals for now and the future

- Inclusion of “medical/hospital CBRNE defense” into the curricula of universities’ medical/nursing schools. In this way, medical students will have the opportunity to come into contact with CBRNE issues and this will improve their differential diagnosis capabilities in case they are asked to face reality as future front-line health professionals. Otherwise it will be either “flu” or “flu”...
- Revise/improvise existing CBRNE emergency plans on anthropocentric/interoperability basis;
- Support fixed decontamination stations for all hospitals. They cost less than you think and all it takes is a good plumber and inspiration!
- Motivate medical/nursing personnel to be actively involved;
- Educate the “GP force”; they are the first to be contacted for medical consultation;
- Educate populace in proper CBRN response. It is strange that we leave the most important player out of the game! Imagine you have a contaminated plume directed towards the City. You order “shelter-in-place” or “shelter-in-a-room” and nobody knows what do you mean or what they need to do in order to be protected. Knowledge will combat panic and will strengthen state response while minimizing casualties. Establishing “NBC safe rooms” (Home & Apartment Safe Rooms and Strategy Page, 2010) at home/apartment (like the Israelis) is complex and expensive but at least a tape, a radio and some supplies could make the difference and might save lives.

If beginning January 2011 someone was proposing a working scenario including a mega earthquake, a mega-tsunami and a mega nuclear catastrophe, participants or the audience will consider him as coming from outer space. And then it happened! In Japan! And we all witnessed the unexpected that happened! After this, nobody has the right to consider CBRN release as science fiction. It might happen to us as well! Tomorrow!

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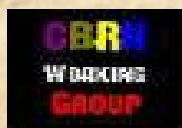
Abbreviations used in the text

NBC : Nuclear, biological, chemical
CBRNE: Chemical, biological, radiological, nuclear, explosives
CBRE : Chemical, biological, radiological, explosives
HQ : Headquarters
IED : Improvised Explosive Devices
RDD : Radiological Dispersing Devices

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Why do governments hosting large sporting events wait until the last moment before putting in place a CBRN response programme and purchase the necessary equipment to do the job?



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UK • Agreed! it would be also useful for the organizers to actually appoint some Emergency Managers for such a large sporting event, rather than viewing EP arrangements as the responsibility of other agencies.

USA (Minneapolis) • Because they think it's easy! Also, possibly because they think this is an "environmental" issue that can be handled after the hard issues of violent threats, crowd control and overall security are in hand. Have a look at the Canadian model for handling the Winter Olympics if you want to see how to do this right

UK (different) • Also, the funding they set aside gets used on other programme overspends

USA (Nebraska) • I think the budget has a lot to say about this question. And I think its fair to say that that level of preparedness might not initially be apart of the event management "to do" checklist. The goal of set up to an event is to have the entertainment; the large number of the masses is given, but not always seen as an opportunity to use CBRN to those planning it. It's suppose to be a happy sports event that makes money, and hiring assessors and responders for the event is pricey. As a spectator you may know you are accepting the risk in being in the crowd. It could be a late reaction in the planning, and then a budget issue. It's the nature of preparing for any disaster event, you do it because it might happen, and you weigh what's important to prepare for to spend money on. No?

UK (different) • Anything high profile attracts very senior people to the table. They do bring experience, but this is often counteracted by a desire to enhance their careers. The end result is a lot of talking about primacy between agencies, rather than working out a viable plan. Why not let the practitioners get on with it, then present something workable to command for sign off: less ego and more productivity.

UK (different) • There is still a fear of what public opinion will be by senior people in seeing responders in Protection Suits and respirators. A few years ago the same could be said about police in the UK publically carrying firearms routinely. This is now accepted and part of everyday life in the UK. I am aware of a situation where this was the case and pressure borne on responders at the major event having to revise their planned response to an incident thus the potential to compromise the responders' safety and certainly their training to accommodate this very viewpoint.

USA (Nebraska – same) • I still say that the last moment planning is due to ill planning in the budget and ignorance to it even being a threat at a large event.

