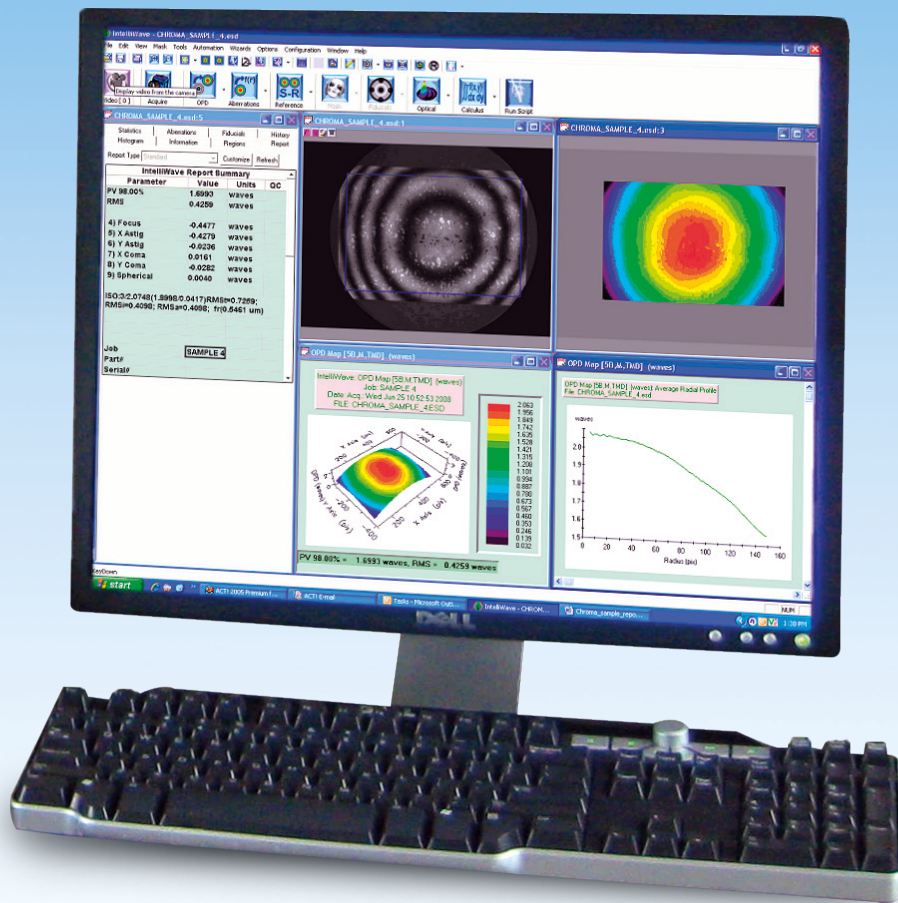


# MarOpto



**IntelliWave**  
Easier, Faster and Enhanced  
Interferometric Characterization  
with IntelliWave 6.7

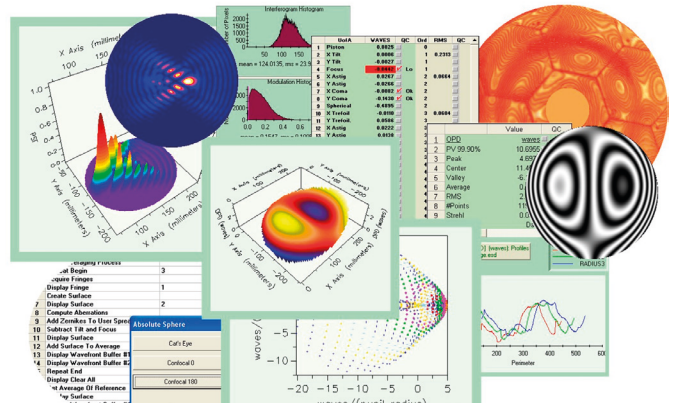
- 0 +

**Mahr**

EXACTLY

## IntelliWave

IntelliWave allows for the characterization of spherical optics, aspheric optics, machined parts, ceramics, semiconductor wafers, and analysis of optical wavefronts. Applications include measuring, flatness, irregularity, roughness, parallelism, curvature, stress, and strain. In addition to running on MarOpto FI interferometers, IntelliWave runs on virtually any commercial or custom interferometer.



