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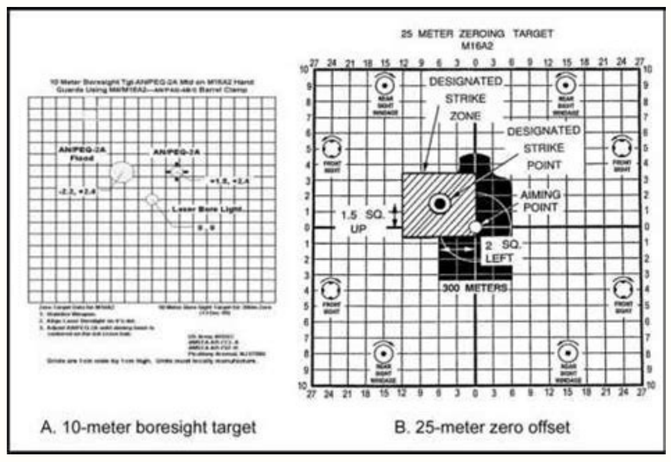

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Initially, the optical surface of a reference mirror 31 of FIG. 3. The laser is prealigned within the casing so that it directs its light beam along the axis of the gun tube. This setup won't be cheap. 4) is the ability of the gunner to observe the laser light on the target. 4 is a schematic diagram of a boresight alignment unit in accordance with the present invention; and FIGS. Adjustments of the gun position will then be made with continual firings until the light beam is on target. AFFILIATION: Make your purchases online by clicking on our affiliate links here Amazon or Aliexpress. It is therefore readily apparent that the use of an empty shell casing to hold the electro-optic package in accordance with the present invention is efficient in that empty shell casing are readily available, requiring no special design to fit the gun breech at low cost. Once a satisfactory target has been chosen at an approximate range of 1200 meters, the superelevation is removed from the gun. The operator will view a reticle 7 as shown in FIGS. Skip to content EUR EN add-to-printlist#togglePrintlistPanel> star-rate#init> ? Click the Download button and select Run to install the Drag Function Synthesizer to your PC. The Weber fraction (see, for example, "Digital Image Processing" by Pratt, page 32) establishes that the necessary contrast (delta I/I) between two areas, one with intensity I and the other with intensity I + delta I, for detection by the human is approximately 2 percent. BRIEF DESCRIPTION OF THE PRIOR ART Current boresighting devices and procedures on armored vehicles are costly, inconvenient and often present situations of extreme peril. The system comprises an electro-optic package containing a laser head 21, which can be in the visible or infrared frequency range, beam expansion optics 23 shown as a pair of lenses and a laser power supply 25 which is fitted into an empty shell casing 27 and fed with power external of the casing, preferably from the tank electrical system. The firing pin assembly was then removed from the breech of the gun and the gun loader peered through the gun tube with a pair of binoculars and "talked" the gunner onto a 1200 meter distant target wherein the cross hairs were on the target as viewed through the binoculars. The peak human response is at 0.555 micron. It is therefore the intention that the appended claims be interpreted as broadly as possible in view of the prior art to include all such variations and modification. The boresight unit 35 and alignment tool 37 are positioned orthogonal to the alignment laser 33 line of sight via the aforementioned autoreflection technique. Laserlyte sensors aren't cheap. Your muzzle velocity and intended distance is something no manufacturer knows, so you can often improve your accuracy by using a BC specific to your needs. The gunner then moves the gun according to the commands until the loader advises that the gun is on target. Just place the printed target downrage at the distance you specified and center the boresighter's laser on the spot indicated on the target and adjust the gun's scope to align with the printed crosshair. When you click to download you can either run or save the setup file to your computer. Next, the boresight unit 35 is placed in the line of sight of the alignment laser 33. The boresight laser (21 of FIG. The laser provides a source of light which is intense and has a low divergence characteristic. If the gunsight has a magnification factor of eight, a target 2 inches in diameter would be visible at a distance of 1200 meters. Both the 32 and 64 bit editions of Windows® are supported. You can then print a boresight target customized for your specific settings. Use of this device permits a tank crew to reconfirm boresight of the main gun only minutes before every battle as well as, possible, during lulls in a battle. You can easily save the results to your computer and process them with the Drag Function Synthesizer. This will continue to be done until such time as the operator observes that the gun tube is on target as shown in FIG. Hence, the laser spot must appear 2 percent brighter than a sun illuminated target. At the target, a circle of laser light (visible or infrared) will appear. These casings are easy to store in the vehicle and provide an extraordinary amount of protection for the optics. Furthermore, due to the dangers involved due to exposure to fire external of the tank and the complexities involved in calibration with a Pi-Watson device, it is substantially impossible to recalibrate or realign the gun during battle except on a "seat of the pants" basis. When the setup file is launched, Windows® 7 through Windows® 11 display a dialog showing the software publisher's name. 4) is then energized and autoreflection is used to adjust the laser 21 to the original alignment laser line of sight. Watch these videos for tips on boresighting. 