Employment of Information Technology and Natural Resources in Support Investment in Tourism Industry – The Case of "El Alamein"

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ABSTRACT

The aim of this paper is to support investment in the tourism industry sector as one of the pillars of the Egyptian government's overall strategy for achieving sustainable development in North West Coast of Egypt. This paper presents an improvement in the method of mine detection to release the El-Alamein zone from ground explosives and rehabilitate it for tourist investment using a strong and effective natural sensing element in detecting the TNT odor inside ground explosives - mines - whether they are anti-personnel or armor, this highly sensitive natural element is the noses of wild mice -Hero Rats- that live in that desert environment [1], in addition to monitor and save the coordinates of land mines active on geo-geographic maps supported by geographic information systems and remote sensing, packet oriented mobile data service that available through the global system for mobile communications to accomplish that task, As

previously published in research papers [2][3], in preparation for the clearing of fenced and suspected land mines as a subsequent step - as published in [4]- and a prelude to tourism investment in the vast land that was liberated from the curse of mines. This paper provides the safe detection method by using trained wiled rats from a safe distance to the human in the process of monitor and save the coordinates of landmines with an Eco-friendly method. Prelude of clearance to liberate the infected zones by landmines by locating and destroying all mines and other explosive hazards within a defined area to a specified depth. In preparation for the expansion of investment in the tourism sector in accordance with the wise plan of the Egyptian government to achieve sustainable development. This requires management systems and clearance procedures that are appropriate and safe and efficient. Community liaison is an important part of the demining process and an effective means of building confidence amongst key stakeholders, especially users of released land[4], Wishing to invest in tourism through the construction of hotels, tourist villages, resorts and others.

Keywords

Tourism Sector, Sustainable Development, Wiled-Hero Rats, TNT, Mobile Data Service, Cellular Technology, Integrated Technologies, Mobile Communications, Spatial Databases, GPS Tracker Devices, Mapping Software and Google Earth, Tracing Explosives, Coordinates, General

Packet Radio Service, Mobile Data Service, Global System For Mobile Communications, Multimedia Messaging Service, Wireless Application Protocol , GSM Tracker Devices.

1. INTRODUCTION

Investment in the tourism industry means the creation of capital or goods capable of producing other goods or services in tourism industry for earning higher profits in the private sector or regional revitalization and economic growth for public [5], to achieve tourist investment subject to the item of regional activation in El Alamein zone, must be cleared of the curse of sand or landmines. Landmines originated in WWII, where Germans and Italians improvised antipersonnel land mines with grenades and fuses in order to prevent allied soldiers from deactivating antitank mines placed on already determined defense lines [6]. Landmines can be categorized into two types: Anti-tank mines generally fit into the following two basic categories: Blast type anti-tank mines are pressure-activated and designed to immobilize a vehicle. They are normally designed with fuses that require 150– 300kg pressure to activate and have approximately 5–15 kilograms of explosive charge, ensuring that the resulting explosion will break a tank track or destroy a truck. The vehicle occupants are commonly injured or killed in the explosion. Penetration These mines have a specially shaped charge that directs the force of the explosion into a searing, hot stream that

penetrates through armor plate into the tank or vehicle. The results normally destroy the tank and kill the crew. Penetration type anti-tank mines can be activated by pressure, tilt rod, pneumatic hose or magnetic influence, which attack the full width of the vehicle rather than just the wheels or tracks. Anti-personnel mines generally fit into the following two basic categories: Blast Mines Blast mines are pressure-activated devices containing explosives in bulk or shaped charges. The explosive content, ranging from 20 grams to 200 grams, is designed to remove or damage a person's foot or lower leg. Blast mines can be laid on the surface but are usually laid a few centimeters underground. The pressure required to set off a blast mine ranges from 3–15 kilograms, making them easily activated by children. Fragmentation mines are normally metal-encased explosives designed to detonate by activating a trip wire. Fragmentation mines can be of several types: Stake Fragmentation Mines Mounted on a stake above ground level, these mines are similar to a grenade on a stick. Activated by trip wire, stake fragmentation mines send lethal fragments in all directions. Bounding Fragmentation Mines These are specially designed mines, buried with a fuze connected to a trip wire for victim activation. When activated, these mines are propelled out of the ground approximately one meter, detonating when the mine reaches full height, sending lethal fragments up to 50

