Oxford Framestore Applications
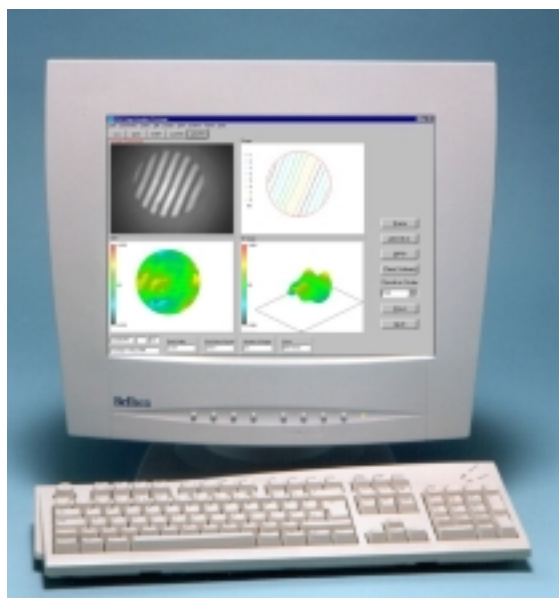
Fringe-Master

for Windows

the *latest* automatic fringe analyser from OFA

"Fringe-Master combines OFA's proven fringe analysis algorithms, the power of the latest Pentium computers and the versatility of Windows '98 or NT ....."

..... the result is the most powerful, cost effective, automatic fringe analyser available!"

"Use Fringe-Master with your existing interferometer. Fringe-Master is already at work in industry, universities and Government laboratories."

Specifications

programmable *"single click"* operation	• runs under Windows '98 or NT
accuracy to better than $\lambda/50$	• takes video from your interferometer
parallelism measurement to 0.01 arc sec	• typical analysis time < 1 seconds
live image on PC screen for set-up	• Zernike polynomial fits to 45th order
automatic editing for low contrast images	• Seidel coefficients & power removal
export to spreadsheets & ray trace codes	• Point spread, MTF and PTF calculation
automatic "Pass / Fail" on P-V and r.m.s.	• TTL trigger for single event capture
multiple configuration files	• available with phase shifting option*

* Visit *OFA's web site at http://www.ofa-ltd.com for more information*

Fringe Master Software

"Fully tested, easy to use software is at the heart of Fringe-Master. The intuitive "point and click" interface gives instant access to all the control, analysis, and display functions needed to extract the data you need in the fastest possible time"
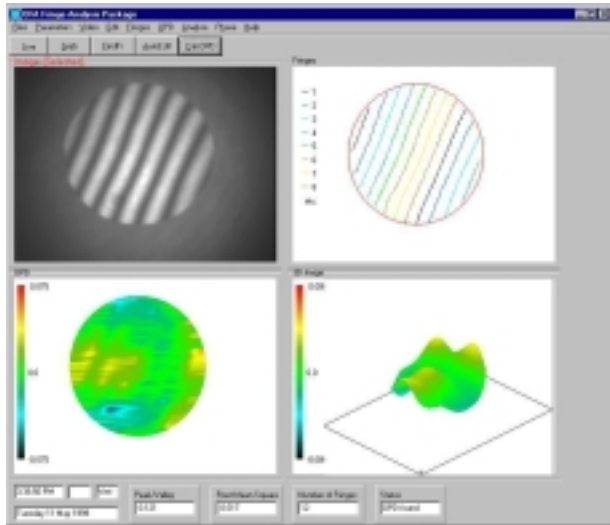
Fringe analysis is simple with Fringe-Master!

All the commands needed to analyse fringe patterns are available with a single mouse click.

The top-level screen shows the input video (top left), detected fringes (top right), OPD map (lower left) and a 3-D view of the OPD (lower right).

A summary of the P-V and r.m.s. measurements is displayed at the bottom of the screen. More detailed optical performance functions are available from the analysis sub-menu, including OPD histograms, Zernike coefficients and MTF analysis.

All software settings are saved in parameter files, which can be customised to suit different measurement configurations.
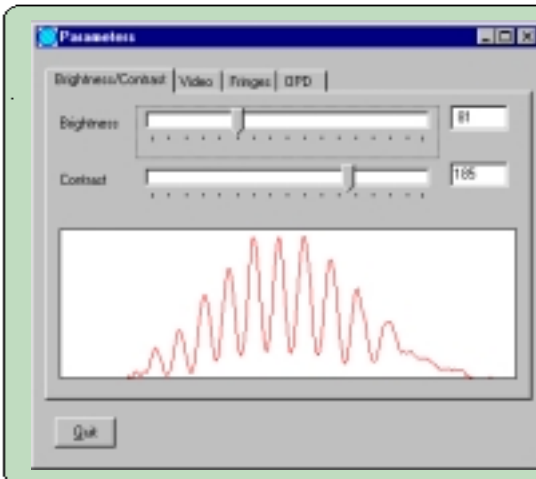

Image set-up

Select *"Live"* **and the input video signal is displayed in real time directly on the PC monitor in the upper left quadrant of the Fringe Master screen. This enables the interferometer to be aligned and the fringe pattern to be adjusted as required without the need for a second monitor. Click on "Grab" and the image is saved into PC memory for analysis.**

Accurate, reproducible results require the full dynamic range of the input video signal to be used. The video gain and offset of the on-board video amplifier are adjusted using the image cross section plot, which is updated in real time.