1, there is shown the prior art Pi-Watson device 1 secured in a gun tube 3. Creation quality: 0.0/5 (0 votes) Evaluation of members on the printability, utility, level of detail, etc. There's no point in lying to yourself if you want to improve. 2. Just download it again. 2 is a diagram of the field of view through a slightly off-center Pi-Watson device; FIG. The BAM consists of a silicon or InGaAs camera rigidly held and combined optically with the target wheel. Once the lenses have been properly installed within the casing, the requirement for later adjustment thereof is also minimal. The manner of operation of the alignment system of the present invention is to load the casing with electro-optical package therein into the breech of the gun under test. DONATE: If you want, you can make a donation via PayPal here. Such one-size-fits-all targets likely didn't meet the needs of many shooters and certainly don't utilize the superior accuracy of SiteLite laser boresighters. If it doesn't say Dexadine, Inc. The angular resolution capability of the human eye is approximately one arc minute (0.0167 degrees). This size will easily fit in the shell casing. Click on image to open in YouTube SiteLite Ballistic Targeting System Version 1.0.4 The SiteLite Ballistic Targeting System (BTS) software works with any laser boresighter, but was specifically designed for SiteLite laser boresighters. To be used for boresight, the electro-optical package is placed into the breech end of the main gun of a tank. Briefly, in accordance with the present invention, there is provided an electro-optic package which is placed in a shell casing of the caliber suitable for the gun under test. Here's why... it's because the file didn't download properly. Here are 4 solutions accessible to all: ADVERTISING: Disable your AdBlock banner blocker and click on our banner ads. 2 and 3 which is a part of the optical system (not shown) of the device 1 relative to the target 9. Through autocollimation, the line of sight of the collimator is transferred to the camera, creating a boresight reference. The minimum spot radius is approximately 9 cm. In order to use this instrument for gun alignment the gun loader of the tank must exit the vehicle and place the Pi-Watson device into the end of the main gun tube. Click on image to open in YouTube. BACKGROUND OF THE INVENTION 1. We didn't forget advanced shooters, however, so similar software is built into Ballistic Explorer where you can take advantage of all it's features such as finding your load in the Ammo/Bullet library, using the the environment you expect to be shooting in (altitude, temperature, etc.), use any standard or custom drag model such as G7, calibrate dual sights for tactical weapons, and compare different zero ranges and save all your work to a project file for each gun and/or load. Hornady uses Doppler radar to produce custom drag functions for their own bullets as well as select bullets from Berger, Lapua, and Sierra. The software then looks up the typical muzzle velocity and G1 B.C. of the bullet and displays those values, which are then used to calculate the bullet's trajectory and produce the boresight target. Rich Langner, President of Concept Development Corporation offers the BTS software Free to the public. When the gunner places the main gun on "fire" and squeezes the trigger, with the power supply voltage (28 volts herein) applied to the power supply, the laser fires down the gun tube. The electro-optic package includes a power supply for driving a laser, the power supply deriving its power either from a battery or, preferably, from the tank electrical system power supply. If you are asked to enter your serial number you can use 123456. It is apparent, as noted above, that the operator must exit the tank to reach the end of the gun tube 3, thereby being exposed to gunfire when in combat. The lens system is adjusted at the time of manufacture to provide the desired size light spot, this adjustment being accomplished by calculation, taking into account the lenses being utilized. At that time, the loader will have the target in the right lower quadrant on the cross hairs. 2, the operator will call to the gunner to move the gun tube up and to the left to approach the target 9. In view of the requirement that the laser spot be 2 percent brighter than the reflected sunlight, the necessary laser illiminance is EL = 87377.53 lumens per meter squared. 