TSIM

Simple tester of thermal imagers

Fig. 1. Photo of TSIM 110 test system

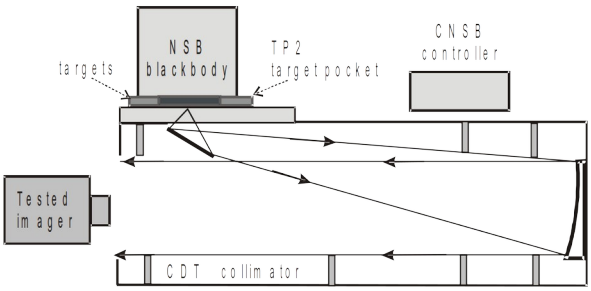

Fig. 2. Block diagram of TSIM test system

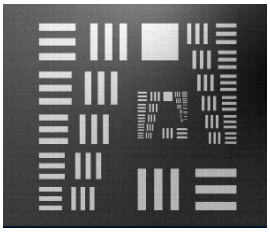

Fig. 3. Image of IR USAF1951 target

BASIC INFORMATION:

DT series computerized test systems are Inframet main systems for testing thermal imagers (https://www.inframet.com/thermal_imagers.htm). They are built as a set of blocks: CDT off axis reflective collimator, TCB blackbody, MWR rotary wheel, set of target, PC set, and control/image analysis software. These expensive test systems offer accurate measurement of a long series of parameters needed for precision evaluation of thermal imagers. Inframet offers also simplified, moderate cost system coded as TSIM for customers that accept limited test capabilities: measurement of resolution, relative sensitivity, infinity focusing, and support for boresight. TSIM can be also optionally used for MTF measurement. It cannot be used for measurement of MRTD or NETD.

TSIM is a stand alone system that projects images of manually changed IR targets illuminated using NCB blackbody to the tested imager. The system built is from five main blocks: CDT off axis reflective collimator, NCB40 blackbody, CNSB controller, TP2 target pocket, a set of IR targets. CDT reflective collimator works as an image projector for the IR target set at its focal plane and irradiated by NSB40 blackbody. TSIM typically project two types of thermal imagers: a)Image of a cross target (two sizes are possible), b)image of IR USAF 1951 target. Thermal contrast of projected images can be regulated using CNSB controller changing temperature of NCB blackbody. It should be noted that in NCB40 is a non stabilized blackbody. User can regulate of temperature but temperature is not stabilized and not accurately measured (only relative indication is available).

From design point of view TSIM can be treated as a special simplified version of DT system where computerized calibrated TCB blackbody, MRW-8 rotary wheel, set of IR targets have been replaced by manual non-calibrated NCB40 blackbody, manual target slider and number of targets have been strongly decreased.

TSIM is a perfect tool for manufacturers of thermal imagers or maintenance workshops that need simple, moderate cost tools to check resolution and focusing and to compare sensitivity between several imagers.

TSIM

Simple tester of thermal imagers

VERSIONS

TSIM test systems are modular test systems that can be delivered in form of different versions of slightly different configurations. The basic division of TSIM series system is based on output aperture of the collimator: TSIM 60: 60mm; TSIM 110: 110mm; TSIM 150: 150mm; TSIM 200:200mm; TSIM 250: 250mm.

TECHNICAL SPECIFICATIONS

Technical specifications of of TSIM test station are presented below.

Collimator	CDT660HR for TSIM 60; CDT11100HR for TSIM 110; CDT15150HR for TSIM 150; CDT20200HR (or CDT20160SR) for TSIM 200; CDT25250HR for TSIM 250
Collimator type	reflective, off-axis
Aperture	TSIM 60: 60mm; TSIM 110: 110mm; TSIM 150: 150mm; TSIM 200:200mm; TSIM 250: 250mm
Focal length	TSIM 60: 600mm; TSIM 110: 1000mm; TSIM 150: 1500mm; TSIM 200:2000mm; TSIM 250: 2500mm
Spectral range	0.4-15 μm
Spatial resolution	As stated in data sheet of CDT collimators for HR versions (option SR or UR versions)
Mirror manufacturing accuracy	L/6 at 630 nm
Coating	Protected aluminum
Field of view	Depends on collimator type
Operating temperature	10ºC to 35ºC
Dimensions	Depends on model from about 610x140x210 to 2610x350x400
Mass	Depends on model from about 8 kg to 50 kg

Blackbody

Model	NCB40
Type	Non calibrated
Radiator dimensions	40x40 mm
Emissivity	>=0.96
Differential temperature range	At least -10ºC to +10ºC from ambient
Dimensions	From 100x110x130 mm
Mass	1 kg

Targets

Cross targets	Line length 7 mm or 14 mm (other sizes are possible)
USAF 1951 IR target	
Spatial frequency of 3-bar patterns of in lp/mm units	1,00 – 14,30 lp/mm
Spatial frequencies range of 3-bar patterns in lp/mrad units	Multiply range in lp/mm units by collimator focal length in meters

Other parameters

Power supply	220/110 VAC 50/60Hz
Operating temperature	+5°C ÷ +35°C
Mass	Depends on model from about 10 kg to 60 kg

Options**:** More IR targets can be delivered.

INFRAMET

Optional boresight of laser systems

TSIM can be also optionally delivered in version capable to do boresight of thermal sight to a small laser range finders/pointers using additional boresight tools.
In this case a set of laser sensing cards are delivered:high sensitivity TEG card, TEP – medium sensitivity converter of SWIR laser pulsed light into thermal radiation. The card is located at collimator focal plane. The cards work as converter of SWIR laser pulsed light into thermal radiation visible for tested thermal imager.

If option is interesting then please add letter L to system code (see section Versions)

Attention: Aperture of collimator of TSIM system should least partially overlap both optics of thermal imager and optics of LRF.

Fig. 4. **Position of optics of tested system relative to collimator aperture: a)perfect, b)barely acceptable**

SUMMARY

TSIM test system is a near perfect solution for a moderate cost system for basic tests of thermal imager.

Version 2.2

CONTACT: Tel: +48 604061817 Fax: +48 22 3987244 Email: info@inframet.com