

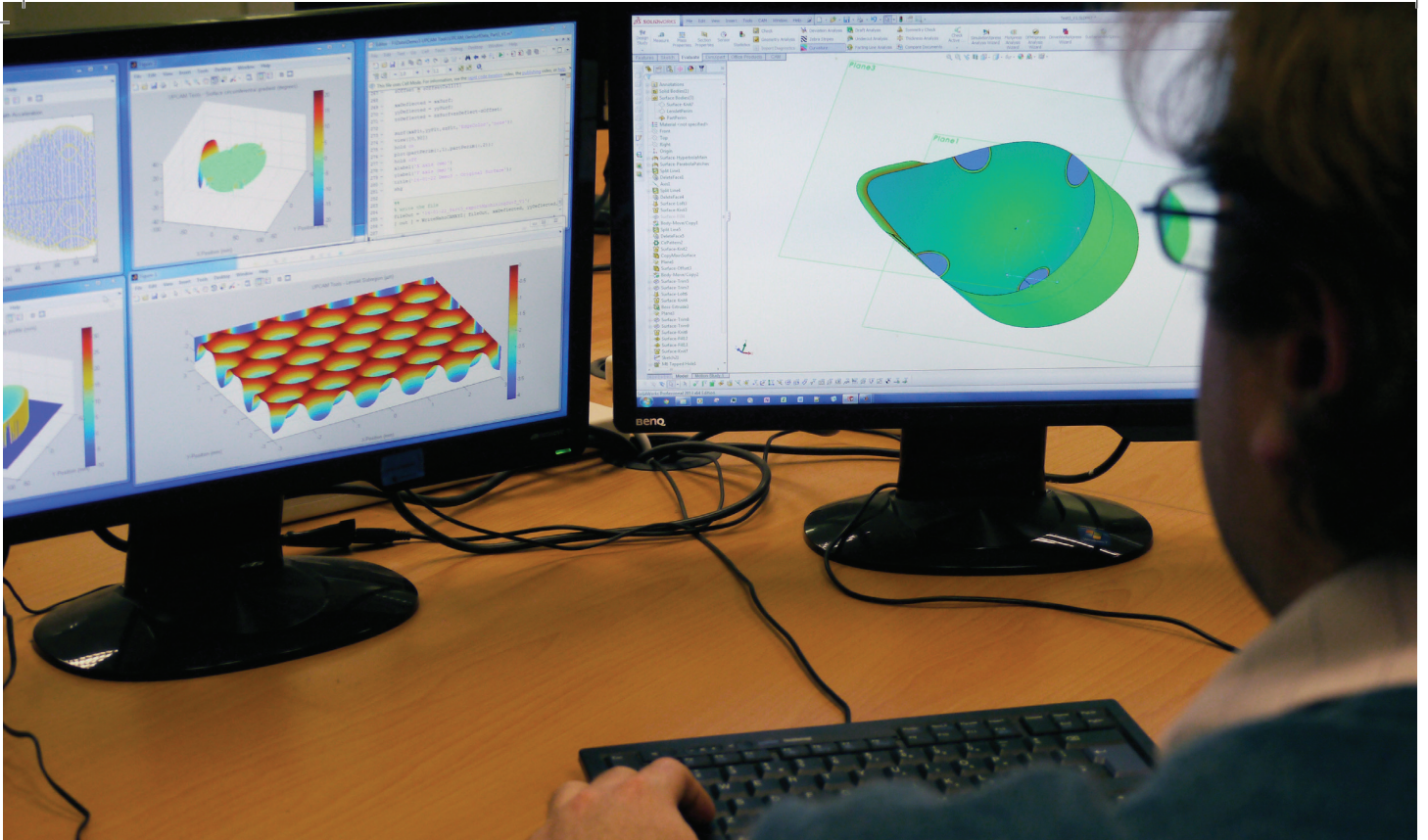


Cutting Edge.

Durham Precision Optics is a world-leading ultra-precise optics manufacturer, offering a wide range of services for optical parts design, manufacturing and testing.

Thanks to our research background, we have developed unique capabilities in optical design, integration and machining that enable previously impossible projects.

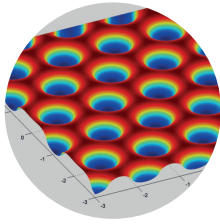
We are constantly pushing past the edge of what is possible. Contact us today to see if we can help your project shine.



Complex parts. Simple process.

Creating ultra-precise optical parts shouldn't have to be a complex process. Durham Precision Optics has pioneered a new approach to creating multi-element optical parts from a single CAD model.