meters in all directions. Directional Fragmentation Mines Directional fragmentation mines have a shotgun effect. They are placed above ground and aimed to cover a large area. These mines are either victim-activated by trip wire or command detonated by electric wire. Releasing hundreds of metal fragments in one general direction, this mine causes death or injury up to 200 meters away[7]. Many places in the world are heavily contaminated with landmines, which cause that many resources are not utilized. This makes landmine detection and removal challenges for research. To guarantee reliable landmine sensing system, deep analysis and many test cases are required[8]. Certain studies point out that there are around 50–100 million AP mines in more than 80 countries around the world. Taking care about environment is a recent phenomenon that widely spread in fact after the World War II (WWII) [9]. The development of science and technology leads to fatal environmental problems especially regarding disputes and wars. One of the worst problems that face the humanity is the buried landmines and unexploded ordnance (UXO)[10] due to the long life of these mines, the victims often have no relation to the original motivation for the mines[10], according to the International Campaign to Ban Landmines, they have estimated that 15,000 - 20,000 people are injured or killed by landmines each year[11]. [12] point out that these mines kill or injure a person every 20 minutes—

70 persons a day, or more than 20,000 people a year. Most victims are children [9] A landmine defines as a device designed to kill or injure anyone that comes in contact with it through direct pressure or a trip- wire [13]. The cost of producing a mine is as little as $3, but it can cost as much as $1000 to remove it[14], The term demining toolkit is frequently used in mine action, typically composed of three elements: manual clearance, animal detection systems and mechanical systems. The use of machines and animals has become common in demining operations, although the majority of landmines and ERW continue to be cleared manually. The decision to select a particular combination of techniques in a country setting is influenced by the extent and type of threat which the munitions pose, as well as other important factors such as financing and security, infrastructure and terrain, and national laws. There are several methods for landmine detection [15] These methods include ground-penetrating radar (GPR), electrical impedance tomography (EIT), x-ray backscatter, and infrared/hyper spectral systems. Different varieties of landmines can be found depending on the casing materials (metallic or plastic), the landmine size and the purpose of using (antipersonnel or antitank) [15]. In [16]an aerial system applied for the terrain mapping and geo-detection of explosive landmine-like objects. In practice in Colombia, a large percentage of the

anti-personnel mines that still remain across the country are hand-crafted and partially exposed on the terrain's surface so that they can be trig- gered.

2.DETECTING SYSTEMS DESCRIPTIONS

In[2] the paper concentrates on the nature of landmines planted during WWII in Alamein, The work explained possibility of use smart cellphones devices, mobile networks and packet oriented mobile data service in landmine detection to provide real-time tracking process, a mini RC truck that controlled from a distance to go all directions in desert environment to provide safety to the detective landmine team, the main components for the previous proposed solution shows in figure 1[3].In [2] The truck platform structure was designed and made of a light plastic and equipped with three DC motors, the first is a stepper motor for steering the front two wheels, the second motor is controlling the truck slow motion by the rear-wheel drive, the last one is the motor which moves in a full circular motion, a fiber arm is fixed and extended from it with 50 cm for radius to carry the metal detector sensor to apply a full circular scanning (angle of 360 degree, radius 50 cm) around the truck to increase the scanned area , and also to carry the GPS tracker device to pinpoint the location coordinates of landmines as shown in figure 1. the configuration for the arm which was used for the detections, a

2 DOF for an arm manipulator with two steeper motors for linear and rotational movement, the truck gross weight was less than one kilo gram distributed on the four wheels, that's make the truck too light to set off mines

Fig.1,[3]: Hardware component for the proposed solution.(1) RC truck with a movable fiber arm, (2) Mini GPS + GSM audio\sound tracker + SIM card, (3)Two smart cellular based on Android OS, (4)Laptop equipped for wireless connectivity to the internet in addition to the spatial database.

the truck was caring two devices a) a smart cellphone based on Android operating system for tracing metallic explosives, the cellphone used as a sensitive sensor to detect explosives through an installed application for metal detection, b) a micro GPS device to pick up the landmine coordinates, the GPS will be harnessed to perform two deferent major processes, one to monitor the noise caused by the cell phone detector when it passed nearby a mine via a

built-in GSM sound tracker, the second to pinpoint the coordinates of those explosives with the GPS tracker devices, the truck was controlled by landmine monitoring team to go all directions from a safe distance, when directing truck to go away within a fenced minefields or suspicious area. In [2] The Landmine tracing strategy was based on a smart cellphone with an Android OS and the professional metal detector application for smart cellphones, there is no need to insert a SIM card into this cellphone, it attached to the movable fiber arm for a perfect detecting process only as shown in figure 2, the metal detector application stimulates the magnetic sensor built-in the smart cellphone that based on Android OS to acts as a specialist scanning tool, the smart cellphone scans the surrounding area, the magnetometer measure the magnetic field, the intensity of the magnetic field in nature is about $49\mu T$ or 490mG, $1\mu T = 10mG$, as shown in figure 3.

