

CHAOS-B IED/RCIED DEFEAT SYSTEM TECHNICAL EVALUATION FOR [REDACTED]

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INTRODUCTION

The CHOAS-B IED/RCIED is the LifeSystems designation for the Protective Systems Bishop® product series. The report will refer to this product as the Bishop®. This product series comes in a variety of packages and models to meet a wide array of potential mission objectives. This report will focus on the potential to use the product to defeat improvised explosive devices (IEDs).

The product works on the principle of electromagnetic wave propagation to saturate the semiconductor components with photons rendering the components inert thus preventing the device from firing. This is a significant technological shift from radio frequency (RF) based technologies like jammers.

The main benefit claims of this product worth consideration are:

1. The device has the capability to shut down an extremely wide variety of electronic circuits to include all RF devices of any frequency, infrared (IR), passive infrared (PIR), and even quartz clocks. This is all done from a single device without having to configure the device hardware or software to address specific frequencies or electronics.
2. There is no jamming of mission communications within the convoy or airborne support.
3. There is no high energy RF radiation creating a safer operator environment than traditional jammers.
4. Typical RF issues like cancellation or RF reflection do not affect the protection area and perimeter.
5. The area and perimeter to be protected can be clearly defined, and can be large (100m or more).

The device uses a continuous wave to provide temporary disablement of electronic devices referred to as device stabilization. Permanent destruction of an electronic device is possible through optional configuration of the device by the use of a pulse wave. However, the process of permanently destroying the device creates short circuits in the device resulting in an extremely high probability of detonation.

REVIEW OF TECHNICAL EVALUATION ACTIVITY

Protective Systems and Life Safety Systems in Ridgecrest California 15-July-2008 performed the technical evaluation activity with [REDACTED], and Byron Spinney.

Five technical evaluation activities of the Bishop® product were performed. Each technical evaluation activity used a selection of “ordinance” and was broken into four activity components.

Ordinance

The ordinance was a variety of CO2 actuators devices, which sprayed a gray talc power emulsion under pressure when fired. Each of these devices was fired using some form of remote device designed to emulate what would be found in theater.

Technical Evaluation Activity Components

The first component was a “cold run”. In the cold run component a vehicle was driven through the staging point (SP) and the ordinance would be fire remotely via an RF based device.

The second component was a debrief to describe the scenario. The debrief provided the following:

- Terrain Description – A description of the terrain with reference as to why it was selected for the evaluation.
- Speed – The approximate speed of the vehicle.
- Device Used – A description of the device used to include the trigger device frequency.
- Tactical Standoff Distance of Triggerman – The distance of the triggerman from the ordinance.

The third component was a “hot run”. In this component there were two vehicles involved. The lead vehicle had the Bishop® on a roof top mount and the second vehicle followed. The ordinance was triggered at the same point as in the cold run and the triggering continued until the ordinance was fired allowing a view as to the distance of the vehicles from the detonation point.

The fourth component was a debrief to describe the scenario. The debrief provided the following:

- Terrain Description – A review of the terrain with reference as to why it was selected for the evaluation.
- Outcome - A review of the outcome of the event.
- Speed – The approximate speed of the vehicles.
- Device Used – A description of the device used to include the trigger device frequency.
- Tactical Standoff Distance of Triggerman – The distance of the triggerman from the ordinance.

Technical Evaluation Activities

The first four activities were convoy simulations and the fifth activity was an explosive ordinance disposal (EOD) simulation.

Each simulation was meant to demonstrate the capability of circuit stabilization in a varied environment to aid in comparisons with standard RF jamming equipment. Each of the four simulations sought to introduce terrain that would present challenges in a RF jammer scenario. Each also introduced a different frequency for the trigger device, with the EOD simulation using PIR.

Activity 1

Terrain Chosen: Open field across from rock formations to accentuate reflectivity issues. The rock formations on the right, in the direction of travel, create high reflectivity producing null and void around the threat device. This would prove to be a very difficult scenario for traditional jammers.