Using proprietary in-house software and machining techniques, parts that were previously impossible can now be created in a single design and machining process. Along with re-enabling previously discounted design paths, this translates into direct savings for your project, and reduced time and uncertainty.

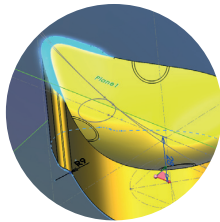


Design

Modern freeform optics can have a range of optical elements on a single physical surface: aspheric surfaces, lenslet arrays and complex boundaries between them. In the past, these were designed separately and not placed in a single CAD model. Our processes mean this is no longer the case - all your optical design can be placed in CAD, with no complex pre- or post-processing required. We can take your CAD model and machine directly from it, and unlike standard CAM packages, we maintain sub-nanometre precision throughout this process.

As well as customer-designed surfaces and microstructures, we can assist with the generation of your optical design by creating complex NURBS surfaces and integrating them into CAD models.

For peace of mind, we can validate CAD models against optical design intents to ensure no accuracy is lost in the process.



Integrate

Optical parts often have peripheral mechanical integration features that need to be precisely registered to the optical surface.

We have developed a suite of proprietary software tools for manipulation of complex multi-element optical surfaces with mechanical features. This allows us to design machining paths that can create your part in a single operation, saving your project time and money.

We can integrate seamless blends and transitions between elements, and ensure extreme accuracy of features as they are created in a single operation, with no re-registration and extra setups involved.



Create

Instead of multiple processes, with fiddly registration of parts and time-consuming setups, our single process can create multi-element optical parts in a single machine operation with a single tool.

Our unique ability to directly program non-conventional toolpaths allows us to handle complex multi-element parts (and unusual freeform designs) that were previously not possible with standard turning techniques.

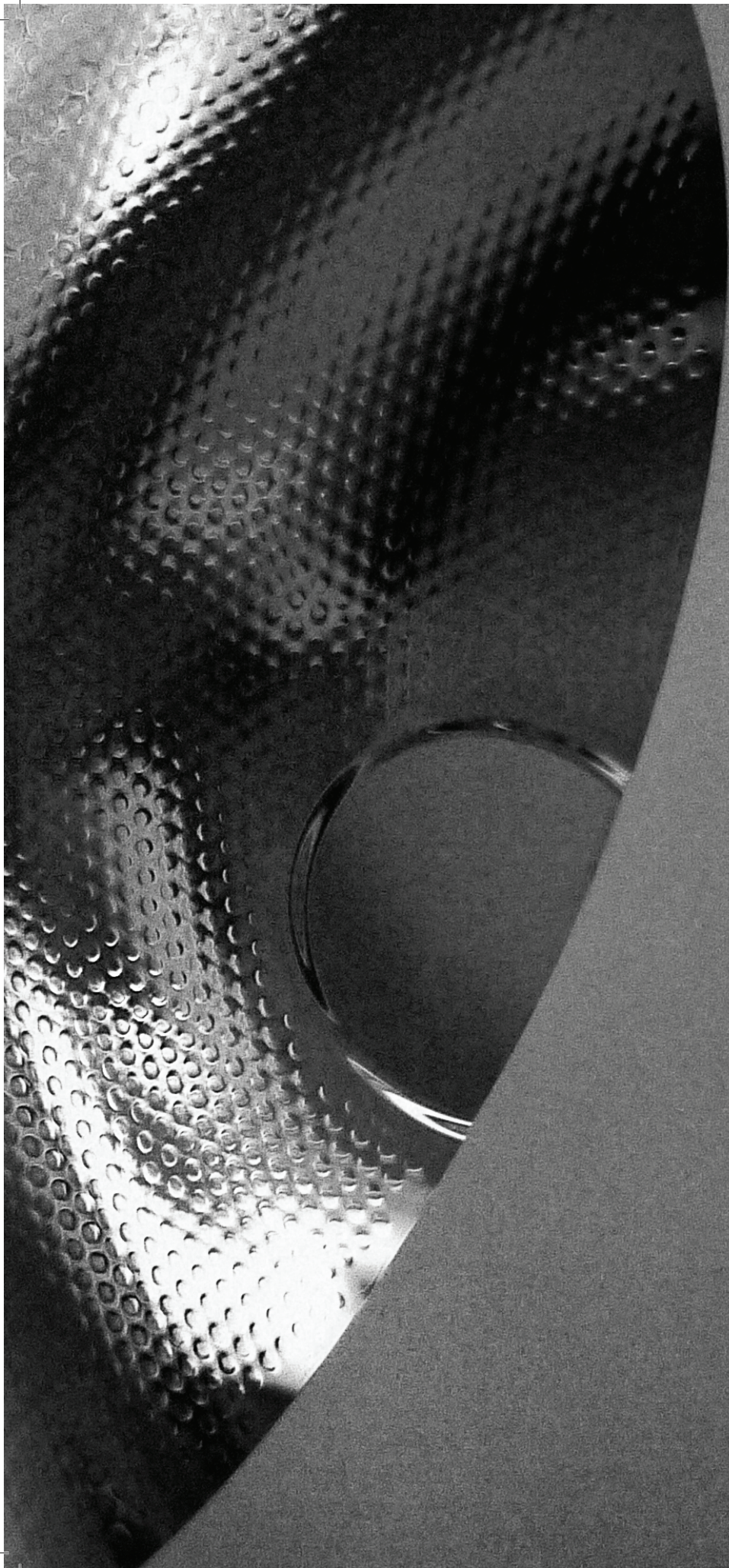
As an example, our newly developed MoSpi™ diamond-turning process for freeform optics enables a whole new class of geometries to be machined that were previously not possible by conventional techniques.

