

## Easier, Faster, and Enhanced Interferometric Characterization with IntelliWave™ 6.7

**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 ESDI **Intellium™** Interferometers, **IntelliWave™** runs on virtually any commercial or custom interferometer.

### New and Enhanced Features for IntelliWave™ 6.7

#### Aspheric Interferogram Analysis

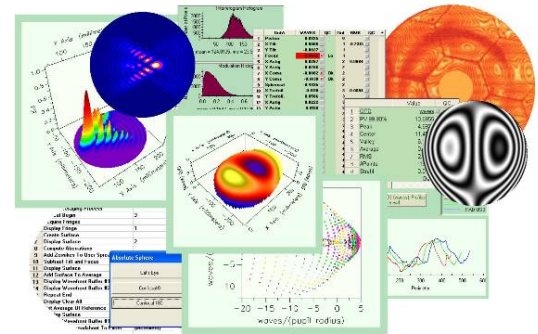
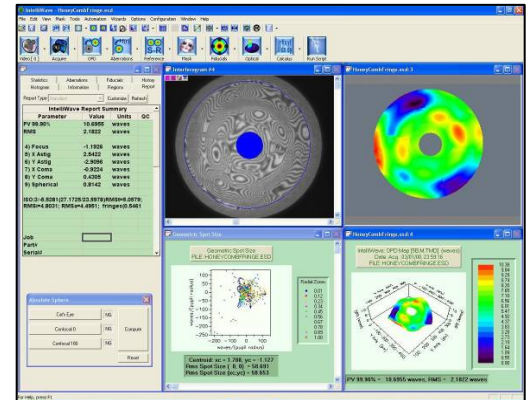
Fringe densities for aspheres easily exceed the resolution of most cameras. **IntelliWave™** has new **Computer Generated Reference™ (CGR™)** and unwrapping technology, allowing for aspheric measurements, even when there are multiple fringes per pixel. Thus very high wavefront dynamic ranges can be measured.

#### 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.



## 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 to 4096x4096

### 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

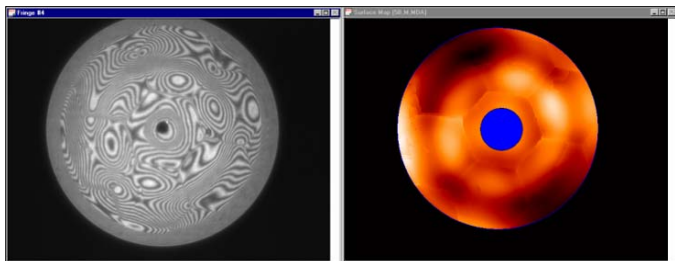
### ActiveX Interfaces

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

## Surface & Wavefront Metrology Beyond Compare

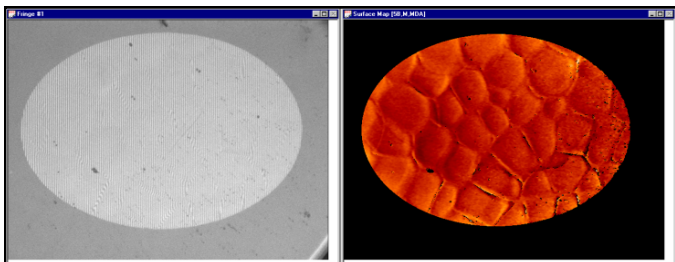
# PHASE MAP GENERATION

**IntelliWave™** can process single interferograms or phase-shifted interferograms using several methods.



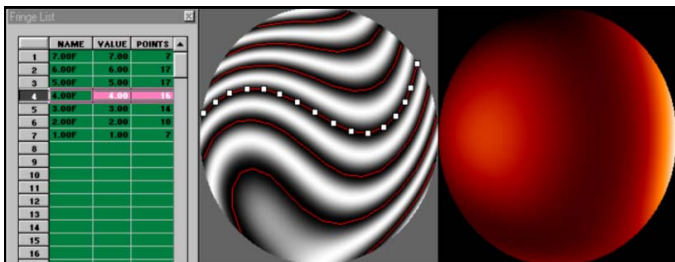
## Temporal Phase-Shifted Interferogram Analysis (TPMI) with Multiple Region Unwrapping

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.



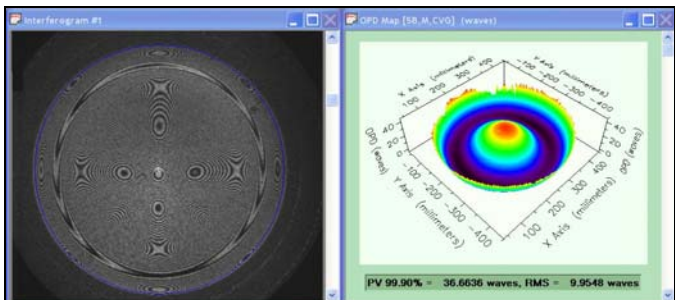
## Spatial Phase-Shifted Interferogram Analysis (SPMI)

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

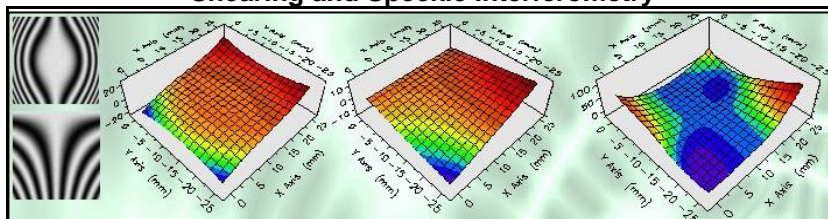
*Fringe Tracing* allows the user to define fringe lines using fringe objects. Points can be moved, added, or deleted at any time. For reference, an interferogram image can be captured by camera or read from standard image file formats. Once defined, the points are used to generate a surface map.



## Asphere Sub-Nyquist Interferometry

Using the **Intellium™ SNI** 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.

## 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.

## Surface & Wavefront Metrology Beyond Compare

Engineering Synthesis Design, Inc.  
 Tucson, Arizona USA | Phone +1 (520) 296-3068 | Fax +1 (520) 296-2897  
 sales@esdimetrology.com | www.esdimetrology.com  
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