Outcome: The Bishop® was able to impede the device from detonating

Distance of Lead Vehicle in Convoy from the Device upon detonation:
Approximately 100 meters

Speed: 45mph

Device Used: Simulated 75mm round, RCIED, 315 MHz

Tactical Stand-off Distance of Trigger Man: 30 meters





Activity 2

Terrain Chosen: Metal grating and additional objects produced random angles of cancellation; the device was protected with wood and metal which would produce

intercepting angles to the device from the triggering signal. This scenario would be difficult for traditional jammers to work effectively

Outcome: The Bishop @, was able to impede the device from detonating

Distance of Lead Vehicle in Convoy from the Device upon detonation:
Approximately 100 meters

Speed: 45mph

Device Used: Simulated Claymore, 454 MHz

Tactical Stand-off Distance of Trigger Man: 30 meters





Activity 3

Terrain Chosen: This area had impairments of banks on both sides of the road to create significant cancellation and null point conditions. Again, a difficult scenario for traditional jammers

Outcome: The Bishop @, was able to impede the device from detonating

Distance of Lead Vehicle in Convoy from Device Before Detonation:
Approximately 75 meters

Speed: 30 mph

Device Used: Simulated Explosively Formed Projectile (EFP), 434 MHz

Tactical Stand-off Distance of Trigger Man: Less than 30 meters





Activity 4

Terrain Chosen: Worst of all conditions; Double hair-pin turns, vehicle forced to present broadside multiple times throughout turns; vehicle front end angled up approximately 15° with respect to the threat device; banks, washes, and

obstructions would cause null points. Again a difficult scenario for traditional jammers.

Outcome: The Bishop @, was able to impede the device from detonating

Distance of Lead Vehicle in Convoy from Device Before Detonation:
Approximately 100 meters

Speed: 20mph

Device Used: Simulated Claymore, 390MHz

Tactical Stand-off Distance of Trigger Man: 40 meters





Activity 5

Terrain Chosen: Small work shed.

Outcome: The Bishop @, was able to impede the device from detonating

Speed: Walking

Device Used: Simulated dynamite, three sticks.

Trigger: PIR







RESULTS AND OBSERVATIONS

The Bishop® performed very well in all of the technical evaluation activities. In a variety of very difficult terrain circumstances the Bishop® was able to defeat the detonation of the devices each using differing frequencies and modalities.

The device works by flooding the gates of the semiconductor devices with photons preventing electron flow and subsequently operation of the device. Working with various models of the Bishop® in the lab and field, specifically activity 5 (EOD) the lower power devices exhibited an anomaly that could only be explained as “partial flooding” of the gates. In these rare cases if enough RF trigger source power is available the target device will actuate. This clearly demonstrates the need to clearly define the protection area and perimeter requirements to assure the proper power levels and dispersal patterns are established.

The device behaves significantly different from RF based devices. The wave front behavior of the electromagnetic field allows the particles (photons) to travel around obstacles, apparently explicable with fluid dynamics (Bernoulli's principle), that would block or reflect RF wave propagation.

The device uses a continuous wave to provide temporary disablement of electronic devices. A pulse wave will permanently destroy the electronic device. However, the process of permanently destroying the device creates short circuits in the device resulting in an extremely high probability of detonation.

RECOMMENDATIONS

The recommendations are:

1. Establish a clear requirement defining area and perimeter protection.
2. Acquire a device designed to the requirement.
3. Work with the [REDACTED] to perform pre-fielding tests.
4. Upon successful results of [REDACTED] testing move the product into operation testing.

SUMMARY

The Bishop® is unique in the approach to temporarily disable electronically triggered devices. The initial technical evaluation and observations clearly indicate that the product demonstrates significant value in the ability to stabilize electronic based devices in an inoperable form. Finally it is clear that this product requires further testing in a controlled environment against detailed specifications.