

TAIM

System for testing thermal sights/clip ons



Fig. 1: Photo of TAIM test system

1 BASIC INFORMATION

DT series systems are the most popular quasi universal Inframet systems for testing testing of surveillance thermal imagers. From design point of view DT system is an image projector that projects reference test images combined with a computer system to carry out analysis of electronic video images generated by the tested imager. The crucial point for DT is that measurement of a series of objective parameters of tested imager is done on basis of analysis of video image obtained at imager electronic image output.

DT system can be considered as near perfect solution in case of testing thermal cameras capable to generate only electronic video image. However, there are some limitations of DT systems when testing thermal sights and thermal clip ons that generate non only electronic image but also optical image to be seen via ocular. The DT systems cannot measure image quality parameters by analysis of output optical image and cannot be used for checking boresight of clip-ons or checking diopter power of oculars of sights/clip ons/thermal monoculars. Next, in case of DT system customer is typically responsible to deliver proper stage for tested thermal imager, and proper table for both DT system and tested imager.

TAIM can be treated as a version of DT systems optimized for testing typical thermal sights/monoculars or thermal clip ons when all tools are delivered and are optimal for fast, expanded and accurate testing.

TAIM is built as typical DT120 test system (used as image projector and image analysis computer system) with a set of additional blocks: Picatinny rail for tested tested sight/clip on, set of two HEC cameras to do capture image from tested sight/clip on, AHEC adpter for positioning of HEC cameras, YNAS10 stage as an angular platform for both tested sight/clip on and the HEC cameras, DPM diopter power meter, AT820 optical table, some additional software to analyse images from HEC cameras and optional DICAN distance changers.

These additional blocks convert typical DT120 system into a new test system of new features:

1. Ability to measure some parameters (MTF, FOV, distortion) of thermal sights/clip ons not only using electronic image output but by analysis of output image presented on device display,
2. Ability to measure deflection angle of thermal clip ons (angular shift of passing parallel beam)
3. Ability to measure range of regulation of diopter power of ocular of thermal sight
4. Easy mounting of tested thermal sight/clip on on Picatinny rail of regulated angular position,
5. CDT12100 collimator of aperture and focal length optical for testing typical thermal sights/clip on of optics below 120mm,
6. TCB-2D blackbody delivered in special version with internal illumination in visible light,
7. Delivery of expanded test system that does not need any additional parts to start tests of thermal sights/clip ons of optics below 120mm.

Optional:

8. Ability to check if there is any image shift when focusing from infinity to simulated short distance
9. AT820 optical table for positioning of tested system and TAIM.

To summarize, TAIM can be considered as near perfect system for expanded testing and boresight of thermal sights/clip ons available on international market.

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2 SYSTEM STRUCTURE

TAIM test system is a modular system built using a series of blocks:

1. CDT12100HR off axis reflective collimator (other collimators of different aperture, focal length can be delivered). Details as in <http://www.inframet.com/Data%20sheets/CDT.pdf>
2. TCB-2DV differential blackbody – special version of TCB-2D blackbody with illumination of its emitter). Details as in <https://www.inframet.com/Data%20sheets/TCB.pdf>
3. MRW-8 motorized rotary wheel (optimized for cooperation with a set of IR targets). Details as in http://www.inframet.com/rotary_wheels.htm
4. Set of IR targets (typically set of eight 4-bar targets, cross target, edge target, dot cross target). Details as in <http://www.inframet.com/targets.htm>
5. PBP passive blackbody plate (special passive area blackbody used during noise/sensitivity tests of thermal imagers)
6. Analog video frame grabber for capturing analog video image
Details as in http://www.inframet.com/computing_system.htm
7. PC set – typical PC/laptop working under Windows 10 operating system (with installed frame grabbers and tested by Inframet to check compatibility with the grabbers and Inframet software).
8. High performance analog video monitor for subjective image quality tests of tested imagers
9. TCB Control– computer program used for control of TCB blackbody and MRW wheel
10. SUB-T program – computer program that offers software support during measurement of subjective parameters like MRTD,
11. BOR computer program to support boresight
12. Picatinny rail for tested tested sight/clip on,
13. set of two HEC cameras to do capture image from display of tested sight/clip on,
14. AHEC adapter for positioning of HEC cameras,
15. YNAS10 stage as an angular platform for both tested sight/clip on and the HEC cameras,
16. DPM46 diopter power meter to measure range of regulation of diopter power of ocular of thermal sight
17. TAS-T – computer program used for semi-automatic measurement of a series of objective parameters of thermal imagers: MTF, SiTF, NETD, FPN, non uniformity, distortion, FOV, magnification.

Options:

18. Digital frame grabber. Customer can choose one of digital interfaces: CameraLink, GigE, LVDS, HD-SDI/DVI/HDMI, AHD/HD-TVI/HD-CVI, CoaXPress, USB2.0, USB3.0.
19. AT820 optical table to work as a platform for both TAIM and the tested devices.
20. Set of two DICAN distance changers (to enable change of simulated distance to the targets).

3 TEST AND BORESIGHT CAPABILITIES

TAIM offers expanded testing and boresight of thermal sights and thermal clip ons of optical aperture not higher than 120mm. The tests can be carried out using analysis of image captured from electronic output or image captured from display of tested device.

Total test capabilities:

1. Measurement of MRTD
2. Measurement of deflection angle and image rotation of thermal clip ons,
3. Measurement of range of regulation of diopter power of ocular and accuracy of diopter scale,
4. Measurement of MTF, NETD, FPN, non uniformity, FOV, distortion, magnification at both electronic output and optical output (display). Attention: noise parameters measured only at electronic output.

Options:

1. Checking if there is any image shift when focusing from infinity to simulated short distance

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4 VERSIONS

TAIM in its basic version form a quasi complete system for testing short/medium range thermal sights and thermal clip ons. However, several additional options are possible.

1. Additional digital frame grabber to enable capturing electrical video imager from digital thermal imagers. Customer can choose one of digital interfaces: CameraLink, GigE , LVDS, HD-SDI/DVI/HDMI, AHD/HD-TVI/HD-CVI, CoaXPress, USB2.0, USB3.0.
2. Delivery of AT820 optical table for positioning of tested system and TAIM.
3. Ability to check if there is any image shift when focusing from infinity to simulated short distance (delivery of set of two DICAN distance changers (to enable change of simulated distance to the targets)

If these option are interesting then add option number. TAIM 123 means that TAIM with options 1,2,3 is to be delivered.

5 SUMMARY

TAIM is the best system for testing thermal sights and thermal clip ons available on international market. It offers test and boresight capabilities not met in case of typical test systems.

Version 1.6

CONTACT: Tel: +48 226668780

Fax: +48 22 3987244

Email: info@inframet.com