3 is a diagram as in FIG. Keep in mind this works best with a 1 piece cnc upper. Alignment of the boresight unit itself is performed at an alignment station with the use of special equipment. The output of the laser is passed through a lens system which is designed to provide a spot of light emanating from the casing which is preferably two inches in diameter at the target. It does so by using well known math and methods to process the downrange data. All of our products are digitally signed with our name, and thus, our reputation. Report a problem You like Cults and you want to help us continue the adventure independently? It should be emphasized at this point that the actual required laser powers may be less than calculated above due to the assumption that the target is fully illuminated by sunlight and that specular reflection of the laser light has not been included. BRIEF DESCRIPTION OF THE DRAWINGS FIG. Response to all wavelengths of visible light is uniform. When the gun is fired, the laser will emit a light beam which the gunner will spot on the 1200 foot distant target. It should be understood that the above noted alignment procedure for the boresight is only a preferred embodiment therefore, many other procedures being equally applicable. In addition, the Pi-Watson device is expensive and the procedure required for alignment is long and cumbersome. Boresighting is the primary test performed with this module, but the BAM is also capable of other beam-profile related tests, including divergence measurement. with a 6 cm. You can download a timer app on the phone which WILL pick up the "shots". Most handheld devices and phone apps that shooters use in the field support G1 and G7, but may not support the custom drag function for the bullet being used. If the laser wavelength chosen for use is 0.6328 micron (HeNe), the required laser irradiance is given by ##EQU2## If the laser spot is 2 inches in diameter then the spot area is A = 20.27 square centimeters and the required laser power is given by ##EQU3## This is a large amount of energy for a HeNe laser and is currently beyond the state of the art, but is envisioned as a part of the invention herein in the event the art of HeNe lasers advances to make them practical herein. WORD OF MOUTH: Invite your friends to come, discover the platform and the magnificent 3D files shared by the community! The Boresight Alignment Module (BAM) is used to co-align multiple imaging systems to each other and to laser transmitters. The mirror is located a large distance from the laser for best accuracy. Please note that we are a small team of 3 people, therefore it is very simple to support us to maintain the activity and create future developments. The above noted device, while disclosed herein with respect to use in conjunction with the main gun of a tank, can be used with any type of gun which is capable of being aligned with a target. The loader must then be hoisted to the level of the device side eyepiece and look through the side eyepiece into the device. "Zeroing" of the gun was then accomplished by firing a group of three rounds or shots through the target with the gunner then re-aligning the gun sights to the center of the shot group. To accomplish this, the loader must generally find something to stand on. All programs on this page were developed by Dexadine, Inc. Though the invention has been described with respect to a specific preferred embodiment thereof, many variations and modifications will immediately become apparent to those skilled in the art. 5a and 5b are schematic diagrams showing the procedures required in aligning the boresight unit in accordance with the present invention. As stated above, the laser power supply is placed inside the shell casing with the laser head for convenience, but it should be understood that the power supply could be located externally thereof. Atmospheric conditions are assumed to have no impact on the analysis. Furthermore, on occasion, especially due to the exigencies of combat, personnel have forgotten to remove the Pi-Watson device from the gun tube, thereby causing great damage to gun and calibration instrument upon firing the next shot. The alignment tool mirrored surface 41 is then parallel to the original reference mirror 31. The relative visibility factor for 0.5 micron is 32.3 percent, only slightly better than that for the HeNe wavelength. Prior to the use of the presently used Pi-Watson device, boresighting of a gun was accomplished by first taping thread over the end of the gun tube to form a crosshair. When I tried it on the stock 2 piece upper the flex caused the laser to elongate a bit too much, not registering on the laserlyte. A weighted average wavelength for the laser is 0.5 micron. An alignment tool 37 comprising a ring assembly 39 and a mirrored surface 41, which are machined to close tolerance for orthogonal fit, is placed around the boresight unit 35. The argon ion laser is a commercially available visible laser with moderately high output power. If a laser with an output wavelength of 0.555 micron were used, the relative visibility factor would be 1.0. Hence, the required laser power is given by ##EQU5## This is a modest amount of power. The alignment process is then repeated. Concentration of this section will therefore be on the power requirements for visible lasers. Problems inherent in the Pi-Watson system are that the loader must exit the tank for gun alignment, thereby exposing himself to fire under combat. Radiometric units can be converted to photometric units using the equation Ev = F × Ee where, Ev is the photometric illuminance (lumens per meter squared), Ee is the radiometric