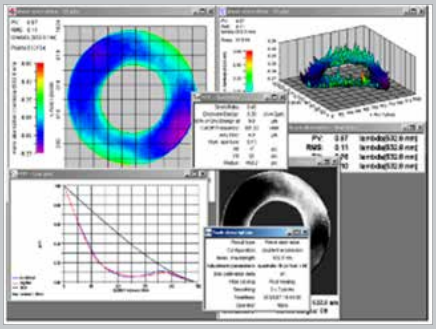
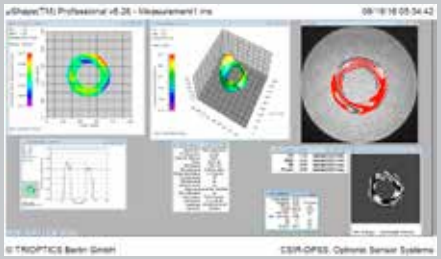
Focus on CSIR

Services in Optronic Sensor Systems

Optronic Test and Evaluation Laboratory





Simulation is increasingly being used to support military system development throughout the entire product life cycle, from concept analysis, development, and doctrine development.

The situational awareness and threat identification afforded with surveillance cameras, night vision devices and infrared cameras depend on the quality of images produced by these sensors.

To ensure that sensors are fit for purpose they require testing and evaluation under controlled conditions both in the laboratory and in the field. Optical components (such as lenses) need to be quality tested and characterised and the alignment of optical systems need to be done under controlled conditions.

The Optronic Test and Evaluation Laboratory looks at the performance of sensor systems with various in-house facilities and technical expertise.

The results from testing and evaluation enable:

- Specification support and acceptance testing
- Acquisition decision-making support
- Selecting usable legacy equipment such as visible cameras, night vision devices and infrared systems

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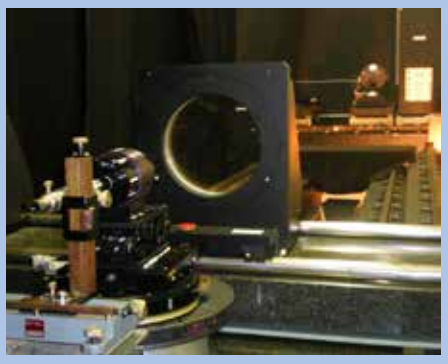
Minimum resolvable temperature difference testing

Infrared cameras are useful in military applications because they can detect heat emitted by objects such as body heat, heat generated by engines of vehicles, ships and aircraft, as well as the environment. Tests exist that characterise the performance of infrared cameras. It is the equivalent blackbody temperature difference between a standard target at a given spatial frequency and its background, such that the target is "just resolved" by an observer.

An integrating sphere source generates a uniform radiance for a hyperspectral camera and is used for satellite calibration and camera non-uniformity characterisation.

Day and night resolution tests

The purpose of this day and night resolution tests is to determine the smallest pattern (highest spatial frequency) that can be seen by a sensor such as a lens, camera or system. The finer the pattern the system can see, the better it will function. The result provides objective values that can be used in specification support, acquisition decision-making support, acceptance testing and selection of usable legacy equipment.

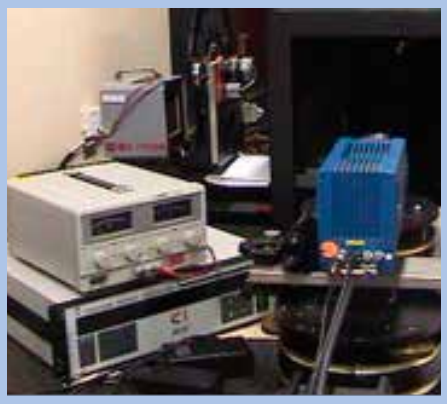


Modulation transfer function testing

In order to be able to use the result, it is necessary to define what task the end-user of a lens has in mind for it, for example, to identify a number plate or a particular camouflaged vehicle. It is then necessary to establish what levels of modulation at specific spatial frequencies are required in order to perform the test. If the system is capable of delivering these levels of modulation, then the task is possible, otherwise not. The result provides objective values that can be used, e.g. in specification support, smart buyer / decision support, and acceptance.

Studying thermal effects using an incubator:

The behaviour and performance of optronic sensors, cameras and lenses depends on the temperature at which it operates, which is can be affected by, for example, ambient temperature. The optronic test and evaluation laboratory is equipped with an environmental chamber that enable environmental testing.



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