Programming Fringe Master

Fringe Master performs a complete analysis sequence with a single mouse click.

Sequence options, selected from a menu, include the grabbing of a new image, contrast enhancement and smoothing, fringe finding and editing, OPD calculation and hard copy report generation.

The analysis sequence can be initiated by a mouse click, an external TTL trigger or set to "free run" until the STOP button is pressed.

The ticked options selected in the Auto setup panel are recorded in the parameters file and re-loaded when Fringe Master runs.

Optical Performance Analysis

"Fringe Master performs a wide range of optical performance calculations ranging from a simple "pass / fail" assessment of flatness to Zernike polynomial coefficient calculation, and Modulation Transfer Function (MTF) using in-built Fourier transforms"

Optical Path Difference (OPD)

The software computes the deviation of the interferogram from the best-fit reference plane, presents the result as an Optical Path Difference (OPD) map and calculates the Peak-to-Valley (P-V) and r.m.s. deviation of this surface.

The OPD can be displayed in 4 orthogonal 3-D views, exported to spreadsheets or exported to ray tracing and beam propagation software.

Fringe-Master results can be expressed in microns, waves, fringes or μ-inches
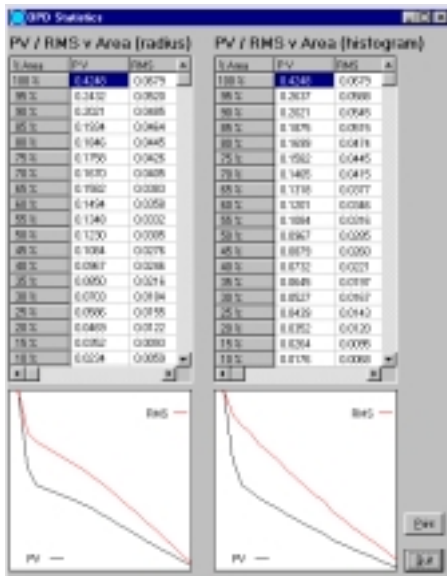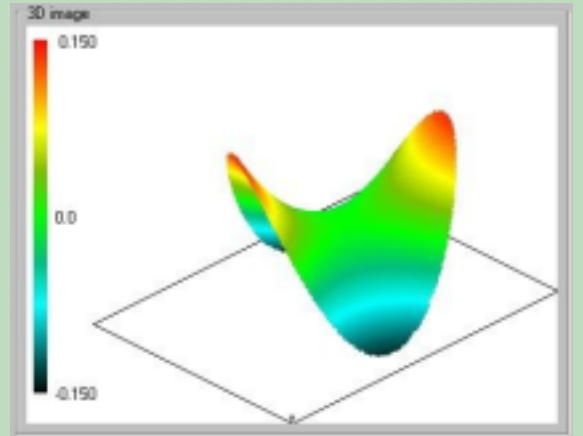
OPD Pass / Fail

For high throughput, minimum supervision applications, Fringe Master gives a simple Pass / Fail result on checking P-V and/or r.m.s. against user entered criteria.

OPD Histogram

The histogram of P-V and r.m.s. values gives additional statistical information on the OPD distribution. For example, in the case illustrated it shows that while the overall P-V figure is 0.42 waves, 90% of the area of the test piece has a P-V better than 0.2 waves.

The information is available as a table of values which can be printed, saved to disc, or displayed graphically.

Similar information is provided as a function of radial distance from the centre of the test piece, giving positional information on the OPD distribution.

