T-CAT

Thermal Camera Acuity Tester

A new portable system for quick resolution measurement of thermal imagers

Definition

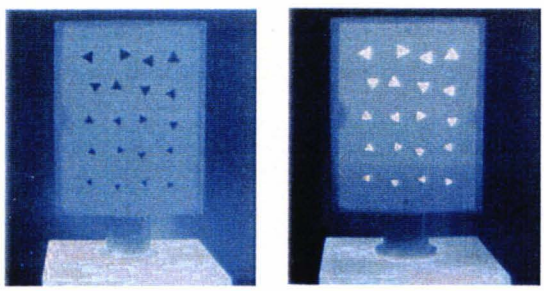
T-CAT (Thermal Camera Acuity Tester) is a thermal 'test chart' for measuring the spatial resolution ('sensor acuity') of thermal imaging systems. It is a small, portable system, that it used in a similar way as the optometrists' eye chart. The design is an implementation of the TOD (Triangle Orientation Discrimination) method for electo-optical sensor characterization that has recently been introduced[1,2].

Technical specifications

- 'Test chart': 20x30 cm blackened aluminum plate
- Background plate: 3 cm behind the test plate
- Positive and negative contrasts
- Curent ΔT range : ±2K, ±5K, ±10K, ±20K
- Temperature control accuracy: 0.1 K
- Triangle test pattern no. / size: variable
- Test pattern orientation: randomized per row
- Test plates: easily interchangeable

Measurement

1. The camera to be tested is aimed at the test plate, distance is chosen such that the largest triangles are just visible on the image.
2. An observer marks the orientation *of each triangle as he/she perceives it.*



Thermal images of T-CAT. Left: -2K; right:+2K

3. If the orientation cannot be discerned, the observer has to guess. This takes some getting used to. People always do better than they think.

T-CAT: Thermal Camera Acuity Tester. The triangular thermal test patterns are generated in the top part. The control electronics and power supply are housed in the base.

4. A triangle size corresponding to 75% correct responses (S75) is calculated from the observer's score. Sensor acuity defined as 1/S75, measured in $mrad^{-1}$, has the same unit as spatial frequency.

References

1. P. Bijl and J.M. Valeton, "TOD, a new method to characterize electro-optical system performance". *Proc. SPIE* 3377, 182-193 (1998).
2. P. Bijl and J.M. Valeton, "TOD, the new alternative to MRTD and MRC". *Optical Engineering* 37(7), 1984-1994 (1998).

Information

Dr. J.M. Valeton
Dr. P. Bijl

TNO Human Factors
PO Box 23
3769 ZG Soesterberg
The Netherlands

phone: +31 346 3567 239
fax: +31 346 353 977
email : valeton@tm.tno.nl