## New and Enhanced Features for IntelliWave 6.7

### Aspheric Interferogram Analysis

Fringe densities for aspheres easily exceed the resolution of most cameras. IntelliWave has new Computer Generated Reference (CGR) and unwrapping technology, allowing for aspheric measurements, even when there are multiple fringes per pixel. Thus very high wavefront dynamic ranges can be measured.

### Dynamic Motion Analysis

Using virtually any interferometer, measure and analyze surface deformation, statistics, and aberrations as a function of time.

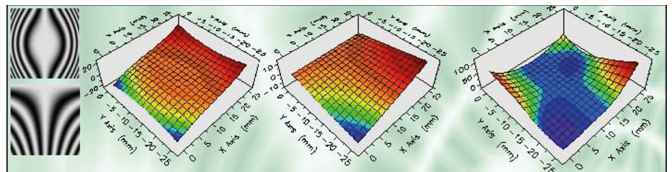
### IntelliTrack Fringe Motion Analysis (PE only)

Monitor over 30 fringe parameters (area, size, temperature, etc) over time for applications such as fluid flow and thermodynamic analysis.

## Shearing and speckle Interferometry

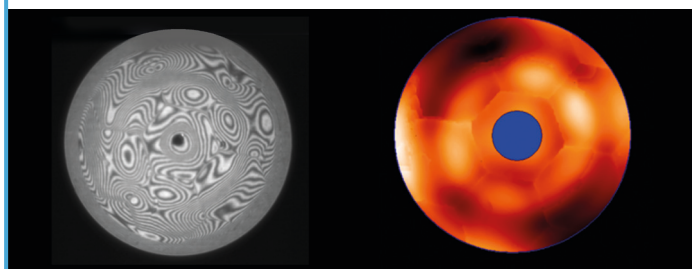
IntelliWave has all the tools required to process bi-lateral sheared interferogram data. Two sets of orthogonally sheared interferogram data can be acquired (or imported), unwrapped, and then integrated into a single surface map.

In the images below from left to right: X and Y Slope Interferograms, X-Slope Map, Y-Slope Map, and Integrated Surface Map.



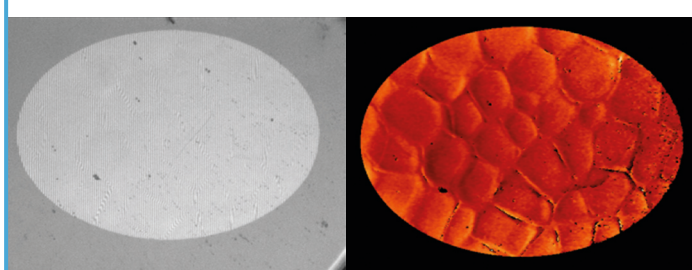
# IntelliWave

## Phase Map Generations



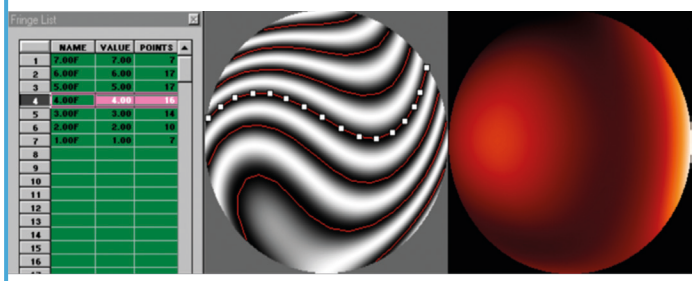
### Temporal Phase-Shifted Interferogram Analysis (TPMI) with Multiple Region Unwrapping

Phase Measurement Interferometry (PMI) is used to directly measure wavefront phase in an interferometer corresponding to relative differences between test and reference optical paths using multiple interferograms. The precision of phase-measurement techniques is a factor of ten to a hundred greater than Fringe Tracing. The image at left shows how IntelliWave can unwrap highly complex interferograms. Also, multiple regions can be processed and analyzed within a single image.



