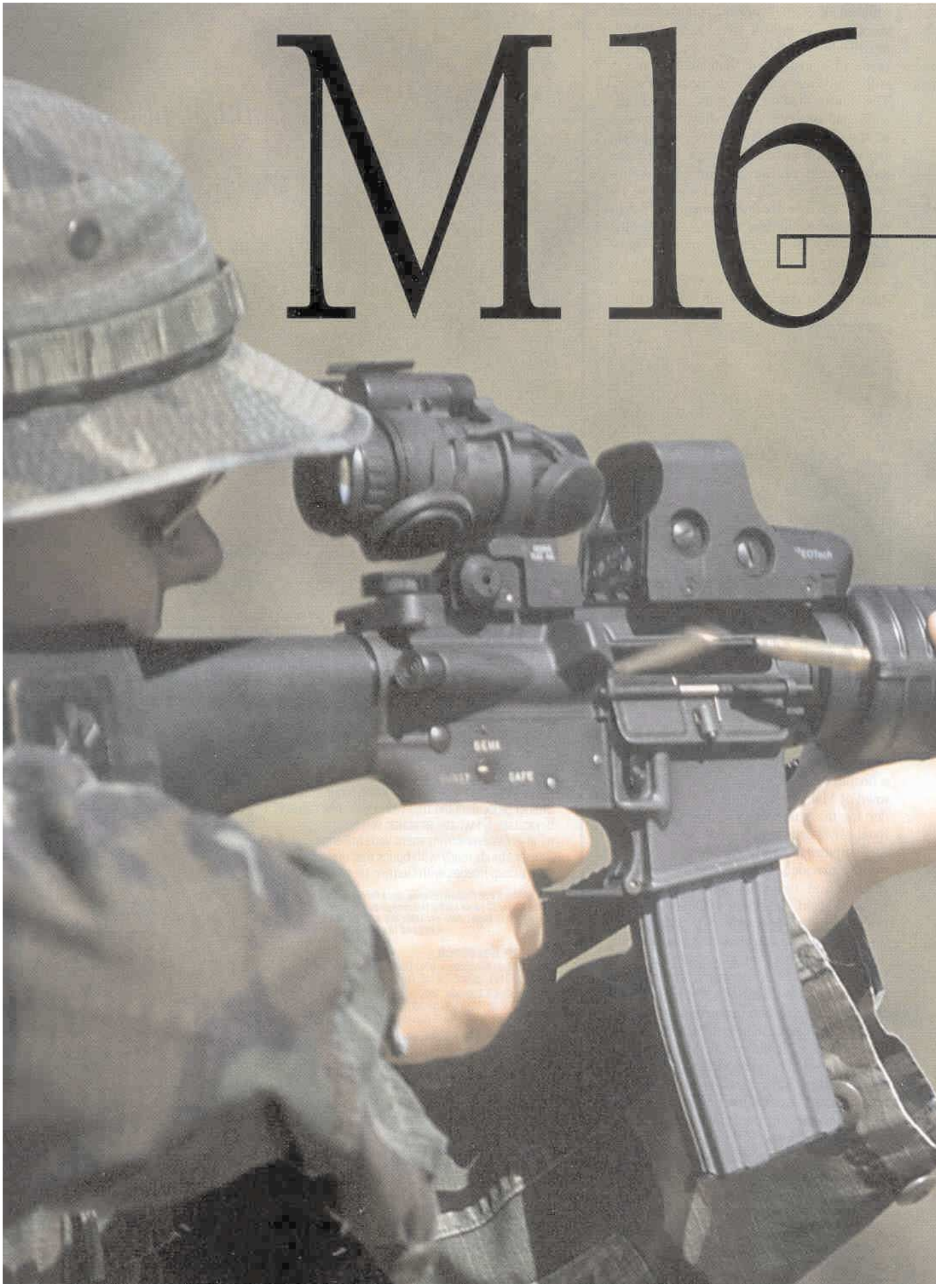
M16



MILLENNIUM MODIFICATIONS

Enhancing The Black Rifle

Text & Photos by Peter G. Kokalis

The M16 series has quite a bit of competition, supposedly. There are a number of different caliber 5.56x45mm NATO assault rifles in service throughout the world. A brief survey would include the Austrian Steyr AUG, Belgian FNC, French FAMAS bullpup, the new, and as yet unproven, Heckler & Koch G36, Israeli Galil (essentially a Kalashnikov), the dreadful British L85A1 bullpup, and a number of AKs now chambered for this round. None of them have come even close to developing the almost bewildering array of potential improvements and enhancements that can be attached to, or modified on, today's M16. In service now for almost three decades, no other modern infantry rifle (actually in service) offers to an operator the amount of sophistication provided by the latest improved M16s. M16 enhancements are evolving with alarming speed. What follows is a detailed look at some of the cutting-edge technology currently available to those deploying with an M16/AR-15.

