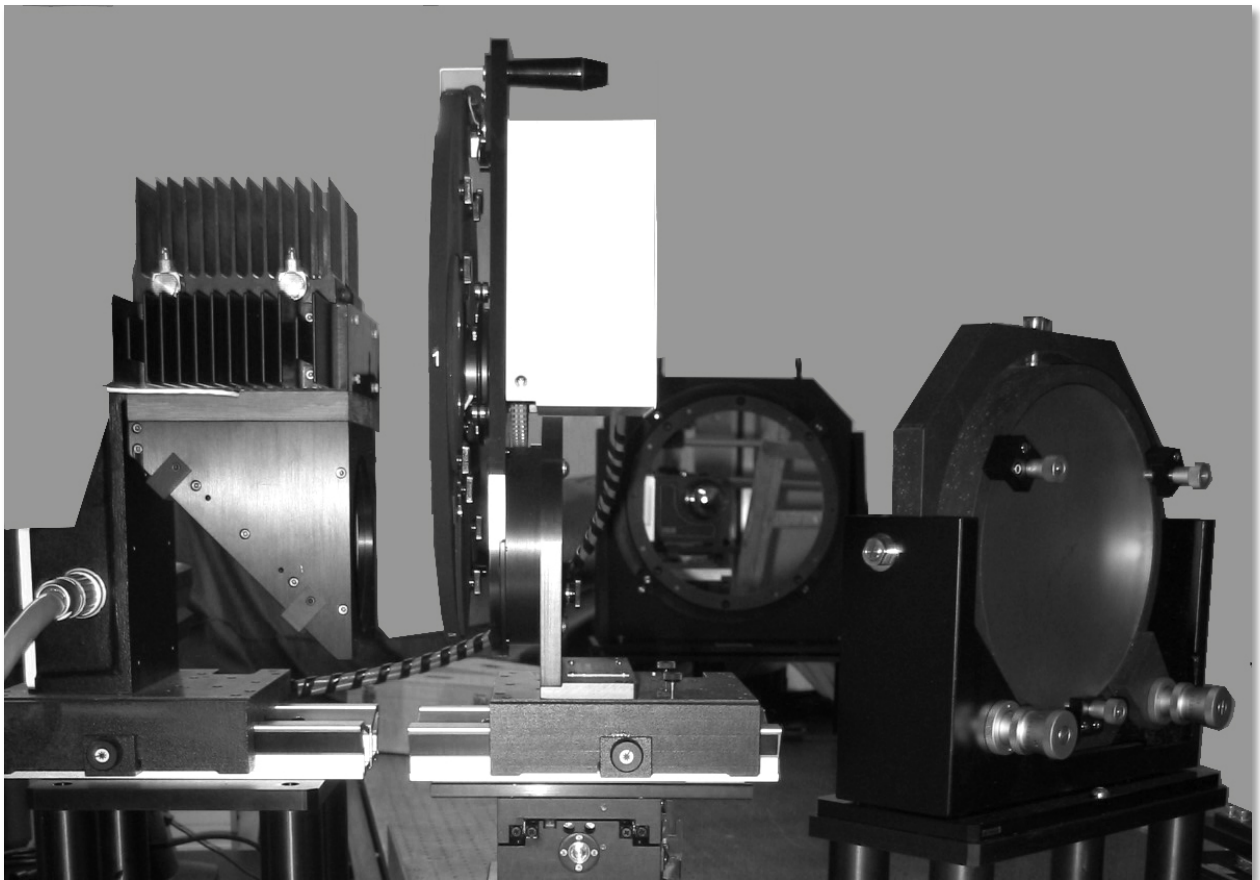


I-SITE™ IMAGER TEST AND EVALUATION



The Concept

The Optikos® advanced software measurement package is the heart of its electro-optical testing system. The I-SITE™ system is the most flexible test suite commercially available, testing discrete components through complete systems. The I-SITE™ system is designed to provide measurements at multiple points in the signal processing chain for many types of electro-optical systems. I-SITE™ software can be expanded to accommodate new measurements and can be upgraded to incorporate additional modules as the user's system requirements change.

The I-SITE™ software package is designed specifically for connecting the Optikos source units, positioning equipment, and other measurement devices to Windows NT compatible systems. With appropriate hardware, I-SITE™ software can capture data directly from optical images or video signals to make a range of important measurements on almost any electro-optical system. There are standard I-SITE™ configurations for testing thermal imagers, CCD cameras, displays, image intensifiers, and array detectors.