Fig.2, [3]:Truck platform structure design. (1) The stepper motor for steering the front two wheels, (2) The back motor to control the back wheels, (3) The third motor to rotate the fiber arm in a circular shape with 50cm radius to increase the scanned area,(4) The fiber arm with 50cm length, (5) The smart cellphone that act as a metal detector sensor, (6)The GSM Audio\Sound tracker and GPS sensors.
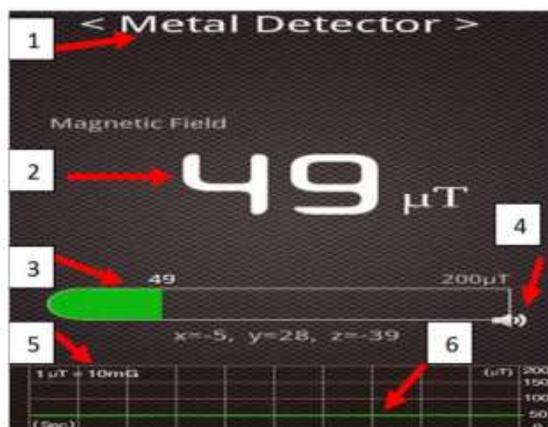

Fig.3,[2]:The normal phase for the metal detector.(1) Metal detector app/Android OS, (2) Magnetic field level in nature is about 49µT, (3) The green color reflects the natural state of magnetic field level, (4) The sound alarm sign, (5) 1µT = 10mG, (6) The green color of line chart means that magnetic field level in natural range.

a metal detector consists of an oscillator which produces alternating current, when it passes through the transmit coil built-in in the metal detector, a magnetic field is produced around it, when an electrically conductive metallic object comes in contact with the coil, it produces another magnetic

field around it, the metal detector contains another coil in its loop called receiver coil, which detects the changes in the magnetic field caused due to presence of the metallic object. As mentioned in figure (3). In [2] The explosives detection strategy was built throw an integrated technologies based on wireless communications and cellular technologies. After detecting landmine and producing high peep by the metal detector, comes the role of GSM sound tracker, the GSM is a unit built-in the GPS device, when GSM sense of high peep produced by metal detector GSM stimulate the GPS device to do two main functions a)pick-up the landmine coordinates, b)directly contacts the monitoring team with SMS via an inserted prepaid SIM card using the mobile networks, the SMS contains the landmine locations. In [2] The monitoring process and pinpoint the coordinates process were important to provide real time connection between the two smart cellphones to display changes that occur on the cellphone unit that act as mine detector with the other cellphone with the monitoring team, if the shared data shows that magnetic field intensity is more than 49μT or 490mG, the monitoring team have to expect receiving two SMS in a consecutive terms , each SMS contains the same coordinates for one landmine site. Handle with the coordinates and results in [2] were as flow, after confirming the presence of metallic landmine nearby the metal detector by the real time tracking system, the

landmine monitoring team receives SMS from the GPS, The SMS contains the landmine coordinates (Latitude, Longitude), that are showing the location of the explosives, the main advantage to the IM instant message is a store-and forward service, meaning that when GPS send a text message to the landmine monitoring team, the message does not go directly to landmine monitoring team's cellphone, the advantage of this method is that team's cell phone doesn't in range, the message is stored in the SMSC Short Message Service Center (for days if necessary) until the landmine monitoring team moves into range, at which point the message is delivered. The message will remain stored on the team SIM card until they process it. If the landmine monitoring team's smart cellphone was connected to the internet, immediately they can handle with the received coordinates via Google earth application that includes a flight simulator so that you can view the Earth from a unique perspective or Google Map application for exploring the surface of the Earth and underground locations. The monitoring team also can store coordinates in a spatial databases by using Spatial Database System. In other side there are another techniques to detect landmine locations as using giant rats [1], APOPO is a social enterprise that researches, develops and implements detection rats technology for humanitarian purposes such as mines/ERW and Tuberculosis detection. The initial research

as to the feasibility of using rats as a means of detecting landmines was carried out in Belgium in 1998. APOPO has found that the African Giant Pouched Rat (Cricetomys gambianus) is the best species of rat to use for detection tasks due to their longevity, with a life span up to eight years, resistance to tropical diseases, calm nature and ease of training[1].