irradiance (watts per meter squared) and F is the conversion factor given by ##EQU1## where K(λ) is the relative visibility factor of the human eye. The gunner then places his selector switch to fire and squeezes the trigger. For a thermal sight, this is directly related to the amount of reflected IR laser energy from the target and the sensitivity of the thermal sensor used in the sight. You can see if you made a 'hit' or not. If you have a copy of Ballistic Explorer installed on your PC, you can also export drag functions for use with Ballistic Explorer's extensive features and tools. you'll need this laser boresight: ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1 high infill, maybe even 100% Ive included files for both the mamba CNC upper and the original plastic one. The loader then loads the boresighting round into the breech in place of a normal round and places the gun into the firing mode. The software is digitally signed by Dexadine, Inc. Watch these videos to learn how to use the Drag Functions Synthesizer. I combine this with some laserlyte laser sensors and you can practice all day. The values for K(λ) are listed in Table II (from "Principles of Optics" by Born and Wolf). The image of the laser spot is digitized with 12 bit accuracy, a centroiding function is performed by the IRWindows™5 software, and the measured off-set from boresight is reported. At that time the gun is assumed to be properly aligned and ready for use. It would be desirable from the point of view of a tank commander to have a boresighting tool that could be used with such ease and speed that a boresight performance check can be made on each occasion just prior to entering a battle situation and possibly during lulls in the battle situation itself wherein the inherent dangers to the personnel are minimized. The target can be essentially any flat surface that has good reflectivity of the laser wavelength. 5(a) is positioned orthogonal to the line of sight of an alignment laser 33 using an autoreflection technique. Performing the indicated calculations result in a conversion factor value of F = 207.089 (lumens/watt) and a resultant illuminance of Ev = 85664.244 lumens per meter squared. In operation, the operator must be in a position to look through the eyepiece 5 at a target 1200 meters away. However, Hornady makes it easy for shooters to study and analyze the data produced by their 4DOF Calculator off-line by including a "Download Spreadsheet" button at the bottom of the Trajectory Results page. An alternative would be just to use paper targets. Currently, those custom drag functions only seem to be used in conjunction with Hornady's 4DOF Calculator. The main difficulty in observing a visible laser spot on a target is competition with sunlight. For CO2, a 2 inch diameter spot is not easily obtained at a range of 1200 meters. The laser spot is assumed to be 2 inches in diameter at a distance of 1200 meters. The casing with package therein is loaded into the breech end of the main gun tube of a tank. Dimensionally small, high powered carbon dioxide lasers are available which are capable of providing sufficient laser power to meet almost any requirement of boresight. Drag Function Synthesizer The Drag Function Synthesizer gives shooters the ability to visually study the drag characteristics of Doppler radar tested bullets by synthesizing a drag function that closely corresponds to the drag function any ballistics calculator uses to produce its downrange data. Again the plastic one will create a larger laser image on your target because it's 2 piece. In addition, the operator must be elevated to the level of the eyepiece which can be more elevated than the eye of an ordinary person, this possibly requiring that an assistant also exit the tank and be exposed. As viewed in FIG. The required laser power at this wavelength is given by ##EQU4## This power requirement is easily achieved by commercial lasers. The eyepiece 5 is disposed in the side of the device 1 for viewing by an operator or loader. This alignment takes place at the time of manufacture of the boresight unit by appropriate adjustment of an alignment and support structure within the casing to which the laser is secured. Esp if you need 5 of them. 405 views 1 like 0 comments 0 makes If you're like me who uses airsoft for target or uspsa training and not for games then this might help you. 1 is a schematic diagram of a prior art Pi-Watson device loaded into the end of a gun tube; FIG. The data listed is in units of irradiance (watts per square meter) and must be converted to photometric units to account for the response of the human eye in the analysis. to have a 2 inch laser spot at 1200 meters. For the purpose of the present analysis, a worst case situation is assumed of a perfectly white diffuse surface illuminated fully by the sun. On this page you'll find software we developed either for ourselves or for other companies who are making it available to the public for free. Critical to the performance of the boresight unit (FIG. The loader