Actual measurements performed depend upon the physical measurement device used. There are many options that may be employed; thus there is no single I-SITE™ setup. Sources, detectors, and intermediate optics may all be configured to your requirements, and several different analysis options are offered.

APPLICATIONS

I-SITE™ tests the performance of:

- Video cameras
- Digital imaging systems
- Displays
- Photographic systems
- Visual imaging systems
- Fiberoptic faceplates
- Night vision systems
- Thermal imagers
- Imaging radiometers
- Imaging intensifiers
- Thermographic systems

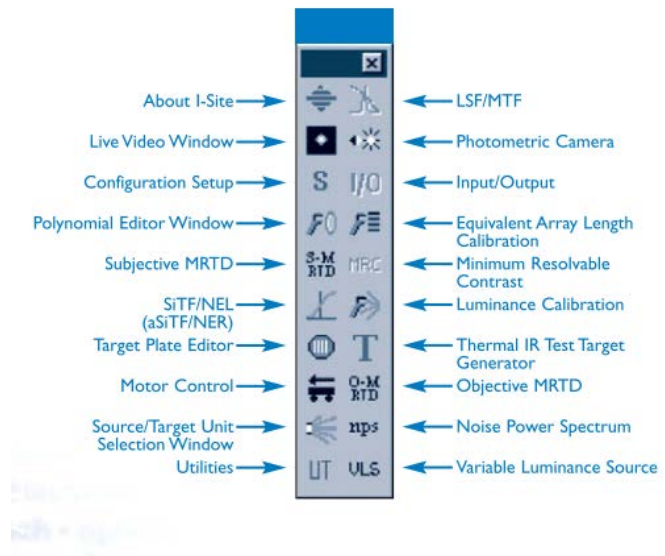


Figure 1: I-SITE™ toolbar with easy access to I-SITE™ measurement functions.

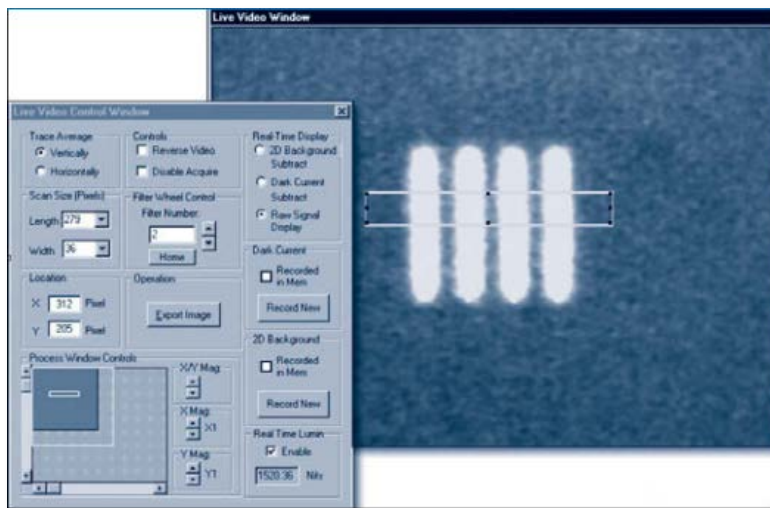
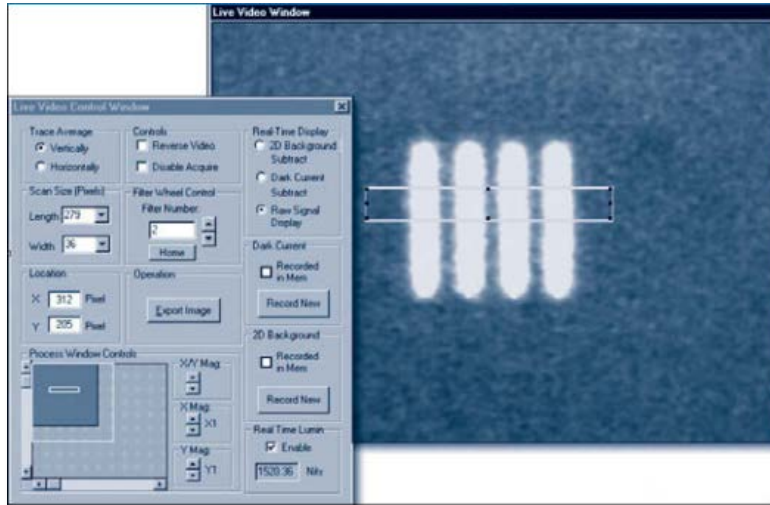


Figure 2: With 2D I-SITE™ MTF, 4-bar MTF of a FLIR can be measured in real-time.