(top, inset) The M3 Tactical Illuminator weighs only 3.3 ounces with batteries. Yet, using a tungsten halogen, xenon-filled bulb and two standard DL 123A 3-volt lithium batteries, the unit delivers an amazing 80-90 lumens of white light. Shown here attached to an M16A2 by means of a GG&G mount. (left) Right now, the hottest optical sight combination available for the tactical M16/AR-15 series may very well be the new EOTech Model 500 Holographic Diffraction Sight with a Litton M983 night vision scope mounted to the rear.

Illuminating the Goblins

No accessory you can add to your urban rifle, shotgun or submachine gun is more important than a flashlight specifically designed for use with fighting firearms. Flashlights attached to a shoulder-mounted weapon or used in conjunction with a handgun should be powerful —very powerful. Goblins like to move at night, and not necessarily when the moon is full.

Lights of this type are most definitely not aiming devices. They do not replace the weapon's sights. These lights are used to illuminate the target and permit proper target discrimination, to prevent popping a family member or fellow officer. They backlight the weapon's sights and permit their proper use. If powerful enough, they can also be used to momentarily blind your opponent. Self-luminous tritium sights do not assist target discrimination in total darkness.

Common sense is required in the tactical application of flashlights. They should be turned on only long enough to identify a potential target — fire, if required — then turn the light off and move. In the presence of potential danger, these devices should never be used as searchlights to visually clear an area. They will only serve to compromise the mission and draw fire if used indiscriminately.

The most meaningful measure of the power of a flashlight for comparison purposes is the total amount of light it produces, which includes both the focused and wide-angle portions of the beam produced by the flashlight. This is measured by an instrument called an "integrating sphere" and given in "lumens."

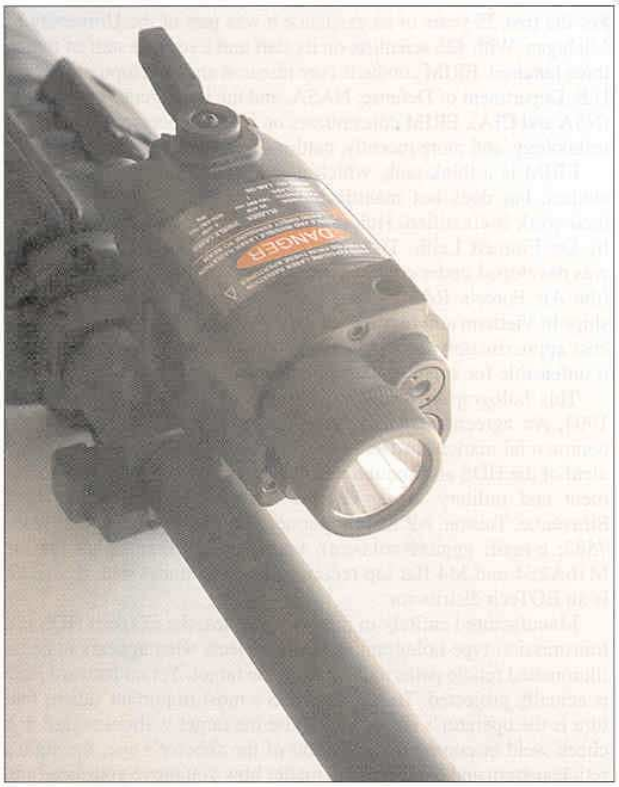
Recently surging forward in this area is Insight Technology, Inc. (Dept. SOF, 3 Technology Drive, Londonderry, NH 03053; phone: 603-626-4800; fax: 603-647-7234; web sites: www.insight lights.com [manufacturer] or www.streamlight.com [distributor of all Insight products]) whose tactical illuminators and Laser Aiming Module (LAM) are gaining distinct prominence in law enforcement and military circles. Their M3 Tactical Illuminator weighs only 3.3 ounces with batteries and measures but 3.4 inches in length and about 1.5 inches in height and width. Yet, using a tungsten halogen, xenon-filled bulb and two standard DL 123A 3-volt lithium batteries, the unit delivers an amazing 80-90 lumens of white light. Made of lightweight polymer materials, the M3 features both momentary and steady-on switches and a focusable beam. Suggested retail price of the M3 Tactical Illuminator is $149.95. Usually mounted on handguns or shotguns, GG&G (Dept. SOF, 3602 East 42nd Stravenue, Tucson, AZ 85713; phone: 520-748-7167; fax: 520-748-7583; e-mail: gggaz@aol.com) has introduced a mount for the tiny M series Tactical Illuminator that adapts it to the M16/AR-15. The price is only $25.