USA (Boston) • My experience, unnamed venue, is that it is a matter of arrogance. They think that they know better and that it is unneeded. When they seek to address it, it is for purposes of "checking off the box" and they want to prescribe the plan. When they are told that they are



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wrong, and that it will require more resources to be effective, they don't want to pay for it ... end of story, end of discussion. Outcome, no CBRN protection. The same people, multi-millionaires, seem to feel that it is a "public" responsibility to protect their private corporation/event. In other words, they want the tax payer to pay for it.

USA (St. Louis) • Having worked on supporting such events both domestically (US) and abroad, I have to concur that many of the lead planners see this as just another of the boxes to check. In their defense there are many additional needs that have to be met with for the venues. Especially if it is a multi-week multi-location event with many different venues. CBRNE response is only a component of the larger picture (although an important one) If a country has a good response program with routine national security events, it should not be difficult to implement it to a new venue (save fixed facility detection equipment which hopefully was designed in during the design/construction phase). D.. has a point as well - the "lets just wait to see who will pay for it" does impact lack of forward motion at times...

USA (Nebraska – same) • I also maintain that until a CBRN event happens, it is not a top priority to those who are not charge to think of it.

USA (Washington DC) • It turns to HAZMAT which goes to Fire Fighters, which is the rule of thumb. Back up from the scene until you can cover it with your thumb, that's the ICP. Anyone who makes it out of the stadium needs to walk between the fire truck hoses, and you're done. Every plan taken care of. Cross your fingers.

USA (Washington DC – same) • @ ... half. Seriously, that is a rule of thumb, back up til you can cover it up and proceed from there. Given the tongue in cheek nature of the question might as well tell someone all the old school tricks before HAZMAT got real dangerous. I guarantee most first responders know that one and they are glad they aren't Fire Fighters. But then, now I know more about HAZMAT and would gladly proceed to the hot zone, just for the cold shower afterwards....

UK (different) • The question is about government hosted large sporting events therefore the comment about multi millionaires is inappropriate and the taxpayer does pay for it, or subsidise it. What the question does do is reflect on the national resilience plan, and why sufficient CBRN resources are not available as a matter of course to deal with potential mass casualty or disruption events. The UK has a national risk register that includes a middle ranking consideration of non conventional terrorist events. Assuming other governments have similar policies the question should be why are governments not able to step up to the mark, and deal with any large sporting event situation as a matter of national policy, and without additional significant cost. Terrorists don't need a government hosted large sporting event to create mayhem - Christmas shopping at ... or ... will provide the same opportunities for CBRN chaos.

UK (different) • Unfortunately until we have a CBRNE event at a high profile sporting event the Government will continue to pay lip service to the risk. I am sure arrangements are in place for responding and dealing with such an event. I'm not so sure that all the responders will be aware of the capabilities, procedures or responsibilities of there co responders. I hope we don't find out the hard way

USA (Florida) • We will always be more reactive than pro-active. It's the nature of the beast unfortunately.

UK (different) • Jim highlights an important point, which is that most nations do have risk registers that do have CBRN events included. However, after that point is when the problems start. An important first step is to create a scenario around which the problem can be evaluated and the protection and countermeasures required can be developed. Get agreement for a "credible"



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scenario is generally the stumbling block as many, and probably most, of those who have to agree this are non specialists and have difficulty in accepting the potential level of problem. How often have you been accused of scaremongering? Then, when the scenario is worked through, the potential scale starts to become apparent. Rapid reductions will ensue and finally it can end up in minimal bolt on bits at the end, whereas designing in at the beginning would have been more prudent. Public perception is also a key factor, and I think many with the responsibility of implementing this protection worry about how overt to make it lest the public are scared off rather than made to feel safer. I also echo another of Jim's points; this problem applies across the public area and not just for specific, periodic high profile events. There is a very similar question on the CBRNe Central Group about whether or not the US should continue to put in place systems when there have been so few B events.