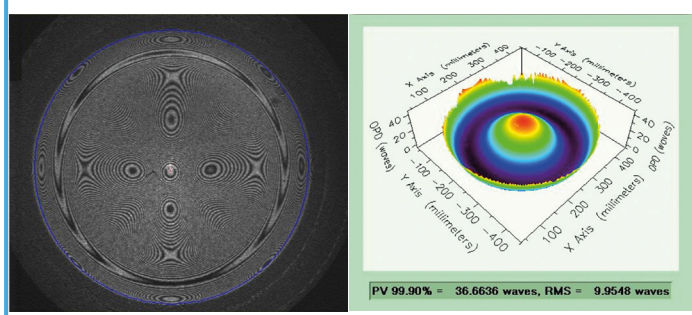
### Spatial Phase-Shifted Interferogram Analysis (SPMI)

The Spatial Carrier Method is a powerful means of allowing interferogram analysis to be performed on a single interferogram without any user interaction, fringe tracing, or interpolation. All that is required is that the user add tilt to the wavefront such that it is the dominant frequency (dominate aberration). In this case the tilt carrier frequency is too high to see in the image (far left). However, IntelliWave can still process it as shown in the image at the right.



### Static Interferogram Analysis with Fringe Tracing

Fringe Tracing allows the user to define fringe lines using fringe objects. Points can be moved, added, or deleted at any time. For reference, an interferogram image can be captured by camera or read from standard image file formats. Once defined, the points are used to generate a surface map.



### Asphere Sub-Nyquist Interferometry

Using the MarOpto FI 2100 AS Interferometer and IntelliWave with its patent pending auto-nulling CGR technology can process up to four fringes per pixel. This provides one to two orders magnitude higher than standard interferometers in aspheric departure.

Interferogram #1

OPD Map (waves)

PV 99.90% = 36.6636 waves, RMS = 9.9548 waves

## IntelliWave

### Main Features

#### Wizards

Asphere CGR  
IntelliStream Dynamic Analysis  
IntelliPhase Real-time phase  
Prisms  
Corner Cubes  
Homogeneity  
Radius of Curvature  
Tool Offset  
Fringe Tracing and Tracking  
Three Flat Test  
Absolute Sphere Test

#### Data Acquisition

Most interferometers supported  
Fast data acquisition for static and phase shifted data  
Use any camera or scanner  
8, 10, 12, 14, 16 bit gray scale  
Resolutions up 4096 x 4096

#### Multi Mode Interferometry

Conventional, simultaneous, and spatial phase-shifting;  
plus fringe tracing interferogram analysis in one package

#### Analysis

Classical, Shearing, & Speckle analysis  
Multi-Region unwrapping & masking  
Statistical & Zernike/Seidel analysis  
Geometric & Diffraction analysis  
Angle, Wedge, Homogeneity, ROC  
Frequency Analysis (Power Spectral Density)  
Time Sequence Dynamic Analysis  
ISO 10110-5 Report Support

#### Data Import and Export

Binary, ASCII, BMP, TIF, JPG files  
ZEMAX/CODE V/OSLO Import/Export  
Send images/graphs to clipboard  
Publication quality on any printer  
Publish to HTML or the Internet

#### Vibration Insensitive Measurements

IntelliPhase interferometry makes virtually any interferometer  
vibration insensitive without additional hardware.

#### Automation

Automate any complex task  
150 functions to choose from  
Real-time user interaction  
While/Repeat loops, Quality Control

#### ActiveX Interfaces

Research Systems' IDL™  
Microsoft Excel™  
National Instruments' LabVIEW™  
Add your own Plug-In's

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