Parallelism measurement

Fringe Master measures parallelism, or wedge angle, of optical components down to 0.01 arc sec. The software prompts the user to obtain interferograms over a range of sample orientations from which the wedge angle and its direction is calculated.
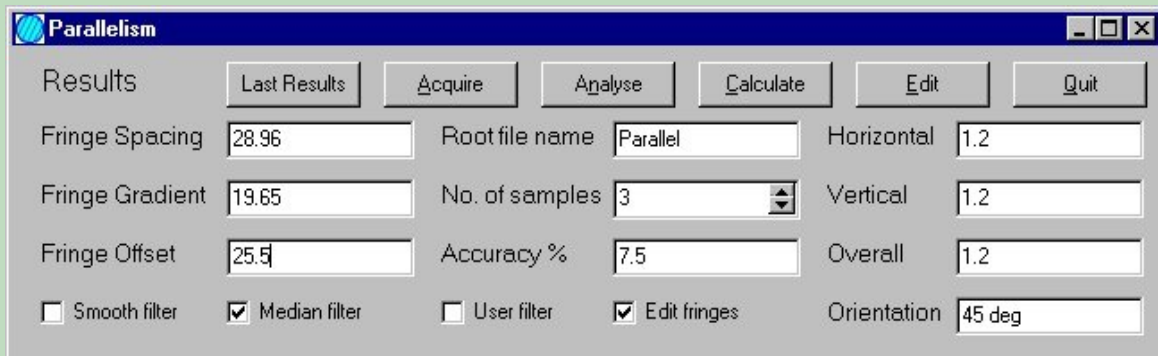
# *Fringe Master: verifying your optical design*
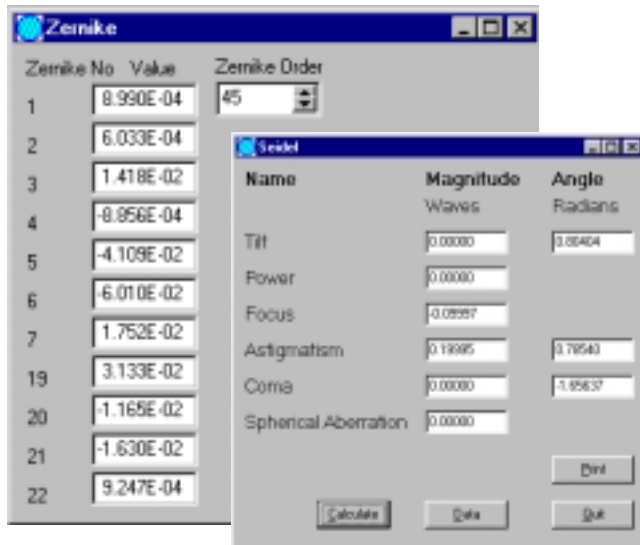
Zernike polynomials
By expressing the OPD wavefront as an orthogonal set of terms as defined by the Zernike expansion, tilt, spherical power, astigmatism, coma etc. can be identified, measured and subtracted from the wavefront. Fringe Master includes Zernike analysis up to 45 terms.

Seidel coefficients
Seidel analysis is based on a power series expansion of the OPD. The Seidel coefficents are used widely by optical designers to express the primary aberrations of optical systems.
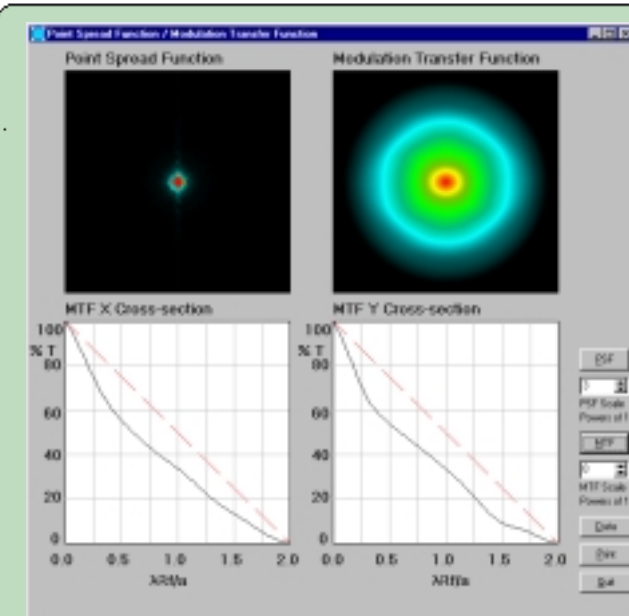
Point Spread, MTF & Strehl ratio
Built-in FFT routines transform the OPD distribution to give the Point Spread Function (far field intensity distribution), Phase & Modulation Transfer Function (PSF & MTF) plotted in x & y directions.

MTF is a widely used tool in the design and measurement of optical imaging systems. By comparing, for example, the frequency response in the horizontal and vertical directions, the effects of astigmatism on the imaging properties of the system can be determined.

The PSF is used to calculate the power distribution in the focal plane expressed as the Strehl Ratio.

Free analysis offer
"Send us one of your typical interferograms, either in electronic form by e-mail or hard copies in the post or by fax and we will get back to you with a quantitative assessment. We are confident that you will appreciate the advantages of Fringe Master for your Q.A. applications."

Manufactured in the UK by:

Oxford Framestore Applications Ltd.
Orchard End, Ickleton Road,
Wantage, OXON.
OX12 9JA, England
Tel: (0)1235-766078   Fax: (0)1235-769619
e-mail: sales @*ofa-ltd.com*

Your local distributor: