

DIFFSYS® is the leading global computer-aided machining (CAM) software system for generating tool paths used for ultra-precision machining of optics. DIFFSYS is recommended by leading manufacturers of ultra precision machine tools for programming optical surfaces.

DIFFSYS is a windows-based system with an easy-to-use menu structure to input:

- Machining process to be used
- Machine geometry (CNC axis)
- Tool geometry (e.g. radius, relief angle, rake angle, wheel diameter etc.)
- Definition of the surface

DIFFSYS supports multiple popular methods used to define surfaces:

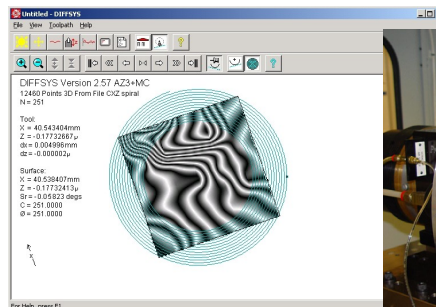
- Menu-based coefficient input for standard optical equations
- Point clouds

DIFFSYS provides tool path correction of repeatable form errors for rotationally symmetric “2D” surfaces and non-rotationally symmetric “3D” surfaces. Measurement data can be created using on machine metrology or off machine metrology instruments.

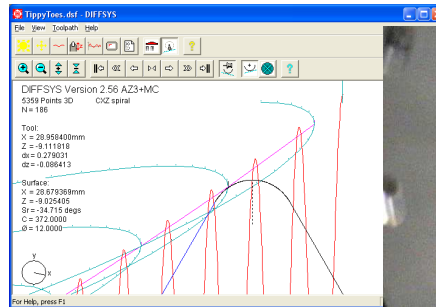
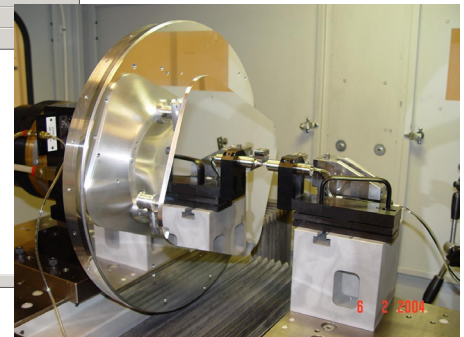
DIFFSYS® has become the industry standard by providing excellent technical support to users of all commercially available diamond turning machines. As part of the AMETEK Precitech product offering, this tradition of customer support and technical excellence will be continued and expanded.

Well over 80% of users of ultra precision machine tools use DIFFSYS for CAM programming of optics. If you are not familiar it, simply ask other diamond turning users. It is more than likely they use it and can tell you about DIFFSYS's ease-of-use, reliability, precision of generated tool paths, and excellent technical support.

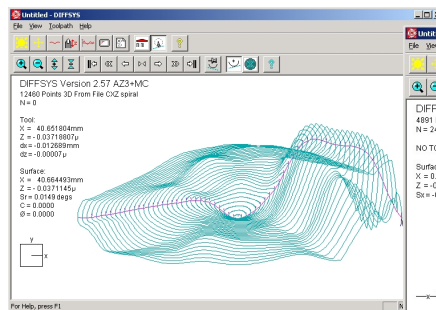
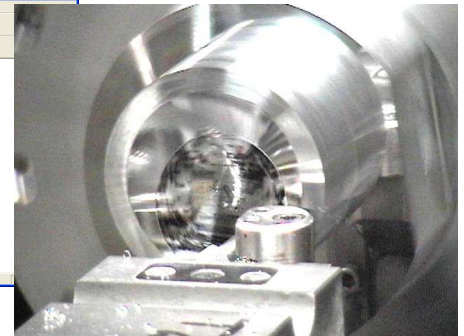
- ▶ **Industry standard, over 80% of the global diamond turning community use DIFFSYS**
- ▶ **Flexibility, multiple methods to define surfaces, generates tool paths for all common optical surfaces, supports all common machining methods, produces tool paths readable by all machine tools supporting the G-code standard for CNC programming**
- ▶ **Easy to use, windows-based system, menu-based, intuitive user interface, extensive context sensitive help for new adopters**
- ▶ **Superior technical support is available from Precitech when needed for new processes**



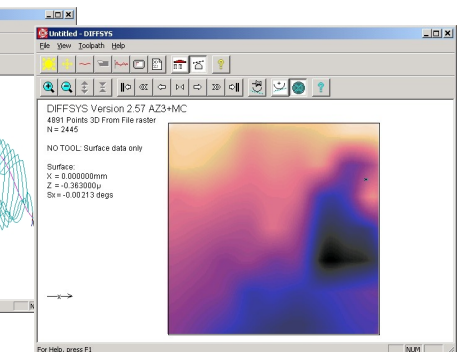
Large FREEFORM mirror machined with DIFFSYS. Photo shows 3D measurement with on-board probe. (courtesy TNO-TPD, Netherlands)



Off-Axis asphere, machined to sub-micron accuracy. (courtesy Thales Optics, UK)



2D & 3D measurement corrections, Imported from on-board measurement probe, or from e.g. Taylor Hobson Taly surf. Contact us about Interferometer corrections.