Similar in configuration, but much more robust in construction to the M3 is Insight Technology's Model 100 LAM, which is available to law enforcement agencies and military organizations only. It weighs 5 ounces with batteries and measures 4.5 inches length, 1.6 inches in width and 2 inches in height. This is a state-of-the-art LAM in every regard. Waterproof (at a depth up to 66 feet with submersion for two hours) and powered by two 3-volt lithium batteries, it can be attached or removed from the weapon in less than 15 seconds. More important, it features not only visible (usable out to 50 meters in daylight and more than 700 meters at night) and infrared (usable out to more than 200 meters) laser beams, but also both a focusable visible flashlight (facial recognition out to 25 meters) and infrared illuminator (with a range of 50 meters or less). The Model 100 sent to *SOF* for test and evaluation was designed to be mounted on either a Glock or MilStandard 1913 rail. Other models in "00" series are intended

for attachment to either the H&K USP or MK-23 pistols. A model with a rail-grabber interface is also available. Units with infrared capability are available to the military and law enforcement only. Models in the "50" series, with a visible laser and flashlight only, can be purchased by the public and are offered with the same attachment interfaces as the "00" series. The Insight Technology LAM is issued with an operator's manual and remote switch.

Operation of the LAM is straightforward, but requires study of the manual and some practice. A mode selector on the side of the unit has two visible light positions, two IR positions and an OFF position. The "VIS" position enables the visible laser aiming point. The "VIS/ILL" position enables both the visible laser aiming point and the 60 lumens visible flashlight. When the knob is rotated to "IR," the infrared laser aiming point is enabled. At "IR/ILL" both the IR laser aiming point and the IR flashlight are enabled. A long, easily manipulated toggle switch provides either momentary or steady-on modes when toggled to either the right or left. A laser inactivator switch at the rear of the LAM permits the operator to inactivate the visible laser aiming point while in the "VIS/ILL" mode. The two IR positions are, of course, intended for use with night vision equipment. Insight Technology's LAM is without doubt the most sophisticated of its type available, and is presently preferred over any others by all law enforcement and military special operations groups deploying with this type of equipment.

Holsters Plus (Dept. SOF, 25727 Coeur d'Alene River Road, Wallace, ID 83873; phone: 208-682-9435; fax: 208-682-4536; web site: www.holstersplus.com) makes Kydex light holders for the M3 Tactical Illuminator that provide storage on the operator's belt and easy access when the unit is not mounted on a weapon. *SOF* was provided with test specimens of their L100 Classic, which offers full protection for the light's bezel at only $30, and the abbreviated L102 Clip-On unit for $39, which was designed for environments in which the light is not carried full-time. Both of these holders match the superb quality of the M3.



(above) Insight Technology's Model 100 LAM is state-of-the-art in every regard. A mode selector on the side of the unit has two visible light positions, two IR positions and an OFF position. A long, easily manipulated toggle switch provides either momentary or steady-on modes when toggled to either the right or left. (left) Using Black Hills caliber .223 Remington 68-grain Match Hollow Points, *SOF* staff was able to shoot consistent groups under 2 MOA at 100 yards (off the bench). That's outstanding, as the EOTech Model 550 HDS is equipped with a 1 MOA center dot, and more important, no illuminated reticle pattern sight can match the clarity of a standard optical scope's crosshairs. (below) GG&G's MAD (Multiple Aperture Device) BUIS (Back Up Iron Sight) was mounted to the rear of the EOTech HDS. It features both a large and small aperture on the same plane and thus can be zeroed to the same point of impact.

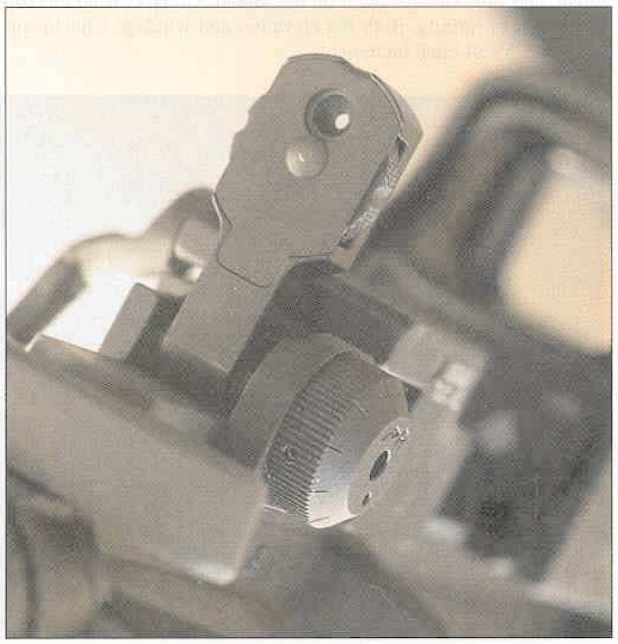
EOTech's New Model 500 Series Holographic Diffraction Sight

Weapon sights using an illuminated reticle pattern, often a red dot, and mounted on the Colt M16/AR-15 series now prevail in both law enforcement and military circles. The U.S. Army purchased 80,000 Aimpoint Comp M electronic reflex sights in 1997 for their M16A2 M4 assault rifles. There is, in my opinion, a far better alternative.

EOTech, Inc. (Dept. SOF, P.O. Box 134010, Ann Arbor, MI 48113; phone: 734-994-1200, ext. 3661; fax: 734-741-8868; e-mail: vdonohue@hotmail.com) developed and now markets exclusively to law enforcement and military personnel and agencies, the amazing Holographic Diffraction Sight (HDS) Models 510 and 550. A Model 500 HOLOsight was introduced for the civilian market at the 2000 SHOT Show. The HDS features advanced technology previously encountered only on the heads-up displays of weapon targeting systems found in the cockpits of modern fighter aircraft.

Holography is the technique of producing visual images by means of wavefront reconstruction, especially by using lasers to record on a photographic plate or screen from which a three-dimensional image can be projected. A hologram, or holograph, is the pattern or image generated in this way. EOTech's revolutionary HDS uses a hologram of a reticle pattern recorded on a heads-up display window. When illuminated by laser (an acronym which stands for "Light Amplification by Stimulated Emission of Radiation") light, the holographic image becomes visible at the target plane, where it remains in focus with the target and provides instant target acquisition.

EOTech, Inc., which was founded in the summer of 1995, is a subdivision of the Environmental Research Institute of Michigan (ERIM). ERIM, a non-profit R&D organization, is now 50 years old.



For the first 25 years of its existence it was part of the University of Michigan. With 425 scientists on its staff and a support staff of two to three hundred, ERIM conducts core research and development for the U.S. Department of Defense, NASA, and the intelligence community (NSA and CIA). ERIM concentrates on image processing and sensor technology, and more recently, battle surveillance equipment.

ERIM is a think tank, which develops and conducts feasibility studies, but does not manufacture equipment. Ninety percent of their work is classified. Holography was invented at ERIM in 1962 by Dr. Emmett Leith. The original Holographic Diffraction Sight was developed under contract with Wright Patterson Air Force Base (the Air Force's R&D center) for deployment on helicopter gun ships in Vietnam and for anti-aircraft weaponry. At that time the unit cost approximately $800 and had a 4x5-inch window, which made it unfeasible for small arms applications.

This holographic technology was shelved and then revived in 1994. An agreement was reached in 1996 with Bushnell for the commercial market. In 1998 EOTech introduced the archery equivalent of the HDS and about a year later they entered the law enforcement and military arena. GG&G (Dept. SOF, 3602 East 42nd Stravenue, Tucson, AZ 85713; phone: 520-748-7167; fax: 520-748-7583; e-mail: gggaz@aol.com), which makes rear sights for the M16A2E4 and M4 flat top receivers that cowitness with the HDS, is an EOTech distributor.