Benefits

- Captures data directly from many optical images or video signals
- Expands to accommodate new types of measurements
- Readily upgraded to support additional hardware modules
- Can be integrated into a manufacturing environment

Features

- Measures throughout the signal processing chain
- OLE interfaces through Visual Basic®, C++, and others
- Setup, results, and calibration data can be printed or output to files
- Interactive real-time 2D video screen (with 2D devices)

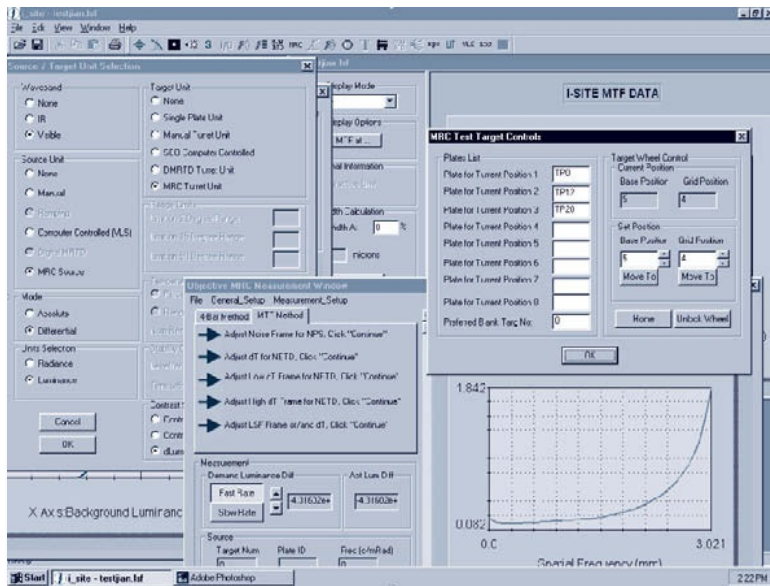
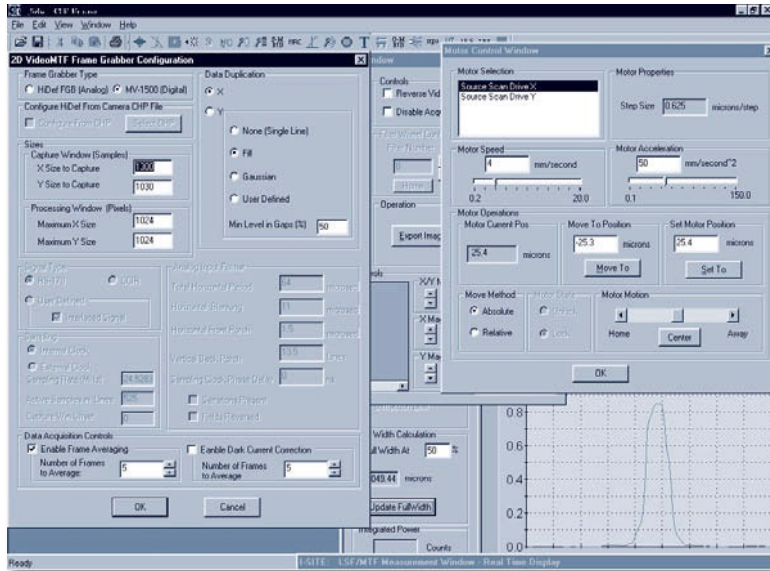


Figure 3: The multiple window interface allows several test parameters and results to be viewed simultaneously.

CREATING MACRO PROGRAMS

I-SITE™ software provides OLE interfaces for users to create optical testing macro programs. Third party industry standard tools, such as Microsoft® Visual Basic®, National Instruments LabVIEW and Sybase PowerBuilder can be used to access many I-SITE™ functions. Macro programs allow seamless integration with application programs such as Microsoft® Excel and Access®. The ability to create stand-alone programs is a standard feature of I-SITE™ software and samples are provided.

Applications range from simple "go/no-go" macros, to more elaborate programs linking bar-coded lot information to MTF measurements. Access to I-SITE™ functions gives you unparalleled flexibility and power in building your quality control infrastructure.

