SIM

Simple tester of thermal imagers

Fig. 1. Photo of SIM110 test system

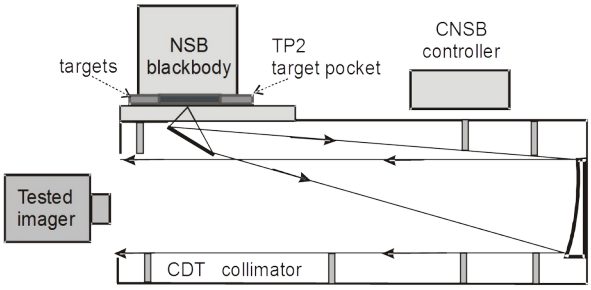

Fig. 2. Block diagram of SIM test system

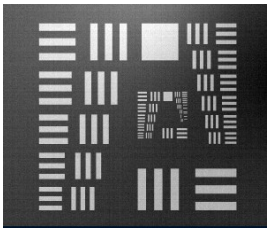

Fig. 3. Image of IR USAF1951 target

BASIC INFORMATION:

Inframet offers DT series test systems based on ultra high performance TCB blackbodies and high resolution reflective collimators for testing thermal imagers. These test systems offer accurate measurement of a long series of parameters of thermal imagers needed for their precision evaluation. However, DT series systems are also quite expensive. Therefore Inframet decided to offer also simplified, low cost system coded as SIM for customers that cannot afford for DT systems and accept strongly limited test capabilities: measurement of resolution, relative sensitivity, infinity focusing, and support for boresight.

SIM is a stand alone system that projects images of manually changed IR targets illuminated using NSB blackbody to the tested imager. The system built is from five main blocks: CDT off axis reflective collimator of standard resolution (not suitable for testing long range imagers), NSB40 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.

SIM 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 NSB blackbody. It should be noted that in NSB40 is a non stabilized blackbody. User can regulate of temperature but temperature is not stabilized and not accurately measured (only relative indication is available).

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

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VERSIONS

SIM test systems are modular test systems that can be delivered in form of different versions of slightly different configurations. The basic division of SIM series system is based on output aperture of the collimator: SIM60: 60mm; SIM110: 110mm; SIM150: 150mm; SIM200:200mm; SIM250: 250mm.

TECHNICAL SPECIFICATIONS

Technical specifications of of SIM test station are presented below.

Collimator	CDT660SR for SIM60; CDT11100SR for SIM110; CDT15150SR for SIM150; CDT20200SR (or CDT20160SR) for SIM200; CDT25250SR for SIM250
Collimator type	reflective, off-axis
Aperture	SIM60: 60mm; SIM110: 110mm; SIM150: 150mm; SIM200:200mm; SIM250: 250mm
Focal length	SIM60: 600mm; SIM110: 1000mm; SIM150: 1500mm; SIM200:2000mm; SIM250: 2500mm
Spectral range	0.4-15 ⌣m
Spatial resolution	not less than 30 mrad-1 for CDT660SR and CDT11100SR not less than 50 mrad-1 for bigger models
Mirror manufacturing accuracy	L/3 at 630 nm
Coating	Protected aluminum
Field of view	2.7°
Operating temperature	10ºC to 35ºC
Dimensions	Depends on model from about 610x140x210 to 2610x350x400
Mass	Depends on model from about 7 kg to 50 kg

Blackbody

Model	NSB40
Type	Non stabilized
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.

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Optional boresight of laser systems

SIM 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 SIM 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

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

Version 2.1

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