DIFFSYS® diffractive & 3D software for CNC machines

Design types:

- Aspheres, Multi-Segments, Sinewaves
- Zones option: Diffractives, Fresnels, Hybrids
- 3D option: Off-axis aspheres, Torics, Cylinders, Polynomial Freeforms, Zernikes, Micro-lens arrays
- MC2/MC3 options: Import 2D/3D surface or measurement data

Equations:

- Standard aspheric equation, including odd terms. Sag tables. 'Resize' useful for molds.
- 3D: Polynomial Freeform uses standard $X^n Y^m$ equation

Zones option:

Diffractives & Fresnels: Many features for all popular designs. Step direction changes are allowed – as shown in example opposite. Special tool corrections move the tool precisely around each step.

Tool types & modes:

Diamonds, flycutter, ballcutter, wheel, or no-tool; XZ or XZB B-Axis mode; 3D: CXZ slow-tool-servo or XYZ flycutter – either raster or spiral. Slow-tool-servo “Steady-X” option eliminates X-axis oscillation.

Tool corrections:

Diamonds: cylindrical, elliptical, flattened, rake flycutter: tool & swing radius

Lead-in/out:

Various useful options, especially for 3D

Units:

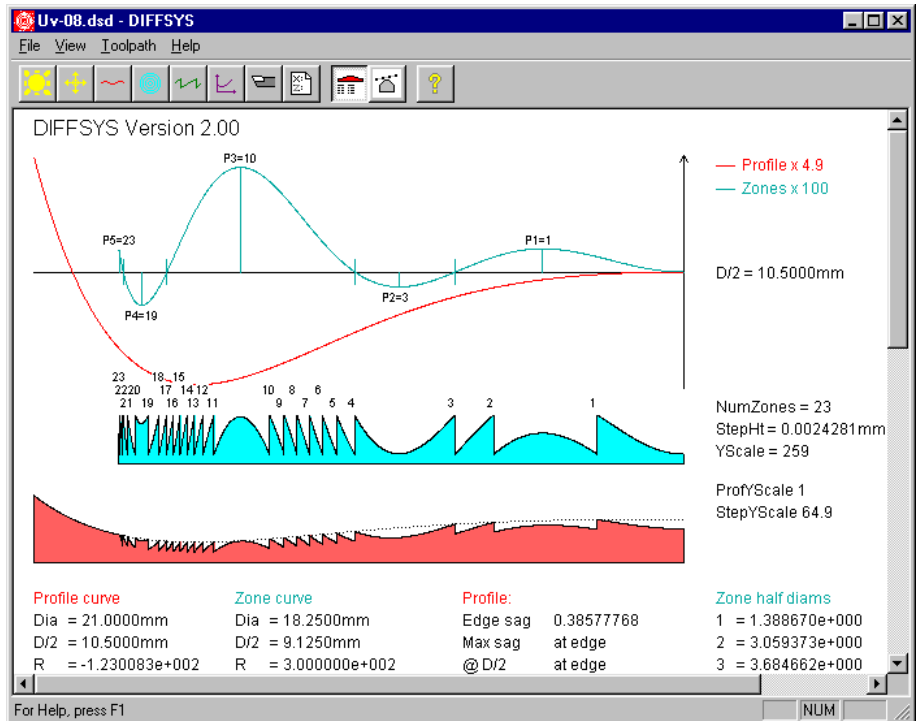
mm or inch, switchable live.

Jobfiles:

(part programs) Prolog & Epilog files; Many format options for any machine; Compatible with Optoform ‘JFL,’ Precitech UltraComp

PC requirements:

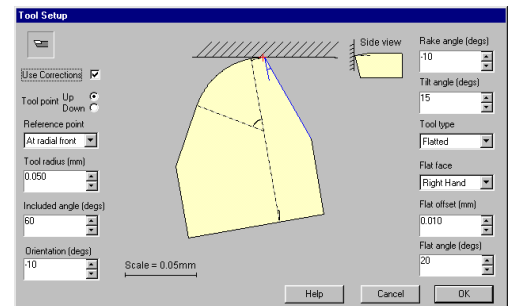
- WINDOWS 2000/XP/Vista/7/8
- 30MB disk space
- Runtime memory: less than 80MB for most applications



Above is a complex example of a hybrid design for correcting distortion.

DIFFSYS Option MC2 2D Measurement Corrections

Import 2D measurements to make an error correction, or import any 2D ‘XZ’ data to generate a surface. Compatible with Taylor Hobson Talysurf, Zeiss, Mitutoyo, Leitz, FRT & Panasonic UA3P.



Above: Tool geometry screen.
Below: Toolpath animation screen.

DIFFSYS Option MC3 3D Measurements & CAD Data

As above, plus with 3D capability. 3D data must be XYZ or CXZ co-ordinates – contact us for details. Linear or curved interpolation. Various extrapolation options. An excellent smooth surface can be obtained with just a few hundred points.