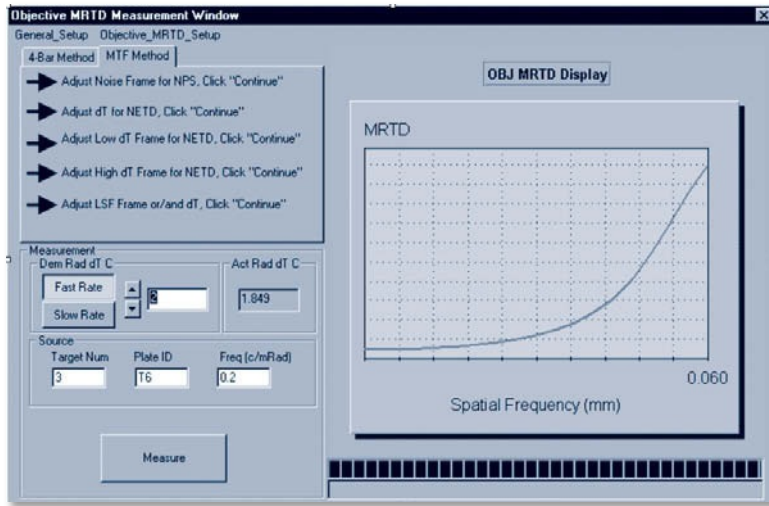


Figure 4: Objective MRTD can be measured using single-button operation.

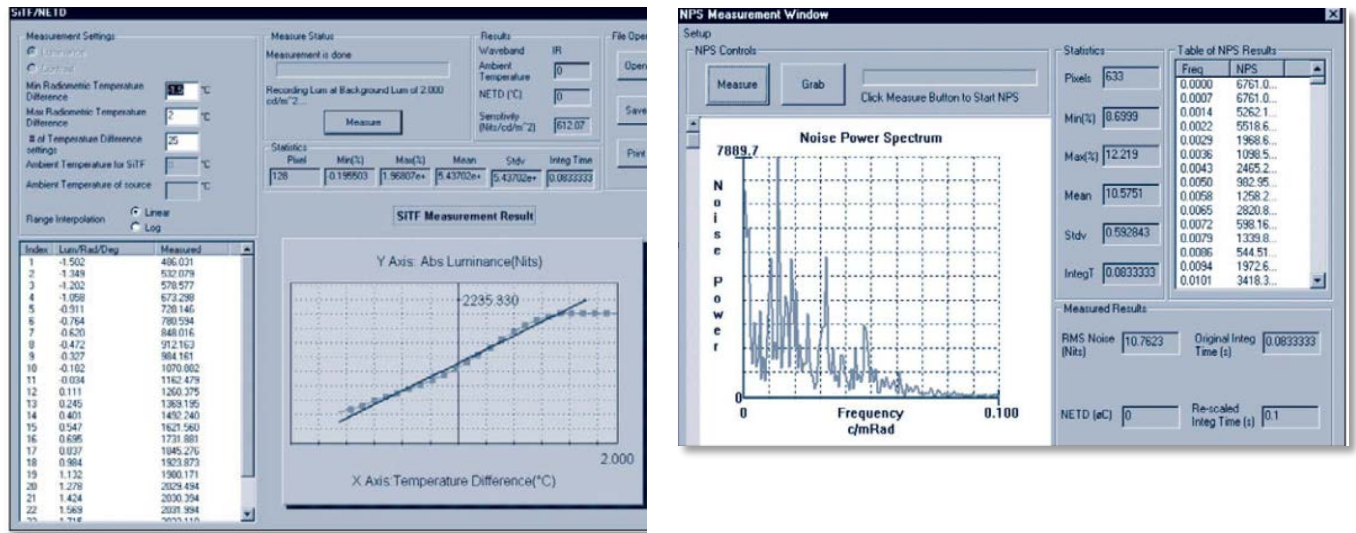


Figure 5: Components of MRTD, such as SiTF and NPS, can be separately analyzed to further evaluate system performance.

