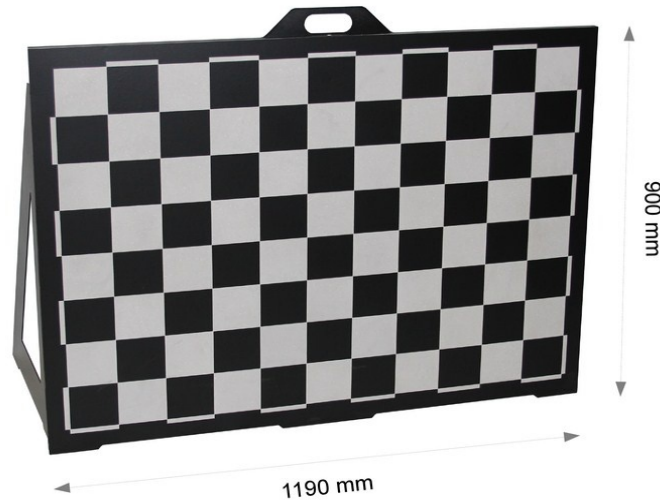# LAM

Multispectral target set
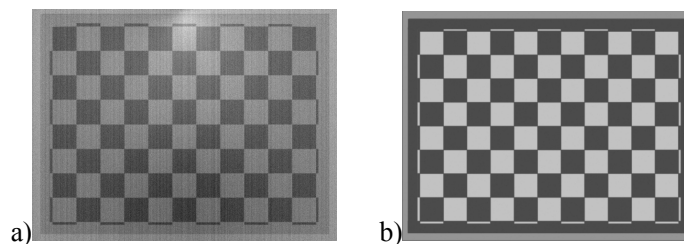

Fig. 1. Photo of LAM target

a)   b)

Fig. 2. Image of LAM target generated by a)thermal imager, b)visible camera

BASIC INFORMATION:

Fusion multi-sensor imaging systems offer increased surveillance capabilities due to fusion of classical thermal image with classical visible image. The fusion systems are typically built using a multi-sensor imaging system composed with a thermal imager and a visible imaging camera (night vision device, visible camera). Fusion of two images can be done using optical method or digital (digital image processing) method.

Generating high resolution fused image is not an easy task due to a series of reasons. Necessity to correct differences in distortion/magnification of images generated by different imaging sensors is one of such reasons. Special targets of well known geometry visible to all imaging sensors are needed for development of image correction algorithms.

The LAM target set has beed developed to support fusion images from two channels in digital fusion imagers. The LAM set is a two block test system: a) large area multispectral chessboard target to be observed by tested fused imager; b) ICAS image capture and analysis station (PC set with internal software and FUS software to analyse images from tested imager).

The chess board target emits its own thermal radiation (the target is actually a large area radiation source of regulated uniform temperature) and reflects also incoming radiation in visible/NIR range. Therefore the chess pattern can be seen by both thermal imagers operating in MWIR/LWIR range and by NVDs/cameras operating in visible/NIR range.

LAM target is to be used at relatively short distance from a tested fused imager (typically up to 10m) when fused imagers are designed for long range surveillance and fusion of images should be done for ininity distance. Therefore raw images of LAM target taken at short distance target-imager are of limited value. However, Inframet has developed a mathematic model that enables determination of a two dimensional map of spatial displacement of image from thermal imaging channel relative to image from the visible imaging channel on basis of images of LAM target taken at a short distance. In this way precision information relative deviations of thermal imager relative to visible image is determined and thermal image can be fused with visible image in optimal way.

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LAM

Multispectral target set

BLOCKS:

The LAM target set is built from two main bloacks: a)LAM traget, b)ICAS image capture and analysis station (PC with internal frame grabber and FUS computer program).

HOW IR WORKS?

The LAM target is built using aconcept of large area, uniform temperature radiation source with surface machined to achieve low emissivity checkboard pattern on high emissivity background. The LAM target is characterized by large dimensions that enable to fill completely field of view of tested fusion imaging system. Single capturing of image of LAM target by thermal imager and by visible/NIR imaging sensor provides data needed for effective image fusion.

PC set with internal frame grabber and FUS software enables capturing images from two channels of tested imagers; analysis of these two images and calculation of parameters that characterize fusion effectiveness.

TEST CAPABILITIES

FUS computer program enables fast analysis of images generated by tested digital fused imager and calculation of following results:

- Alignment error (angle between optical axis of thermal channel relative to optical axis of visible channel)
- Rotation error (angle beteen image from thermal channel relative to image from visible channel)
- Two dimensional map of spatial displacement of image from thermal imaging channel relative to image from the visible imaging channel (information how much and in which direction the pixel is displaced comparing to the same pixel in another channel)

SPECIFICATIONS

Parameter	Value
	LAM target
Imaging pattern	chessboard
Single square field size	100mm
Pattern active size	11x8 fields (110x80 mm)
Reflectance of black fields in visible/NIR range	<0.05
Reflectance of white fields in visible/NIR range	>0.8
Emissivity of black fields in LWIR/MWIR range	>0.9
Emissivity of white fields in LWIR/MWIR range	<0.1
Apparent thermal contrast	>10ºC
Temporal temperature stability	<1%
Temperature uniformity	<0.1K
Stabilization time	15 minutes
Power	AC230/110 V
Dimensions	1190x575x900mm
Mass	15 kg
	ICAS image capture and analysis station
Blocks	PC with internal frame grabber and FUS computer program
PC set	Typical PC desktop with Windows 7 system
Typical internal frame grabber	Analog video (PAL/NTSC)
Optional frame grabber	USB 2.0, USB 3.0; CL, GigE, HD TV, HDMI etc
FUS software	Programn to capture images and to calculate papemeters mentioned as test capabilities

*specifications are subject to change without prior notice

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LAM

Multispectral target   set

VERSIONS

 LAM target set is offered in two version:
1. LAM -A target set
2. LAM-B target set.

LAM-A target set is a reduced verion when only LAM target is offered (no PC, frame grabber, and software)
LAM-B target set is a complete version presented in this data sheet.

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