Manufactured entirely in the Unites States, the EOTech HDS is a transmission-type hologram and thus projects what appears to be an illuminated reticle pattern directly on the target. Yet no forward light is actually projected. To me, the HDS's most important salient feature is the operator's ability to acquire the target without regard to a cheek weld or consistent alignment of the shooter's eye, the sight's reticle pattern and the target. No matter how you move your head and eye about, the reticle pattern will always remain in exactly the same place on the target. This is an incredibly important phenomenon, especially when rapid and accurate target acquisition under stress becomes literally a matter of life and death during a gunfight.

Mud or other obstructions do not affect the operator's ability to effectively see the reticle pattern and engage targets, even if the display window is almost completely covered. The heads-up display window is 3/8-inch thick, with 3 panes of glass bonded together to form a shatterproof laminate. The two outside panes have an anti-reflective coating. The Model 550 HDS sent to us for test and evaluation was equipped with the standard reticle, which is a two-dimensional ring (65 MOA in diameter) with tick marks and a center 1 MOA dot. Custom reticles are available. The exit aperture is 45 degrees.

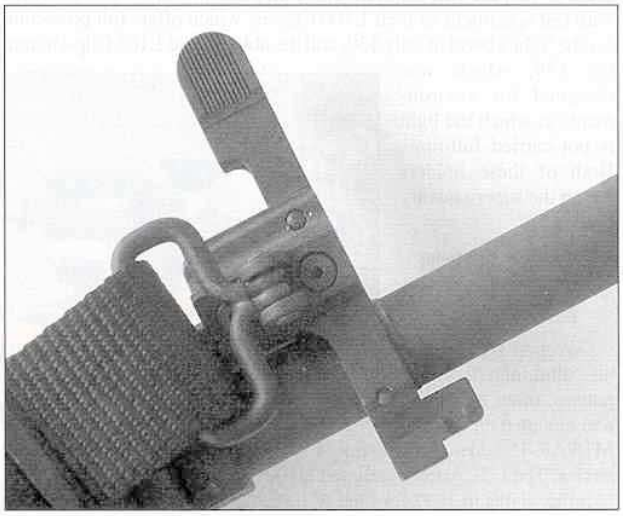
After adjustment of elevation and windage zero, you simply look through the sight assembly's window; place the reticle image on the target, and fire. The eye relief on the Model 550 HDS is an incredible 1-inch to infinity. Both the elevation and windage adjustments are in 0.5 MOA click increments.

In a tactical environment the operator's peripheral vision is almost unlimited and up to 50% on each side of the target. That's because there is no tube, the reticle window remains close to the eye, and the large reticle pattern neither covers up nor obscures the target. As no light is cast upon the target, there is no signature to compromise the operator's position. Glint screens are not necessary.

The Model 550 HDS has 20 levels of brightness adjustment in the normal visual spectrum. When the sight is turned on, the brightness level is automatically set at the factory to level 15. The user can program the sight himself to turn on automatically at level 1 (minimum brightness setting) or level 20 (maximum brightness setting), but he must do so each time the sight is turned on or the sight will move back to the factory default setting. There is also an auto shutdown mode and the unit will automatically shut itself off eight hours after the last push-button control has been pressed. The user can also program the HDS for a two-hour shutdown mode. Two commonly available Type N 1.5-volt batteries power the HDS. As the batteries run down the reticle brightness will remain at the set intensity and then shut down abruptly.

Recoil testing equipment at the EOTech plant simulates the recoil of the .454 Casull (3,500 Gs for 0.5 milliseconds). The first 22,000 HDS units produced were all cycled on this test bed.