SUPPORTED MEASUREMENTS:

I-SITE™ systems support the following electro-optical measurements:

- Line Spread Function (LSF)
- Modulation Transfer Function (MTF)
- Signal Transfer Function (SiTF)
- Noise Power Spectrum (NPS)
- Root Mean Square Noise (RMS)
- Noise Equivalent Luminance (NEL)
- Minimum Resolvable Contrast (MRC)
- Minimum Detectable Contrast (MDC)

For Infrared Systems:

- Noise Equivalent Temperature Difference (NETD)
- Noise Equivalent Radiance (NER)
- Minimum Resolvable Temperature Difference (MRTD)
- Minimum Detectable Temperature Difference (MDTD)
- 3D Noise
- Line Spread Function (LSF)
- Modulation Transfer Function (MTF)
- Signal Transfer Function (SiTF)
- Noise Power Spectrum (NPS)
- Root Mean Square Noise (RMS)
- Detector Detectivity (D^*)
- Bolt Down Boresighting
- Multiple FOV Boresighting
- 1D-2D Non-uniformity
- Jitter
- Narcissus
- Field of View (FOV)
- FOV Change
- Thermal Imager Multiple FOV Switching Time
- Range Performance

MEASUREMENT DEVICES

A measurement device for the Optikos I-SITE™ system is the part of the test equipment that acquires the image or signal from the system under test and transmits it to the computer for analysis. An optical measurement device is used in an electro-optical imaging system where the output of the unit under test is an optical image, such as a display device. Conversely, an electronic measurement device is used in an electro-optical imaging system where the output is an electronic signal, such as a CCD camera.

For a system under test that outputs its signal to a display device, such as a CRT or LCD, an I-SITE system uses the PMC-600 Photometric Camera. The PMC-600 acquires a 2-dimensional image produced by the system being tested. Three software and hardware products are offered: I-SITE™ MTF 1D acquires a single video line from either 1D or 2D analog cameras, MTF 2D Analog acquires the 2D image from the video signal of an analog camera, and I-SITE™ MTF 2D Digital acquires the signal from a digital camera.

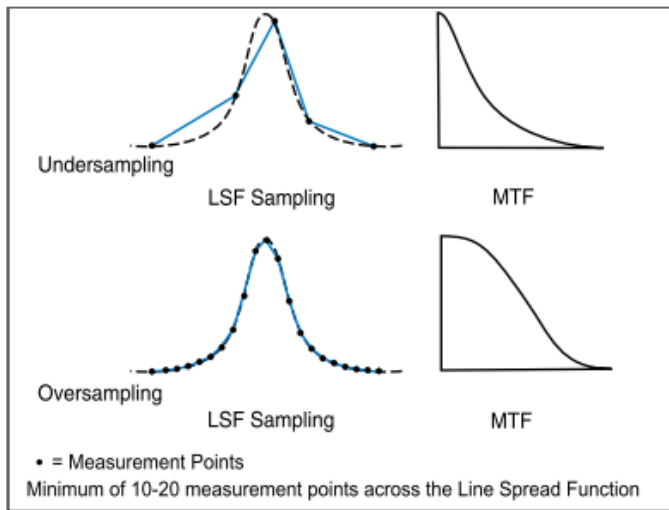


Figure 6: Oversampling ensures accurate LSF and MTF measurements.

Sampling Rule of Thumb

As a general rule of thumb the I-SITE™ system oversamples the unit under test by a factor of ten. That is to say, in making MTF and LSF measurements on a CCD array or other camera, the image of the slit should move across the face of the detector in steps no larger than 1/10 the dimension of the detector. Oversampling the signal from the unit under test assures accurate characterization of the signal. This is achieved electronically by using a high sampling rate, and is achieved optically by magnifying the image using a suitable lens.

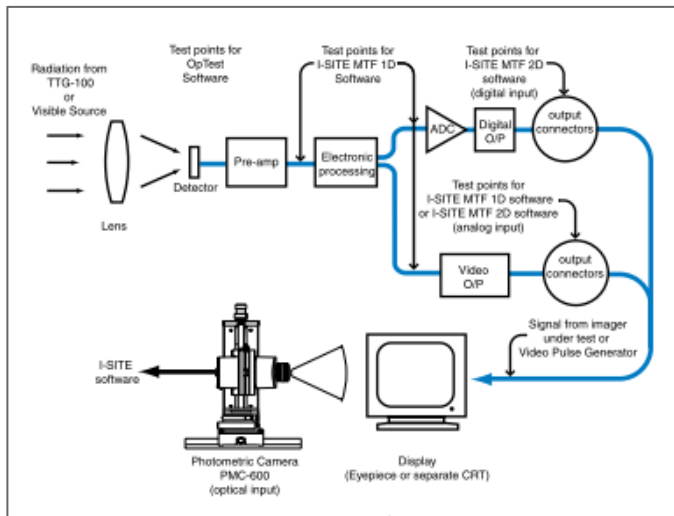


Figure 7: I-SITE™ system measurement devices can measure an electro-optical system at multiple points along the signal path.



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