TCLIP

Tester of aligning of thermal vision clip ons

Fig. 1. Photo of TCLIP test station

BASIC INFORMATION:

Thermal vision clip on is a detachable electro-optical system that when attached to a rifle before a telescopic sight then creates an imaging system capable to generate clear images of observed scenery even under ultra dark night conditions. In this way a soldier/hunter can shoot using a rifle with telescopic sight at day conditions, and can also shoot at night conditions using the same telescopic sight but with attached thermal vision clip.

In detail, thermal vision clip on system is a afocal system that generates thermal image of targets of interest that can be seen by human observer when looking through the telescopic sight. Perfect thermal vision clip, when attached to the rifle should not produce an effect of image shift between thermal image generated by the thermal clip on and image seen directly through the telescopic sight. If image shift is noticeable then the shooter will miss the target even after perfect aiming.

TCLIP is a computerized test station developed to measure deflection angle of tested thermal vision clip on. Measurement of this alignment error is done by a way of computer analysis of images generated by telescopic sight without and with the thermal vision clip on. This computerization significantly improved accuracy of measurement of the alignment errors, shortens measurement time, eliminated human subjectivity error and made possible to archive test results. TCLIP system is also a perfect tool to support adjusting angular position of optics of the thermal vision clip to achieve near zero deflection angle. The user simply looks on laptop screen and adjust angular position of optical elements of the thermal vision clip until perfect position is achieved.

Tested thermal vision clip on is attached to the test station using the standard Picatinny (MIL-STD 1913) rail like in case of real rifles. The station can be also optionally used to measure image rotation and resolution of thermal vision clip ons.

BLOCKS OF TCLIP STATION

FCLIP is a modular station build from following blocks:

1. BTG target generator
2. CRI760 of axis reflective collimator (option: CRI11100 collimator)
3. MP1913 mechanical platform (simulates standard Picatinny rail)
4. IM50 camera
5. BP rail
6. laptop
7. BOR computer program

TEST CAPABILITIES

Test capabilities depends on version of the test station.

TCLIP-A - image deflection angle of thermal vision clip on.

TCLIP-B - image deflection angle and image rotation angle of thermal vision clip on.

TCLIP-C - image deflection angle, image rotation angle and resolution of thermal vision clip on.

Test capabilities can be optionally expanded.

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SPECIFICATIONS

Tested clip on	
Parameter	Value
Acceptable diameter of output optics of clip on	Up to 70mm (option 110mm or more)
Fixing position to test station	standard Picatinny rail
Range of measurement of alignment errors	Up to 40 mrad
Resolution of measurement of the alignment errors	Not worse than 0.03 mrad
Range of measurement of rotation error	Up to 5°
Resolution of measurement of rotation angle	0.5°
FOV of tested clip on	<12° (recommended case) < 30° (optional case)
Maximal thermal resolution of thermal channel	200 mK
TCLIP parameters	
Emission bands of BTG5 target generator	LWIR/MWIR and Visible
Simulated illuminance range	about 150 lx
Simulated temperature difference range	At least up to 20K
Focal length of CRI collimator	600mm (option 1000 mm)
Aperture of CRI collimator	70 mm (option 110 mm)
Resolution of CRI collimator	At least 60 lp/mrad (option 80 lp/mrad)
Sensitivity of IM50 camera	Not worse than 0.1 lx
Spectral band of IM50 camera	400-700 nm
Resolution of IM 50 camera	Not worse than 0.05 mrad

WHY TCLIP?

Alignment error (deflection angle) of thermal vision clip ons can be measured using non computerized test systems based on autocollimators. These test systems can work but are sensitive to human subjectivity errors and real measurement accuracy is rather low. TCLIP is a new generation test station that use fully achievements of modern computer technology. This computerization has significantly improved accuracy of measurement of the alignment errors, shortened measurement time, eliminated human subjectivity error and made possible to archive test results.

Version 1.4

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