Key advantages of the new Model 500 series are a significantly reduced price and a 33% reduction in weight and length. The original Model 400 series HDS was 6 inches in length and weighed 9.1 ounces. The new Model 500 series units are 4 inches in length and weigh only 6.4 ounces. The reduction in length now permits night vision equipment to be more easily mounted in back of the HDS —



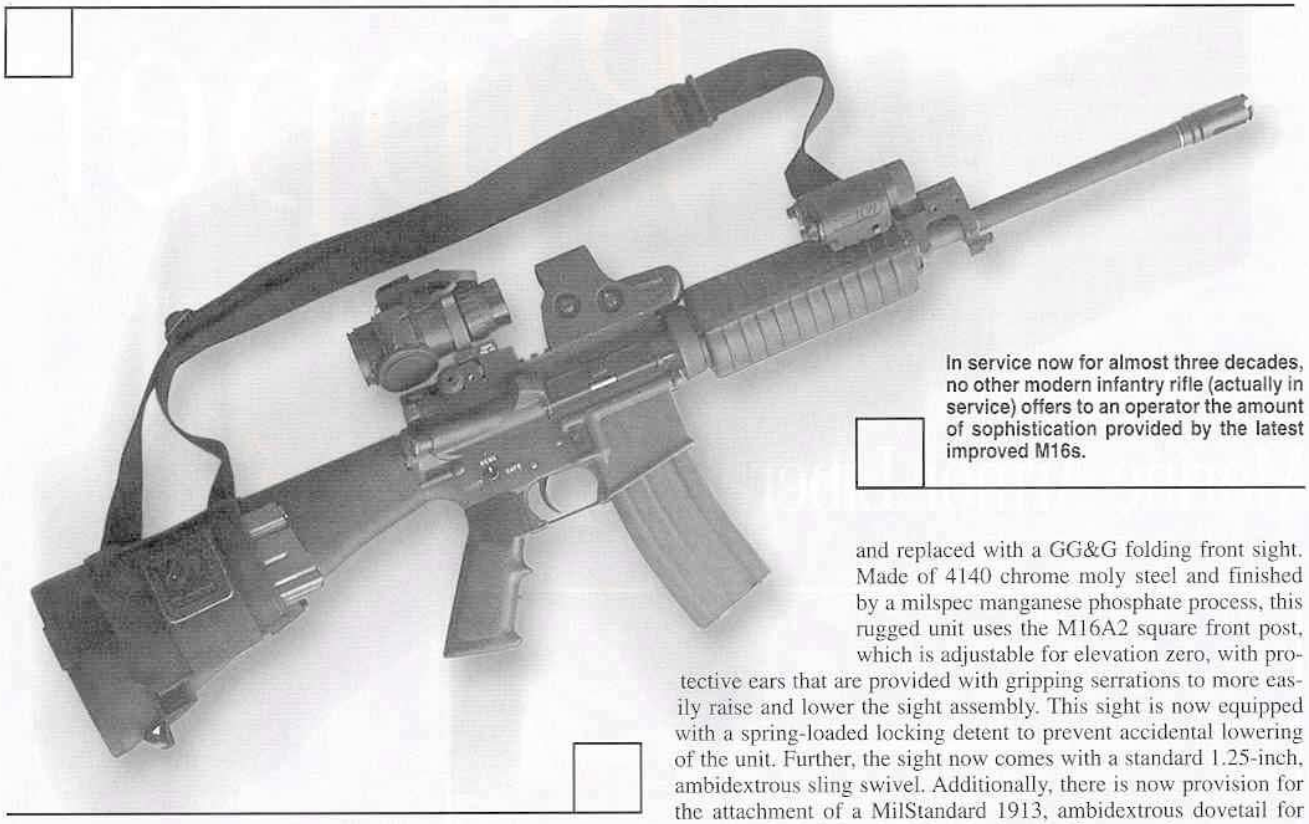
(above) GG&G's folding sight is now equipped with a spring-loaded locking detent to prevent accidental lowering of the unit. Further, the sight now comes with a standard 1¼-inch, ambidextrous sling swivel.

(left) Precision shooting is often required in the law enforcement applications into which an enhanced M16/AR-15 is placed. In that scenario there is no bigger equipment-related distraction than a heavy or creepy trigger pull. GG&G's set-trigger fire-control mechanism offers the operator two significantly different pull weights.

an important consideration for law enforcement and military end users. In addition the brightness range has been increased from a ratio of 2,000:1 to 28,000:1, a 14X increase in the dynamic range and a very dramatic increase in low light environments. The battery cap is now tooless; battery life has been increased by 40% to 70 hours; a built-in sun shield added as well as a filter for night vision compatibility that has a quick engage on/off feature. The unit is submersible to 8 feet indefinitely and will withstand almost any conceivable tactical environment. The battery check indicator is now automatic at start up.