UK (different) • I believe that for most first world countries the answer is very simple we just get the military to step in at the last minute. Why waste money on CBRN precautions early in the planning and finance stage when the money may be needed elsewhere. I military has a host of personnel CBRN trg and with minimal additional trg they can fill the void. it will still have to be paid for but in the long run it is still cheaper than employing and trg a group of inexperienced civilians.

UK (same) • I don't think the issue is training of personnel in their personal capacity - there are many trained blue light service personnel that can operate within a CBRN environment. The issue is more likely the equipment to respond to a given situation, and of course the training that goes with that equipment. Certainly in the UK the ambulance, police, and fire services have plenty of well trained people in terms of their own survivability. Whether they have the appropriate equipment in sufficient quantity is the more likely issue.

USA (W Virginia) • Is the Canadian model open source?

USA (Arkansas) • Complacency. They don't believe it a real threat....not deep down. So they don't place a priority on it. Big mistake! One day a dreadful event will occur and because they are not prepared lots of people WILL die.

UK (same) • Unfortunately it will need an incident to take place for them to wake up. In 2007 I was CBRN & Mass Contaminated Fatalities advisor to the ... Team (including CT Investigation) and there was not any believe at the executive rank that any CT Incident would take place in Scotland. On 25th June 2007 I had one of the regular meetings with the Senior Team members who also believed that Scotland was not safe from attack and 5 days later the Glasgow Airport attack took place. Only then did the executive wake up and take notice. Nowhere is safe and from the recent history of so called 'loners' and statements from Al Qa'ida aligned groups to the fact that the highest profile event in history is taking place in London in 4 months and previously in 1974 was fatally attacked. Ask the Emergency Services and responders in Japan if they take the threat seriously?

USA (Philadelphia) • I'm on a relevant response service and we are hosting a mega sports event in 2014. While I cannot speak for what is happening way up the food chain, at the responder level we have been preparing for the event for some time now. For the last few years our unit has been working with the state Hazmat Response Unit to provide CBRN detection and response capabilities at all ... games at the ... Stadium. Once it was determined we would be hosting the event here the local FBI Hazmat Response Team started attending the games with us in order to build a solid working relationship. Thus far at the responder level we have since developed solid cooperation between multiple agencies (Army, FBI, State Police, local units), determined responsibilities, structured our detection and response packages (ie. what equipment we are putting where, utilizing roving ...teams), and understand the capabilities each entity can bring to the table. All we are waiting on are the big picture specifics to really dial in our plans. Of course everything can go to hell when the big heads all decide to put their 2 cents in but we will roll with it and be successful.



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USA (Colorado) • That is pretty typical from my past experiences. I was once asked why I had spent money buying crime scene gear when we hadn't done any crime scenes yet??? After I struggled to get my jaw closed again I explained that time to do so was before something happened not after. Sometimes you just have to wonder where their heads are. It seems those in the field struggle to deal with a reactive society rather than a proactive one.

John Galatas (Editor) • I think that the answer is simpler to those already mentioned. It is the inherent belief that "it will not happen to us!" - personal experience from participation in a mega sports event. Their "expert" advisers look at the statistics and conclude that it happened only once - in Tokyo metro (almost 25yrs ago). So why bother for something that terrorists did not show any preference for such a long time? But even in conventional



terrorism, same attitude leads to surprised faces on TV stating that it was beyond their expectations. Unfortunately the unexpected always happens...

UK (different) • The sad fact is that CBRN/HAZMAT has to swim in a sea full of other fish... Remember, the overall organizers of these large events have many priorities. Security/safety is important, but it is on a list with many other priorities, like commercial and logistical issues. Within safety/security, CBRN is often one of 20 or so "priority areas" but it has to compete for attention and resources with other valid concerns, like normal physical security, explosives threats, intelligence, public order, traffic control, etc. Also, these large events have spawned a large and complex committee structure. The more advanced notice and planning time, the more the available space gets filled with committees, subcommittees, working groups, task forces, and other spontaneous generators of PowerPoint slides. The success or failure of individual CBRN/HAZMAT professionals in getting their concerns aired and resources allocated depends in large part on surviving and navigating the committees. ■