The most popular method for mine detection in APOPO is

The pole method where a handler directs a rat that is harnessed and attached to a long light-weight pole by a short cable and searches a specific area of ground as shown in figure 4, If the rat indicates on a potential mine/ERW as shown in figure 5(a,b), the indication is marked as shown in figure 6, and a manual deminer will check the indication with a metal detector as shown in figure 7.

Fig.4, [1]: The pole method

Fig.5(a),[1]: The hero rate senses the TNT odor emitted
by the mine

Fig.5(b)[1]: The hero rat stands on his hind legs as
a sign to announce the presence of a landmine.

Fig.6,[1] The location of landmine is marked by deminer.

Fig.7,[1]:A deminer checks the object with metal detector

Once all indications checked, the baseline can then be moved forward and the process commenced again. The process is continuously applied until the entire area that needs to be searched is completed. This paper will focus on the advantages in [1]and [3] to merge between then, The merger

between them to produce a detection system and monitoring of landmines more efficiently are also clarified in the next section, In[3] the most prominent is that the tracking process is to detect the metal and this leads to many errors in the detection process may monitor the metal part of the debris of an armored aircraft or a warplane as a landmine or even detect a mine is real but inactive, The magnetic field is also affected by temperature variations, which may spoil the mine detection process, The high cost of the preparation of this system and in the event of being exposed to explosion during the monitoring process the loss is large and finally the system here only fit in the flat areas non-rugged areas.

As for the most prominent features of this system provides safety to the mine detection team where the process of managing the monitoring of the dimension through remote sensing and the use of modern communication systems and satellites, in addition to the use of geographic information systems and spatial databases in the recording of data coordinates sites targets[3]. In [1] the system an unsafe on the lives of the Explosives Detection Team as shown in figure 7, There is no sophisticated method of remote administration in the detection and monitoring of landmine sites, There is no spatial database to record the coordinates of the presence of mines so that the direct interaction of the monitoring team and manually with the mines and this may expose the deminer to a

serious risk. In [1],One of the advantages of this system in monitoring land mines is to rely on a natural resource that live in this arid desert environment, it's a rats with highly sensitive noses in the exploration, analysis and identification of smells. other advantages are the abundance of breeding of rats and the ease of training to detect the smell of TNT, the performance of delegated tasks and is resistant to diseases of light weight and does not have special requirements as shown in figures 4,5 One of the advantages of this system in monitoring land mines is to rely on a natural resource

Long live in this arid desert environment, it is a mouse with highly sensitive noses in the exploration, analysis and identification of smells. Many of the advantages are also the abundance of breeding of these organisms and the ease of training to detect the smell of TNT and the performance of delegated tasks and is resistant to diseases of light weight and does not have special requirements.

3.SYSTEM DESCRIPTION & SOLVING PROBLEM APPROACH

3.a Landmine tracing strategy

This paper replaced two main parts were in [3] with another two natural parts used in [1], the first replaced item is the metal detectors in with a non-expensive natural detection device that can be used to detect the scent of TNT found