If your project requirements are more unusual we are able to create custom software and machining solutions to enable this.



Ultra Precision.

Durham Precision Optics supports customers in a wide variety of sectors that demand the ultimate in precision and excellence. From photonics and astronomy research to automotive reflectors, micro-replication and solar arrays, we have the expertise to make your project a success.

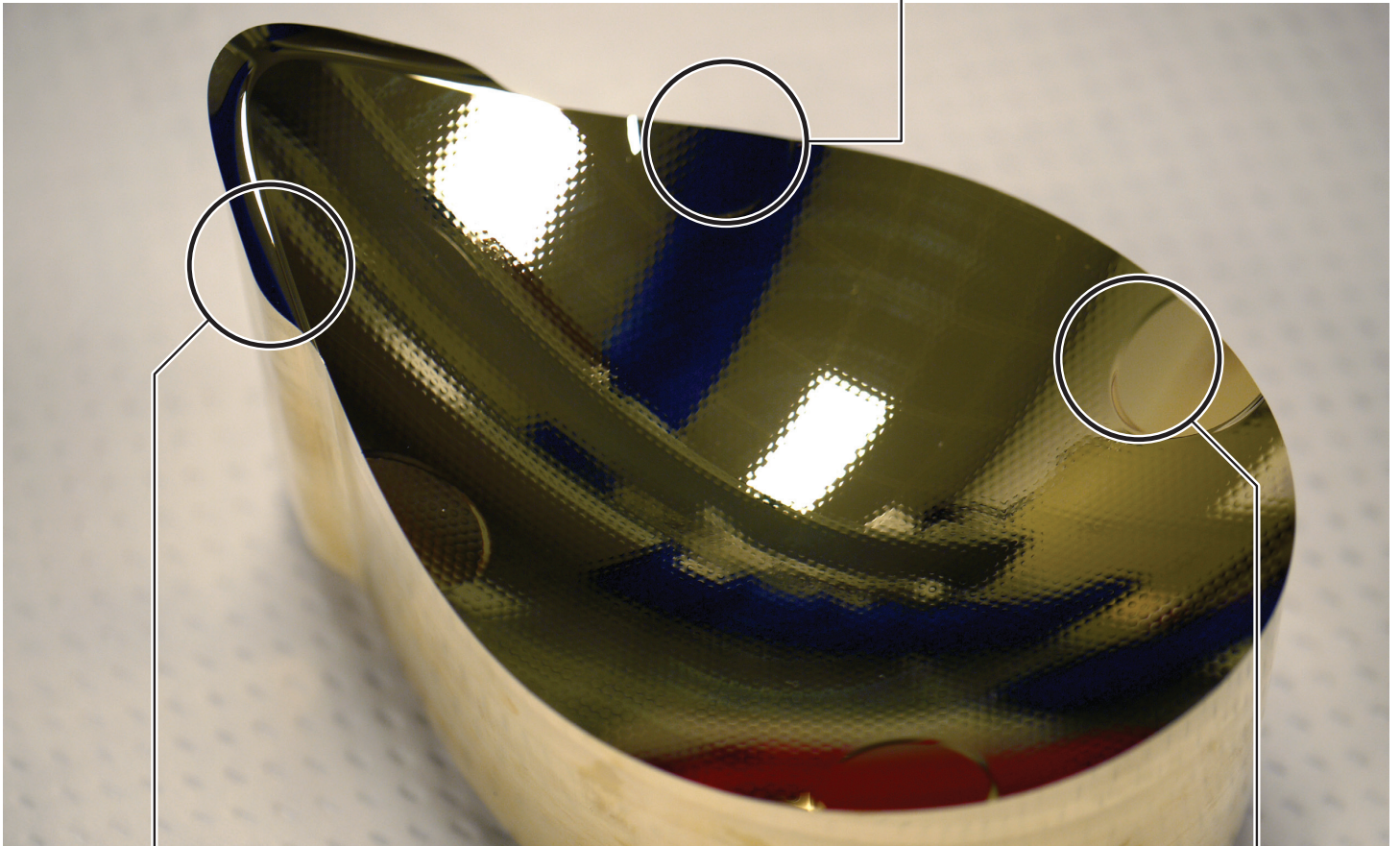


Examples

This complex part, demonstrating our unique capabilities, was machined with a single tool in a single operation.

