

Low-Profile Disposal of U.S. Ordnance

Time: 1130 hours. **Place:** Thumrate, Oman. **Mission:** Low-profile disposal of ordnance. **Profile:** Low. **Personnel:** Two.

by Frederick L. "Bart" Barthold, LEAI International, Inc.

The mission was simple enough: monitor air operations at Thumrate Bombing Range from a safe distance, locate ordnance that did not detonate, ensure a positive identification of said ordnance and ensure a complete disposal of said ordnance is accomplished with the lowest profile possible. Oh, if life could be so easy! The ordnance: MK82, 500-pound bombs using M904E point detonating nose fuze with a M990 series, inertia tail fuze back-up, and GBU-10, laser guided bombs (MK84) with an MK346 electric tail fuze. What normally would have been a "blow-n-go" operation took a brutal turn for the worse when a herd of camels followed by an entire tribe of Bedouins wandered onto the range. This simple act of random grazing blew the "low profile" right out the window and led to a severe case of "mass pain in the six"!

Normal "blow-n-go" operations consist of explosives, time fuzes, M60 fuze lighters and non-electric detonators. The idea is to find the duds, set the charge, allow enough time fuze to get behind a *gerbal* (Omani for "small hill"), wait for the boom, then move on to the next dud. The "random grazing" situation mentioned above entailed much more complex operational dexterity than two individuals should bear.

First, the Omanis own the range—be it in the desert or the coastline. We could do the work, but we could not kill a camel doing it! Evidently, camels are curious and have a highly developed sense of smell. As the fellow explained, in very good English: "If they smell the time fuze burning, they will rush to investigate the source. [T]hey will be too close to the

bomb when it goes off. Thus, they will be killed! Also, camels are a show of wealth and any decrease in the herd would be interpreted as weakness and invite trouble."

Second, this requirement, as simple as it appeared, became the pivot for the downward direction of the operation. Electrical lead line had to be used instead of the time fuze method to ensure that "command control" was maintained throughout the operations. At first, this did not appear to be a bad option. After all, there were only seven duds; surely that small number could easily be disposed of quickly and without complications.

The first of three GBU-10s found was 3968.8 feet from our safe position. The last of four MK82s was found just over a mile and a half from our safe site. It was wonderful to have a Landrover to haul all the explosives and equipment and to pay out the numerous spools of lamp cord wire for the firing lead. Even after the Landrover suddenly shut off and refused to start again, the impact of the moment didn't really sink in for nearly 30 minutes. Without wheels, we were the mode of transport. The last thing I would ever choose to do willingly would be to carry several 1000-foot spools of wire, explosives, equipment and water over a desert bombing range. To the uninitiated, this may not sound as brutal as it really is, but one can never predict the topography of the desert with any great accuracy. There are not enough Band-Aids in two boxes to cover the bangs and scrapes two explosive ordnance disposal (EOD) Technicians will receive while unspooling a mile of wire down hills, up hills, across run-offs (*waddis*) and crevasses, across broken flint fields, etc. To make this grueling story short, what should have been accomplished in two days at most (cleanup included) actually took up the majority of

seven days to complete.

The wire that was laid out is still there, I believe. Ultimately, I'm not concerned. I'm almost positive the fellow we talked with either used it himself or sold it to some other technician!

This scenario never needs to be repeated. There is new, non-explosive, technology available that burns ordnance in place. It uses light energy to initiate a chemical reaction to heat polycrystalline iron whiskers to 2000°C within 0.5–1.5 seconds, which in turn ignites a thermite puck. The thermite is sufficient to burn through thin-case ordnance using one puck and thick-case ordnance when two or more pucks are used. This technology is referred to as a Light Energy Absorbing Ignitor (LEAI) and is currently being developed for underwater applications.

Introduction: New Equipment

The LEAI system is a non-explosive tool that was developed for the humanitarian demining industry. The system can initiate a burn or detonation from distances up to five kilometers by the use of a Class One Eye-Safe Laser and a Light Energy Absorbing Ignitor. The LEAI system has the capability to burn or detonate ordnance in place safely, quickly and efficiently. In addition, the system saves many man-hours by requiring less personnel and support equipment for operational use. The LEAI system does not require magazine storage, the purchase of explosives, Quantity/Distance (QD) restrictions or lengthy shipping and handling times. Class One, Eye-Safe Lasers are used throughout surveying circles and the utilities industry with great and dependable accuracy and has been proven in rugged conditions for many years.