inside the all kinds of explosives, whether metal, glass, plastic or even wooden mines, such as in the newly manufactured landmines, second replaced item is the carrier or the truck that was attached to it all the devices used in mine detection, the truck replaced with the Hero rat to attached with it the GPS that will pick up landmine's locations, so the present paper has relied on a smart cellphone based on Android OS and the professional TNT detector it's the hero rats noses, , the hero trained rats scans the surrounding area by it's natural sensitive nose rats search the TNT scent. The mine tracing strategy presents in figure 8
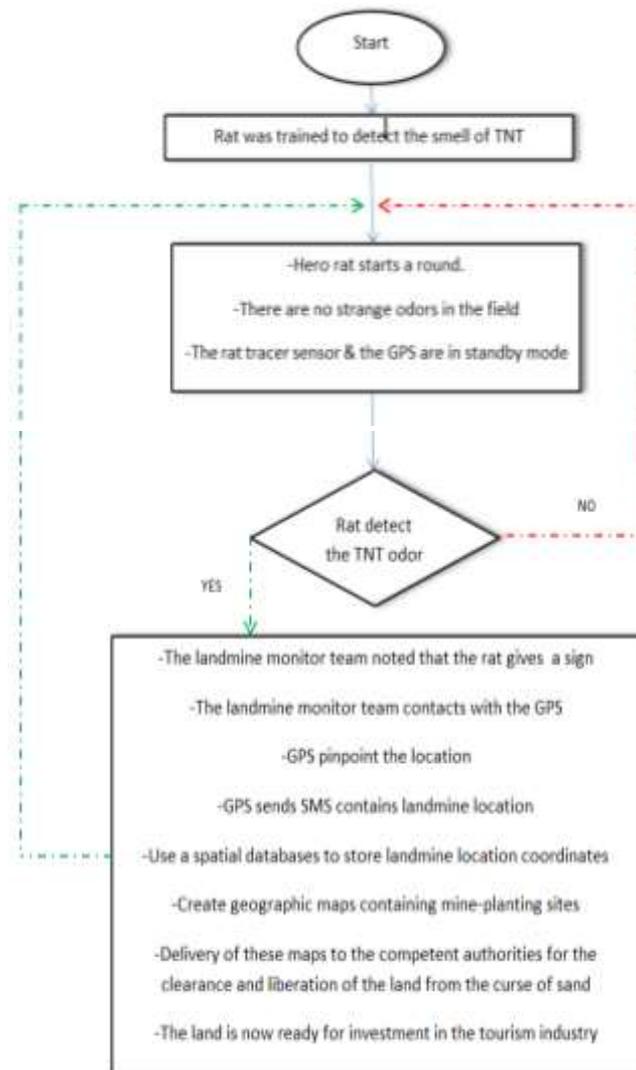
Fig 8: The flow chart for detection process
real-time tracking strategy.

3.b The explosives detection strategy

The explosives detection strategy was built through an integrated technologies based on wireless communications and cellular technologies plus a nature source for TNT scent detection "hero rats". After detecting landmine through TNT scent, The hero rat stands on his hind legs as a sign to announce the presence of a landmine after confirming the presence of landmine nearby the hero rat and his sensitive nose to the scent of TNT, comes the role of GSM sound tracker, the GSM is a unit attached to the rat's body, when the tracking team observe the rat's sing, the landmine monitoring team call the GSM number to communicate with it in a real time to do two main functions a)pick-up the landmine coordinates, b)directly contacts the monitoring team with SMS via an inserted prepaid SIM card using the mobile networks, the SMS contains the landmine locations or coordinates (Latitude, Longitude), that are showing the location of the explosives.

.٣c Handle with the coordinates and results

The hero rat stands on its hind legs as a sign to confirming that a landmine is present near from its sensitive nose through the scent of TNT, the control team communicates with the chip number attached to the GSM audio / sound tracking device and the GPS sensor that tied on the rat body. The group then receives SMS messages containing the location

coordinates of explosives, and the main advantage of IM is the storage and forwarding service, meaning that when GPS sends a text message to Landmine Monitor, no The message is stored in the SMSC (for several days if necessary) so that the Landmine Monitor team moves in the range, at which point the message is delivered. The message will remain stored on the SIM card for the team until it is processed. If the Monitor Landmine Monitor smartphone is connected to the Internet, it can handle coordinates received through the Google Earth application immediately, which includes Flight Simulator so that you can view Earth from a unique perspective or Google Map application to explore the Earth's surface and underground locations. The monitoring team can also store coordinates in spatial databases using a spatial database system.

4.CONCLUSION

This paper combines the advantages of two previous research to bring out a more effective system in spatial mapping by monitoring and determining the coordinates of the presence of land mines to solve the problem of the absence of maps to help in the detection of the sites of those ground explosives, which in turn support the process of disposal and clearance of Alamein area and liberate its territory From the curse of sand in order to prepare and

support the investment process in the tourism industry. The Battle of El Alamein took place on the north coast, which was one of the main reasons for the Allied victory and the end of the Second World War in 1942, but left about 17 million mines planted on the northwestern coast of the desert west. These mines are explosive and impede many development processes and use the natural resources that characterize this region. For this reason, many scientific researches have tried in many ways to find solutions to invest in this rich area in Egypt. This paper combining between the capabilities of the field of communication, modern technology and the special abilities created by God to distinguish some creatures. The combined system brought together to fulfill four main tasks, a) Tracing the explosives, b) Detecting the explosives c) Monitor the minor change happens to the explosive detector sensor d) pinpoint the exact location coordinates of those explosives. preparing to use the stored spatial data in the next step ―Landmine clearance‖. After the completion of the design and construction of a spatial database and its data storage that have been obtained in the phase of data collecting, comes the next stage to provide spatial database to the sovereign bodies concerned for landmine clearance stage, to Liberate Alamein from the curse of the sand "Landmines."

5. REFERENCES

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