Lenslet arrays

We can place complex lenslet arrays at arbitrary locations across parts. The underlying surface can be freeform and projection direction can be arbitrarily defined.



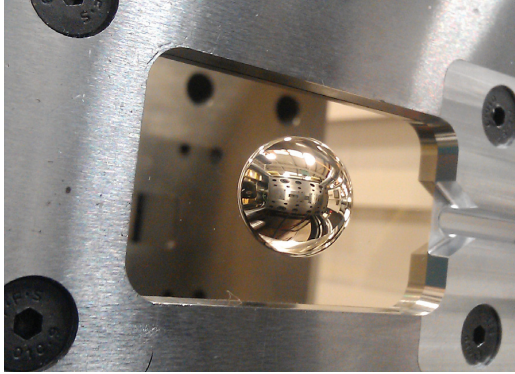
Non-optical features

This part has a range of non-optical features integrated, requiring no additional steps in the manufacturing process.

Multiple optical surfaces

There are multiple off-axis parabolas and a hyperboloid surface on the part, machined in a single operation.

These example parts demonstrate a range of specific capabilities of Durham Precision Optics.

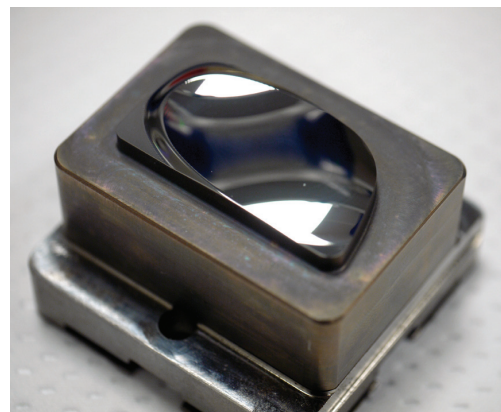


MoSpi™ Machining

This part demonstrates the unique capabilities of our proprietary MoSpi™ machining process. It is a tilted non-axisymmetric convex ellipsoid, with steep walls. This optical form is not possible with conventional diamond turning techniques.

Stainless Steel

We can offer direct diamond machining of freeform and axisymmetric optics in stainless steel (Mirrax), allowing you to create production-ready optics in a single machining step. This new technique has been made possible by continuous investment in state-of-the-art equipment.



Large aspheric optics

Fast-tool servo

Micro-milling

Raster flycutting

Fabrication Methods

We offer a full complement of diamond machining techniques in 2-5 axes. These include diamond turning (both slow-slide servo and fast-tool servo techniques), milling and flycutting (including raster flycutting of complex freeform shapes).



Capabilities

Durham Precision Optics has capabilities and expertise throughout the optical production process, from design through to post-manufacture metrology.

Contact us today to see if we can help you, whatever stage of the process you are at.



Design

The integration of design capabilities and manufacturing sets Durham Precision Optics apart. As well as our unique CAD integration and validation, we can assist earlier in the design process with optical design and analysis, and mechanical integration of your parts into assemblies.

- CAD Model Integration
- Optical Design and Analysis
- Opto-Mechanical Design
- Optical Systems Engineering
- CAD Model Validation
- Freeform Optics Excellence

Manufacture

Our manufacturing capabilities are second-to-none. With the latest equipment and techniques available, along with our proprietary machining advances, we can affordably make ultra-precise optical parts that others cannot.

- Direct Diamond Machining in Stainless Steel (Mirrax)
- Custom Machining Toolpath Design
- Precision Freeform Machining
- Diamond Turning
- Micro-structure Machining
- Precision Micro-milling
- Diamond Flycutting and Raster Flycutting

Metrology

We can offer a wide range of metrology and testing capabilities including optical interferometry, non-contact 3D profilometry, surface roughness characterisation and precision CMM measurements.

The metrology service can be offered as part of the total system design service or as a standalone metrology service for the precision measurement of customer produced parts.

- Interferometry (up to 100mm aperture)
- White Light Interferometry
- Non Contact (CLA) Profilometry
- Contact (stylus) Profilometry
- CMM Measurement