

Z-Bolt® Field Utility Lasers

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Personal – Portable – Adaptable – Affordable Silent Signaling – EOD – EOF – Tactical Team Communication

This document questions & compares capabilities & costs. Military Program vs. COTS Field Utility Lasers. We answer these questions, summarize, and then offer our conclusions:

- What is a military program laser?
- What effect does laser power output, complexity, and high cost have on overall procurement and the existence (or lack thereof) of lasers in US Military Infantry units?
- What is a Z-Bolt® COTS (consumer off the shelf) Field Utility Laser, and how effective are they?
- Capabilities and Applications?
- Reported Battlefield Use?
- Summary & Conclusion

What is a US Army, USMC, or DOD “Military Laser”?

We are all familiar with PM Soldier Sensors & Lasers (PM SSL). They approve & procure extraordinary laser systems such as the AN/PED-1, AN/PEQ-15, & AN/PEQ-15A [MFAL]. Other Army “program” lasers & “dazzlers” provide the soldier a non-lethal means to hail or warn potential hostile forces and/or civilians that are approaching military units or operations – designed for EOF – Escalation of Force. These devices are the best in their class. Sophisticated and well made; effective and durable; very bright with incredible beam ranges and capabilities.

Program of Record lasers are predominately Class IIIB (5 ~ 500mW) or Class 4 (>500mW), which make the systems extremely dangerous to operate. The laser systems carry restrictive safety classifications; high power outputs demand stringent LEP; the systems require burdensome training and SOP manuals. The devices are often too powerful and mismatched to the actual combat or training mission - and thus not employed CONUS due to serious safety concerns (the possibility of the accidental lasing of friendlies – blue on blue - resulting in severe retina tissue damage). As a result, comprehensive laser field training becomes severely restricted, reducing unit effectiveness. And finally, there are cost & budget issues. The PM SSL & PoR laser systems are manufactured in relatively small numbers in comparison to the entire US Military Infantry force; and high procurement costs preclude wider deployment and adoption. Prices of \$2,000 to \$10,000 PER UNIT are common. Reduced budgets and unit priorities for 2020/2021 have further reduced the possibility that greater numbers of PoR lasers will be procured & deployed into the active duty force.

What is a Z-Bolt® “COTS” Field Utility Laser?

Beam of Light Technologies [BOLT] manufactures green, red, blue, and infrared “field utility lasers”. Hand-held, man-portable, inexpensive, easy to operate, extremely effective. Over 50,000 Z-Bolt® **Field Utility Lasers** shipped downrange to Iraq, Afghanistan, Kosovo, & Syria since 2006. Procurement is budget friendly - **\$100 to \$350 per unit**.

Z-Bolt® Field Utility Lasers utilize COTS (consumer off the shelf) laser components and modules. Sourcing components that are widely used in industry enables the production of laser systems that are simple, portable, adaptable, and affordable. Yet these laser systems remain extremely effective, crafted and customized for specific battlefield applications or mission goals. Z-Bolt® Green Lasers are FDA Class IIIa (< 5mW) and do not require LEP or special SOP manuals to operate. **ALL Z-Bolt® systems**

are priced to accommodate reduced budgets and permit wide deployment throughout the infantry force. Field Utility Lasers can provide deployed infantry squads with a safe & effective tool for non-lethal escalation of force – to “hail & warn”. But Z-Bolt® lasers are capable of so much more . . .

Z-Bolt® Field Utility Lasers – Capabilities & Applications – Field Use



EOF – Silent Signaling

Universal Communicator

The Z-Bolt® BTG-10G Green Dot & Beam Laser simplifies tactical operations and **provides an indispensable tool for cross-cultural, multi-lingual communication with Foreign Security Services & Indigenous Forces & Militias** – providing a precise non-verbal communication for tactical teams and an improved state of situational awareness. Field tested for security force assistance – training, advising, mentoring.

Field reports and numerous theater deployments indicate the following Uses and Capabilities:

- Visual Comm to EOD Tech - Illuminate Suspected IED
- Mark IED from Safe Distance - Robot or Dog Inspection
- EOF - Checkpoint – Signal Vehicle Driver Attention
- Mark Targets and Concentrate Fire - Mark LZs for Rotary Aircraft
- Allow / Deny Access to Entry Control Points [ECP] & Traffic Control Points [TCP]
- Illuminate Trip & Command Wires
- Guard House Signaling – Fence Line Incursions
- Base Security Visual Comms - Guard & Perimeter Patrol

36° Fan Angle
15' Line Length @ 15'



EOD – Illuminate Trip Wires

Room Clearing, Breaching

The Z-Bolt® C-TRIP-10G Green Dot & Line Laser is “personal gear issue” for US Navy, USMC, Army EOD & FBI & NYPD bomb techs. The lasers have been field deployed in the operational forces since 2010. **EOD techs use the green laser line to illuminate and fluoresce trip and command wires; to quickly scan doorways, halls, or stair wells during fast assaults.** The C-TRIP-10G also projects a bright dot & beam for EOF; for marking targets; or to communicate suspected IED locations. The Z-Bolt® C-TRIP-10ir variant uses the 830nm IR laser in place of the 532nm green laser module. 8,000 Trip Wire Lasers shipped since 2012.

