

Boresighting Configurations, Procedures And Applications

Get What You Aim For!



PLX’s new Boresighting Verification Technology dramatically enhances your targeting capabilities. *Boresighting* refers to the procedure of aligning hardware line-of-sight to an aiming device. In military and aerospace terms, this can apply to applications such as weaponry, from small rifles to artillery, tank and aircraft fire control systems, or long-range cameras mounted on satellites.

The technology utilizes PLX’s proprietary, high-accuracy, beam-delivery system. This new capability enables you to verify the alignment of

your hardware’s optical axis and your aiming device with sub-arc second accuracy. PLX can build these systems to operate with great stability, even under the extremely harsh levels of vibration and shock encountered in military and aerospace applications. At PLX, we specialize in customizing our proprietary optical technology (as illustrated below) to meet challenging technical requirements within a wide range of applications.

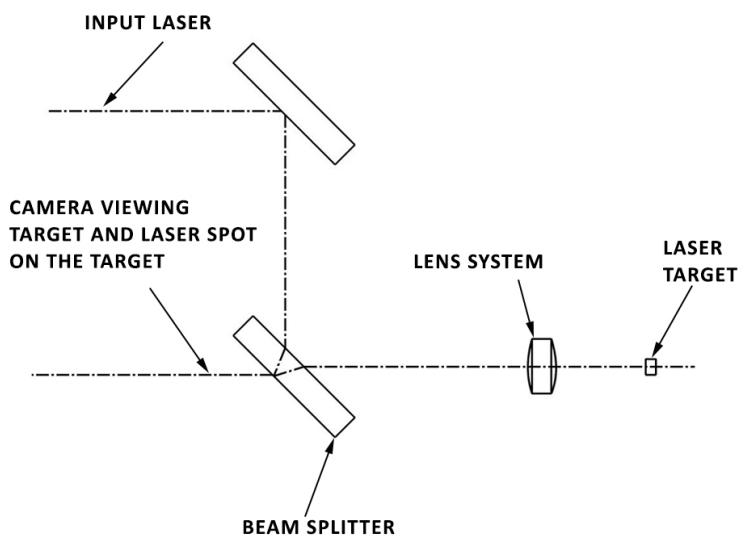


Figure 1. This is a basic diagram showing a long-range camera, such as an IR camera, which must be perfectly aligned to a laser designator.

In this application, the camera and the laser are mounted on a turret that enables viewing in all possible coordinates in space. For the purpose of Boresighting, the turret has a pre-determined position that enables the laser and the camera system to view the laser target through the Boresighting System. The camera, focusing on a cross hair, must display the focused dot from the laser on the cross hair. Mechanical means are required to tip and tilt the laser to bring the laser dot to the center of the cross hair.

In order to achieve this alignment, a *Lateral Transfer Hollow Periscope* (LTHP), with total beam deviation in the magnitude of single arc seconds, can be used. The accuracy of the LTHP is a critical requirement for the system; and it must be maintained under the environmental condition in which the system is operated and throughout the lifetime of the instrument.

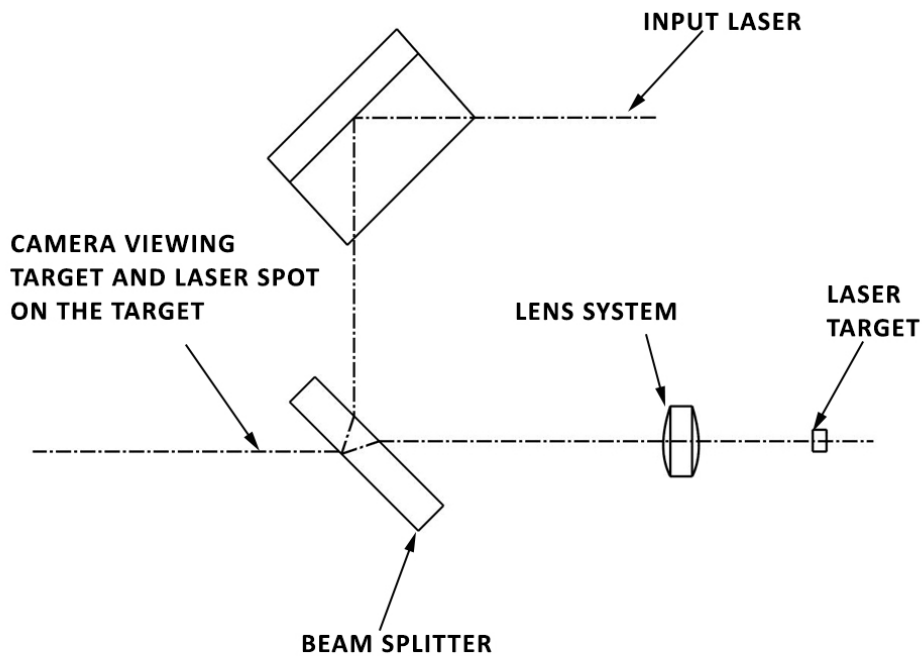


Figure 2. This diagram (on the following page) illustrates the same concept utilizing a Lateral Transfer Hollow Retroreflector (LTHR).