The basic difference between the law enforcement/military Models 510 and 550 is their respective night vision compatibility. The Tactical Law Enforcement Model 510 can work coincidently with Gen II and some Gen II+ night vision gear, but only at Level 1 and maybe at Level 2. Furthermore, the operator must scroll down to the night vision spectrum. The spectacular Model 550 has been designed to work with Gen III, Gen III+ and the soon to be released Gen IV night vision equipment. This unit has a third switch on the membrane pad that instantly drops the unit to the NV spectrum. There are 10 settings within the NV spectrum. This is critical due to varying tube sensitivities, user's eye sensitivities and ambient light scenarios. Neither of these two units emits any muzzle side light signature. The agency price of the Model 510 is $299, while that of the Model 550 is $339. EOTech's Model 550 HDS leads the pack and no other illuminated-reticle-pattern combat sight, at this time, even comes close.

Using Black Hills Ammunition (Dept. SOF, P.O. Box 3090, Rapid City, SD 57709; phone: 605-348-5150 — call for the location of your nearest dealer; if there is none, Black Hills will ship to you at retail) caliber .223 Remington 68-grain Match Hollow Points, we were able to shoot consistent groups under 2 MOA at 100 yards (off the bench). That's outstanding, as the EOTech Model 550 HDS is equipped with a 1 MOA center dot and more important, no illuminated reticle pattern sight can match the clarity of a standard optical scope's crosshairs.



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MAD

The HDS Model 500 series can be mounted for cowitness with emergency iron sights. We attached the Model 500 to an M16A2, equipped with an upper receiver (from the Colt law enforcement AR-15A3 Tactical Carbine, #AR6721) that features a 16.1-inch heavy barrel (chrome-lined with 1:9-inch twist) and removable carrying handle. A GG&G MAD (Multiple Aperture Device) BUIS (Back Up Iron Sight) was mounted to the rear of the HDS and, together with this upper receiver's GG&G folding front sight, zeroed at the range for cowitness with the HDS.

The MAD was originally developed to fulfill a request from Naval Surface Warfare for a back up iron sight that provided both a large and small aperture on the same plane and would thus be zeroed to the same point of impact. The MAD has four apertures, two of each size (so that rotating the aperture in either direction will bring the next size into view). The small aperture diameter is 0.073-inch and the large aperture is 0.199-inch in diameter. It uses the standard Colt windage knob and windage screw. One click of the windage knob provides approximately 0.48 MOA change when mounted on the M16A2E4 rifle and about 0.65 MOA on the M4 carbine.

The MAD mount body is manufactured from 6061 T6 aluminum, hard anodized per milspec. The stem and aperture disc are made from 4140 steel, black magnesium phosphated per milspec. The MAD overhangs the rear of the receiver by 0.200-inch. This provides a lip so that the sight can be easily deployed even with a gloved hand. The unit locks in the up and down position with a positive detent. It sells for $141.

Whether you're deploying with an EOTech Holographic Diffraction Sight or an Aimpoint red dot sight, what you most certainly do not want in the center of your image is the M16's front sight. The answer to that dilemma is to have it completely removed and replaced with a GG&G folding front sight. Made of 4140 chrome moly steel and finished by a milspec manganese phosphate process, this rugged unit uses the M16A2 square front post, which is adjustable for elevation zero, with protective ears that are provided with gripping serrations to more easily raise and lower the sight assembly. This sight is now equipped with a spring-loaded locking detent to prevent accidental lowering of the unit. Further, the sight now comes with a standard 1.25-inch, ambidextrous sling swivel. Additionally, there is now provision for the attachment of a MilStandard 1913, ambidextrous dovetail for mounting flashlights, LAMs and other small accessories onto to gas block base. The cost of the GG&G folding front sight is $191, installed.

GG&G now markets these components under the overall umbrella of what they call the "FIRE" (Fully Integrated Rifle Enhancement) System. This includes any or all of the following as required by the end user: MAD or A2 folding emergency rear sights, folding front sight, standard or "Scout" (extended 2 inches beyond the receiver) interface rails, and standard or cantilever Aimpoint rings.

Precision shooting is often required in the law enforcement applications into which an enhanced M16/AR-15 is placed. In that scenario there is no bigger equipment-related distraction than a heavy or creepy

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