EYE-SAFE TRAINING & FIELD OPS



Infrared Training lasers *EYE-SAFE Ops*

The Z-Bolt® MARK-1ir & MARK-4ir are hand-held infrared training lasers. The MARK-1ir is FDA Class 1 and Certified EYE-SAFE. NOHD = 0. The MARK-4ir is ANSI Class 3R. NOHD = 13.7m. Purpose built for trainers & instructors; LE & Military tactical team leaders. Use to designate assault target – person, door, window? EYE-SAFE Ops when civilians are present. Perfect for rotary wing aircraft crews who require laser tech that can be safely used in training environments and in laser safety restricted air spaces - without LEP. A capability that provides for safe, precise, visual, and non-verbal communication between pilots and crew; between crew and ground operators. **A capability that reduces errors & miscommunications AND improves situational awareness and operational efficiencies.** Use to mark LZ's; to point out obstacles, terrain features, or aircraft rotors to insure obstacle clearance; to reduce radio chatter with precise & silent signaling. Use the MARK-IR's as training lasers for JFO & JTAC target marking; as an instructor tool; for general training in all things CONUS (when high-powered units are restricted & dangerous to employ). 1,000 Meter (MARK-1ir) or 5,000 Meter (MARK-4ir) visible beam ranges.



Green Forensic Lasers *Portable Site Exploitation*

SUMMARY: Advances in laser technology lowers procurement costs; multiplies field unit deployments; retires less effective LED forensic lamp sources; redefines expeditionary & crime scene "portability".

Laser Spectral Brightness Superior to LED

Green (532nm wavelength) lasers have been repeatedly tested and proven to be superior to LED light sources as a tool for the detection & imaging of biological & print evidence in the field and in the lab. Superior spectral brightness provides the operator with a powerful and narrow wavelength band to excite or fluoresce biological evidence for further investigation and photography.

Z-Bolt® C-PRINT Lasers are similar in dimensions to a small-size flashlight, a feather-light 10 ounces. Easy to transport, carry, and operate, the C-PRINT's capabilities compare favorably to the Coherent TracER at 45 pounds. The TracER is marketed as delivering "ultimate portability", but is too heavy to effectively accompany LE, SOF, NSW, EOD, or CID teams into the field. Transported in a large hard case, the TracER is too unwieldy for rotary wing or vehicle transport. In contrast, the Z-Bolt® C-PRINT is MOLLE



Coherent TracER, 45 lbs. \$48,000

or belt portable for on site, on the battlefield forensic detection & effective imaging at expeditionary forensic labs; at crime scenes; at remote, isolated FOBs. The C-PRINT features digital variable power; beam-spot size control; an internal variable sealed zoom lens system; battery "Low-Power" indicator; and easy access power interlock.

**Use the Z-Bolt® C-PRINT for Field Work. . .
AND as an Effective, Portable, & Affordable Lab Laser Replacement**

C-PRINT pricing is reasonable - allowing for wider field deployment; expanded theater coverage; increased collection opportunities. Approx. **\$8,500 ~ \$11,500 vs. Coherent TracER at \$48,000**. LED forensic lights are currently the only reasonably priced alternative to Coherent lasers, but lack the intense spectral brightness required for effective evidence imaging. Z-Bolt®

Forensic Lasers are designed to supplement OR replace expensive legacy laser systems, sustain budget viability, & deliver **increased field portability & effectiveness**. The C-PRINT ships with orange filter safety glasses; rechargeable batteries; laser optics cleaning kit – all in a hard case for stowage & transport. Also kitted with optional C-PRINT Blue LED light if requested.



Z-Bolt® C-PRINT Laser Kit

Summary & Conclusions

Field Utility Lasers Widely Procured & Deployed – Across a Unit's Entire AO

There are many laser systems that are "Program of Record" and available for purchase. But these laser systems are not deployed widely because of cost; because Class 3B and Class 4 lasers are dangerous to operate and to train with; because these systems are often "over engineered" and not built to field requests from the battlefield or training range. **Z-Bolt® Class IIIa green lasers are safe, affordable, & extremely effective - proven to enhance the warfighting capabilities of any US Military infantry unit.** These effective, but inexpensive EOF & EOD lasers should be widely deployed in all US infantry platoons - not to replace, but to supplement existing DAZZLER/EOF laser systems. **Z-Bolt® Class 1 Infrared lasers are EYE-SAFE & increase training opportunities all parts CONUS.** A unit can "train as it would fight" - on base & on location - with no LEP restrictions. And finally, unit commanders can replace "personal" green lasers carried into their AO - eliminating an existing eye safety hazard to troops and civilians alike. (Z-Bolt® Class IIIa lasers are safe for training in restricted areas with no LEP required due to quality-tested safe power outputs)



The US Army, Navy, and Coalition Forces procured approx. 40,000 Z-Bolt® Laser Systems in EOF kits between 2006 & 2011. Brigade debriefs from returning units spoke highly of the Z-Bolt® Green Lasers, the effectiveness of the device, and the broad range of innovative field uses and capabilities. Z-Bolt® Lasers are simple and highly effective, used hand-held or weapons mounted, and can be economically procured & sustained in quantity. **When deployed widely and in large numbers down to platoons & squads, the Z-Bolt Lasers' battlefield effectiveness is a function of quantity and coverage, not only laser capability.** Z-Bolt® Laser Systems are built for today's US Military Infantry Force.

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Question or Comments?
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We Replace Defective Units – We Exchange Direct to the Field - No Questions Asked . . .