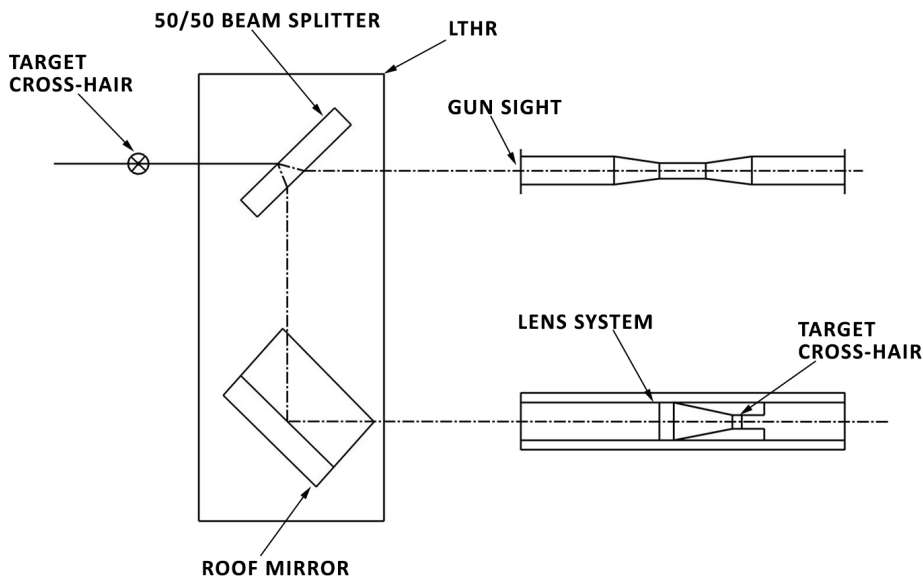


Figure 3. This basic diagram shows Boresighting procedures between a gun barrel and a gunsight. This method of Boresighting is as follows: a collimator that is focused on a cross hair is inserted into the bore. As described above, great accuracy is required between the inside diameter of the barrel and the outer diameter of the collimator.

A unique LTHR, equipped with a 50/50 beam-splitter on the flat mirror side is required. The LTHR is mounted such that the user can simultaneously view the cross-hair from the collimator and the cross hair from the gunsight. The alignment procedure requires a high-resolution mechanical means to tilt and tip the gunsight to a new position where the two cross hairs coincide with each other.

In applications where more than one optical axis exists in a system, the PLX ***Rotary Movement Device*** (RMD) is recommended. The RMD enables a rotary connection between an LTHP, and LTHR or any combination thereof. Such combinations can be utilized in conjunction with the configurations shown in Figures 1. 2. and 3.

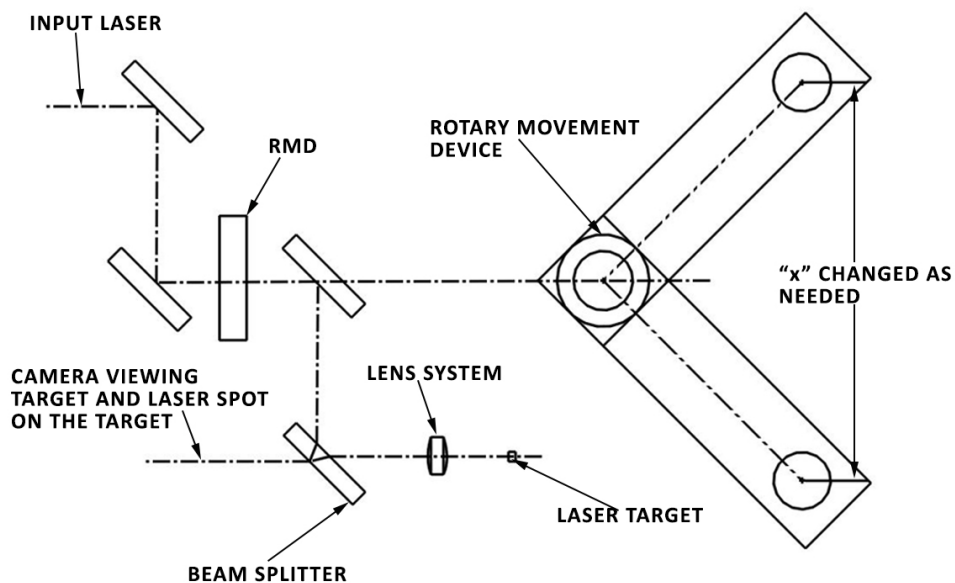


Figure 4. This illustration shows the configuration of Figure 1 utilizing an additional LTHP to enable variable distance of the optical axis. The distance “x” changes as a function of the angle between the devices, thus enabling an unlimited amount of optical axis on one plane. The RMD is supplied with locking mechanism to ensure proper position at any bore-sighting axis.

The LTHP and LTHR are invariant, high-accuracy monolithic optical tube assemblies that enable perfect beam delivery. The tubes and the mirrors are made from low expansion glass such as Pyrex and Quartz, and, as such, are not sensitive to temperature change. They utilize front surface reflection to enable high reflectance at all wavelengths, from UV to far IR. PLX has qualified the tubes for applications involving harsh military conditions, such as helicopter battlefield conditions and space vehicle launch.

PLX can adapt its Boresighting and Boresighting Verification Technology to meet your specific new equipment or upgrade needs. For more targeted optical engineering solutions, call PLX at (631) 586-4190 or contact us via our email below.