then removes the Pi-Watson device from the tube, rotates it 180 degrees and places it back into the gun tube. For a HeNe laser, the output beam radius will have to be 1.044 cm. FIELD OF THE INVENTION This invention relates to a device for boresighting guns and the like and, more specifically, to a device for boresighting guns for use in conjunction with tanks, though the use thereof in other environments is contemplated. The BTS software changes all that by letting shooters print a boresight target specific to their needs. Once the laser is properly aligned, the requirement for later adjustment thereof is minimal. Laser boresighters often come only with a generic boresight target that approximates a typical hunting rifle zeroed at some typical range using some typical ammo and requires the boresight target to be placed at some specific distance downange. The loader must then "talk" the gunner onto the target using up, down, left and right commands as in the older art. Just go to the SiteLite website and click on the BALLISTIC TARGETING SYSTEM button and you'll find the download link at the bottom of the page. DESCRIPTION OF THE PREFERRED EMBODIMENT Referring first to FIG. A shell is normally held securely in the breech, therefore, no angular pointing error is present. Examples of appropriate targets are stucco walls, large rocks, buildings, other vehicles, etc. That doesn't sound too interesting until you consider Lapua, Hornady, and perhaps other ammunition and bullet manufacturers are using Doppler radar to produce custom drag functions for specific brands and models of bullets -- maybe bullets you use or are thinking about trying. Tip For Advanced Users The BTS software is designed to be easy for the average shooter to use, so the user selects the particulars of their gun and ammo from drop down lists. This will probably not fit in the shell casing, but since output power is not a severe limitation for the CO2 laser, a compromise between output beam radius and target spot size can be made, a larger beam radius requiring an increase in laser power. The Drag Function Synthesizer makes it easy to determine how accurately the G1 or G7 drag functions predict drop relative to the custom drag function for the specific muzzle velocity and distance you intend to shoot too. The 1200 meter target must have a sharp angle for proper alignment of the crosshairs. The BTS software lets you select your gun, sight height, ammo, the gun's zeroed range out to 300 yards (meters) and the distance you want to boresight at, which can be as close as 8 yards (meters). Lapua makes their custom drag functions available for download and also gave us permission to distribute them with Ballistic Explorer. Table I lists the solar irradiance at sea level for an area normal to the sun (from the CRC "Handbook of Chemistry and Physics", 56th Edition). At this point, the gunner will program into his system the appropriate numbers obtained for an on-target condition, the casing is removed from the breech of the gun and the gun is now ready for accurate operation. As with all our software, the setup and program files are digitally signed by Dexadine, Inc. Boresighting of U.S. military tank gunsights was improved and is currently accomplished by use of an instrument known as a Pi-Watson device. SUMMARY OF THE INVENTION In accordance with the present invention, the above problems inherent in the prior art are minimized and there is provided a relatively inexpensive, easily and quickly operated system for gun alignment which can be operated without the necessity of the loader or operator leaving the tank. The normal specification for lasers is, however, in terms of radiometric quantities. While looking through the eyepiece, the loader sees a crosshair and a selected 1200 meter distant target. Esp in the winter when it's cold outside. However the practice has helped me immensely. The gunner then adjusts the gunsight reticle to be centered on the laser spot. 4, there is shown the system in accordance with the present invention which overcomes the above described problems of the prior art. 2 with the device on target; FIG. The beam expander is necessary to provide control of the size of the projected laser beam at a selected range. (A smaller spot may be detected, however the contrast required will be much greater.) The laser beam radius at the target is given by W(Z).sup.2 = W(0).sup.2 × [1 + (λZ/πW(0).sup.2).sup.2] where Z is the range to the target, W(0) is the beam radius at the output of the beam expander and (λ) is the laser wavelength. 3D design format: ZIP Folder details Close AAP01_buttonParts.zip AAP01_laserHousings.zip Learn more about the formats Publication date: 2021-11-10 at 22:36 Creator Designs 7 Downloads 41 Sales €84 Followers 6 Issue with this design? radius output beam radius. Referring now to FIG. The BTS software runs on Windows® XP, Vista, Windows® 7, 8, 8.1, 10 and Windows® 11. The laser camera captures laser energy from the UUT laser transmitter.

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