Description

LEAI International, Inc., developed the LEAI system in order to tremendously simplify the removal of landmines and other lethal devices from the ranges and battlefields of the world. The device is intended to help the EOD and UXO Technicians safely and quickly mitigate the

explosive filler ignites, burns away and vents, leaving the ordnance case. This in turn can be disposed of in a much easier and safer manner. The LEAI UN hazard classification for transportation is 4.1—"Flammable Solid"—and it has a minimum shelf life of 10 years. This same process can be used to initiate a detonation by using an electric blasting cap or by connecting a non-electric

Physical Characteristics

Size:	8.4"L x 4.5"W x 7.5"H
Weight:	4.8 lbs. Each unit
Operating Temp:	-22° F to +140° F
Storage Temp:	-40° F to +176° F
Humidity:	90% Non-condensing
Environment:	Water & Dust Resistant
Display:	LCD, 4-line X 20 Characters
Keypad:	Membrane Keypad
Sighting Optics:	Heads Up Display

Laser Rangefinder

Type:	Semiconductor pulsed laser 904 um
Eye Safety:	FDA Class 1 (21 CFR 1040)
Accuracy:	+/- 15cm / 0.50ft. (3 sigma)
Resolution:	1cm / 0.10ft
Range:	5250 ft.+ (w/ prisms)*
Meas. Time:	0.33 sec (0.4sec acquisition)
Divergence:	3 mrad (30cm/100m)
*Atmospheric conditions may affect ranging capabilities	

Ignitor

Size:	5.25"L x .625"D
Weight:	< 5oz.
Active Mtl:	< 3 grams glass sealed
Thermite:	15 grams
Temp/Time:	2000° C w/in 0.5 – 1.0sec
Burn Time:	1.5-3.0sec
Body:	Metal

initial hazard of landmines, submunitions and other UXO. The LEAI system's unique method of initiation is a giant step ahead of any other techniques in the demining and UXO disposal industry. The laser light source transmits a pulsed coded signal to the Receiver/Controller unit (RCU), which in turn opens a circuit to initiate a light-sensitive iron mixture, producing a burn that can vary from 1300°–2000°C—according to the composition and operational requirements. This temperature is sufficient to burn through thin-case ordnance material, such as landmines and projectiles up to one half-inch thick. After burning through the outer case, the

shock tube directly to the RCU. Additionally, an accessory firing box may be used at closer distances for disposal of anti-personnel landmines, thus making the LEAI system very versatile for disposal operations.

Grid-Quality Assurance/Quality Control (QA/QC)

Burning the ordnance in place consolidates clean-up efforts considerably. UXO is more likely to be confined to the specific global positioning system (GPS) location(s) in which it was found, instead of being scattered by a detonation method

of disposal. The actual grid clean-up and certification process is confined to the one-meter grid, which requires less man-hours to remove the residue and promotes a safer working condition by exposing operators to less fragmentation and debris. The "burning in place" method also promotes a higher confidence factor for the entire site clean-up. Sweep teams are less fatigued when they can screen specific GPS location grids where the UXO was found, as opposed to scouring the entire work site for UXO residue that has been detonated. Site remediation is also much easier because the specific GPS location grids require less attention than the overall work site.

Assessment

The LEAI system has a solid foundation. The ignitor whisker material has been in use for over 40 years with an outstanding track record for dependability and safety. The Laser Ranger Transmitter (LRT) has over 20 years' experience in both the military and the utilities industry. Combined, this system has achieved remarkable reliability during field testing. It is easy and safe to use. A continuity check circuit, a safety arming-circuit and a firing circuit are built into the RCU, which permits the user to check the entire circuit. Then, the user can retreat to the specified safe distance before the circuit is armed. The end user may elect to set up either a burn operation using the ignitor, or a detonation operation, using either an electric blasting cap or non-electric shock tube for the disposal operation. The LRT is then triggered to initiate the operation down range. An inherent safety ratio of 3:1 is designed into the circuitry.

Future Development

The LEAI system may be used for Force Protection of Navy ships. A number of perimeter floats containing non-lethal deterrent charges can be set in place around the ship at anchorage. Should fast-tracking boats or other intruders enter the perimeter, these non-lethal deterrent charges, such as the MK141, may be launched and operated in close proximity to the boat.

This same setup may be applied to land-based perimeters using the RCU attached

to a platform, which is configured to the requirements of the specific non-lethal deterrent charge. Various configurations of the LEAI system may be used for close distances required for police bomb squads, hostage rescue teams (HRT) and Homeland Security concerns. The LEAI system may be used in Special Operations where the MK186 Firing Device is presently used.

Operation

The LRT signals the RCU with the required pulsed coded signal. The distance between the two is presently set for up to five kilometers or three miles. The system can be configured for greater distances than this. The RCU has a feature programmable for arming and remaining armed for extended periods of time.

The RCU energizes the Ignitor, which is set near the item to be disposed.

An electric blasting cap or non-electric shock tube is optional for use, making the system a very versatile tool.

The Ignitor is durable and field-ready upon receipt. It is six inches in length and 0.625 inches in diameter. The Ignitor weighs less than five ounces. It is positioned in the vertical in the usual manner of disposal operations.

The Ignitor is durable and easy to store and transport. The long flash lead affords a safe distance during connection to the firing lead. It has a 10-year shelf life.

The Ignitor contains approximately three grams of iron whisker material. It reaches 2000°C within 1.5 seconds. When a thermite puck is added, it will continue to burn for another 30–45 seconds at this temperature. The concentration of heat consumes small sized ordnance, such as anti-personnel mines. The site clean-up time is kept to a minimum because the

UXO case material is usually all that remains. QA grids will have an enhanced degree of clearance confidence. ■

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