

DTCORE

Set for testing thermal camera cores



Fig.1. Photo of DTCORE set

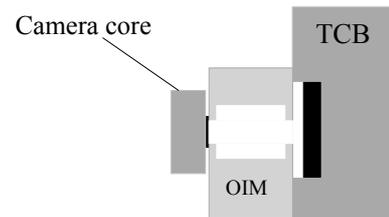


Fig.2. Block diagram of DTCORE set

1 Why testing thermal camera cores?

Thermal camera core is an electronic modules capable to generate output thermal image in one of video image standards. It is built as a raw IR FPA sensor integrated with control/processing electronics. In simplification, thermal camera core can be understood as almost complete thermal imager without optics.

Thermal camera cores are crucial blocks of thermal imagers built by combining camera core, optics and mechanical case. There are some companies who manufacture all these main blocks (camera core, optics and mechanical case) and later built thermal imagers. However, majority of thermal imagers offered at international market is built using thermal camera cores purchased from a dozen of main manufacturers. In such a situation problem of performance testing of thermal camera cores is of crucial importance for manufacturers of thermal imagers who work as system integrators. Test range is typically limited to measurement of NETD (noise equivalent temperature difference) that is that considered as a crucial parameter and is needed to verify quality of purchased camera cores. Other noise parameters like FPN, non-uniformity, 3D Noise model are sometimes measured, too. All these noise parameters of camera cores are measured and presented for a specific reference optics and this optics needs to be simulated during tests.

2 What is DTCORE?

DTCORE is a set of tools designed for testing thermal camera cores. It is offered as an option for DT systems for testing thermal imagers. It offers measurement of following parameters: NETD, FPN, non-uniformity, 3D Noise model. The DTCORE is a modular set built from following modules:

1. set of two OIM optics imitators,
2. TCB-4D blackbody,
3. PC set,
4. analog video frame grabber
5. TCB Control program,
6. TAS-N computer program.

Set of OIM optics imitators is the crucial part of DTCORE. From design point of view OIM imitators are mechanical devices that precisely limit the cone where sensor of camera core gets irradiation from a large blackbody of variable temperature to value determined by F-number of simulated IR objective.

3 Why DTCORE is needed?

Data sheets of thermal camera cores present NETD values for a case when camera core is intergrated with an ideal IR objective of specified F-number (F-number=1 for non-cooled camera cores, or F-number=3 for cooled thermal camera cores). Ideal IR objective means practically an objective of transmission equal to 1 and negligible reflection level from outer parts of lenses and mechanics of the IR objective.

Performance of IR objectives offered on the market vary significantly. Transmission can vary from about 0.6 to about 0.9 and additionally is often known even by manufacturers with limited accuracy. Next, manufacturers of IR objectives typically do not present information on level of reflections by objective outer parts in situation when practical experiments have showed that this effect can vary significantly and can change measurement results.

In such a situation Inframet has proposed to use DTCORE set that includes a set of two OIM imitators that can simulate perfect IR objectives of transmission equal to one and near zero reflections on objective outer parts. The first imitator simulates optics of F-number equal to 1; the second simulates optics of F-number equal to 3.

If needed the software delivered by Inframet can determine NETD valid for different F-number of simulated optics. This correction can be done both for a case of non-cooled cameras or for a case of cooled cameras.

DTCORE

Set for testing thermal camera cores

4 Versions

DTCORE test system can be expanded by consecutive options:

- A) Set of OIM imitators is limited only to OIM-F1 imitator used to simulate LWIR objectives for non cooled imagers (OIM-F3 imitator is not delivered),
- B) TCB-6D blackbody is delivered instead of TCB-4D blackbody to allow to simulate large IR objectives,
- C) TC version of the TCB-4D blackbody is delivered to enable testing thermal cores at temperature chambers,
- D) Second blackbody and additional YLS linear stage controlled from PC to enable fast two point NUC ((type to choose from https://inframet.com/Data_sheets/BNUC.pdf).
- E) Additional OIM imitator to simulate IR objective of non-standard F-number,
- F) Digital frame grabber (type to be determined).

Version 1.2

CONTACT: Tel: +48 22 6668780

Fax: +48 22 3987244

Email: info@inframet.com