

Polishing on Teflon: Cube corner components being machine polished.

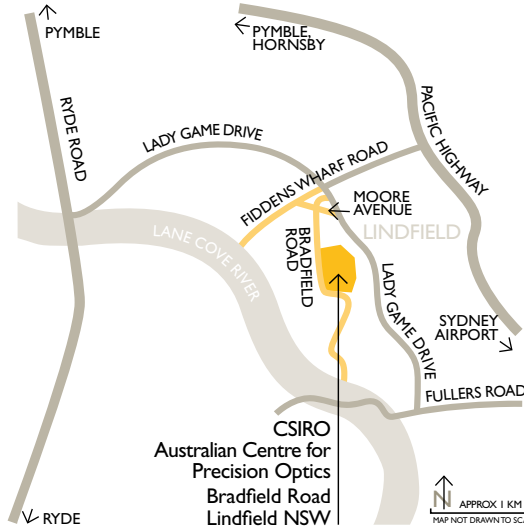


Precision alignment: Positioning the first wedge of a cube corner.

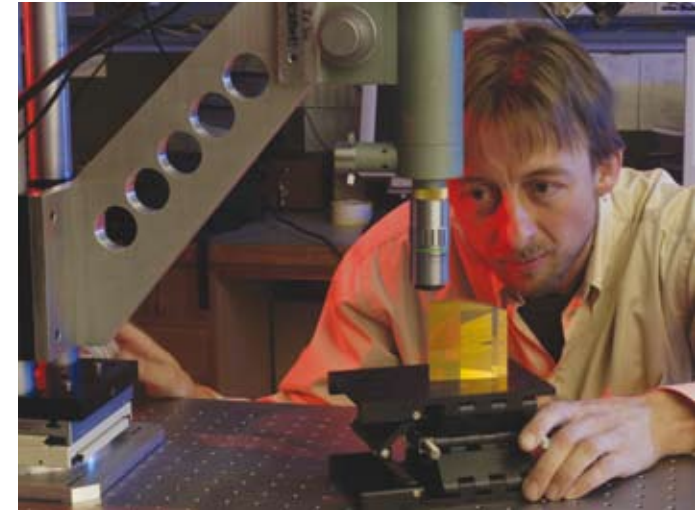


Precision sphere: For new mass standard and redetermination of Avogadro's constant.

Visit www.acpo.csiro.au
or our facility in the Sydney suburb of Lindfield.



Australian Centre for Precision Optics



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ACPO is a fully owned centre of CSIRO, Australia's most trusted and respected science and technology research organisation.



In the field of precision optics,
we deliver unique solutions to our clients.

Who are we?

Experts in precision optics.

The Australian Centre for Precision Optics (ACPO) is in the business of researching, designing and developing precision optical systems for the world's most demanding clients.

Our world-class capabilities are built on more than fifty years research at Australia's most trusted and respected science and technology research organisation, CSIRO, and the National Measurement Institute (formerly NML).

Our systems and components are used in:

- astronomy and space
- semiconductors and photolithography
- fibre optics and photonics
- scientific research and calibration.

COVER PHOTO

Quality control:

Assessing the knife-edge on a cube corner wedge.

Our tight-knit team of optical engineers, scientists and technicians leads the fields of precision optical engineering, coating, and metrology.

We are experts in producing:

- **solid etalons** wide aperture Fabry-Perot narrow-band filters, fixed or tunable
- **flats** < 1m diameter
- **spheres** < 40nm asphericity
- **cube corners** precision retroreflectors
- **miniature optics** for photonics and telecommunications.

What sets us apart?

Our impressive capabilities.

We frequently push the limits of what is physically possible in order to achieve our clients' aims. The fact that they come to us is testament to our international reputation in research and of our proprietary methodologies and techniques.

Our marketable intellectual property is embedded in the proprietary methodologies and the manner in which scientific research, engineering and fabrication is interlocked to present a valuable solution for our clients.

Our skills include:

- **super-polishing** of difficult to handle materials
- **coatings** of many thin layers with better than 0.2% non-uniformity
- **assembly** of complex components with nanometric precision
- **metrology** of roughness, roundness, flatness and optical properties.

We intend attracting significant strategic partners to do better business globally.

Our clients

Europe

IMAX/Sunrise, Fisba Optik, Germany's national metrology institute (PTB), BAE Systems, Max Planck Institut.

Japan

Canon Inc, Hida Observatory, National Institute of Advanced Industrial Science and Technology (AIST), National Metrology Institute (NMIJ), Nikon, University of Tokyo.

USA

NASA's Jet Propulsion Laboratory, CalTech's Laser Interferometer Gravity Wave Observatory (LIGO), University of Washington.

Our capabilities in precision optical engineering, coating, and metrology are internationally renowned.

Optical coatings

ACPO pioneered the technique of Ion Assisted Deposition (IAD). Development of in-situ multi-wavelength ellipsometric monitoring of optical coating deposition enabling very thin (not just $\lambda/4$ or $\lambda/2$ layers) optical layers to be deposited.

Our coatings can be:

- dielectric or metallic
- selectively deposited
- variable thicknesses, > 1 nm
- multi-layered, > 60 layers
- < 0.2% non-uniformity.

Metrology

Our skills in precision metrology include:

- surface form with absolute uncertainty of a few nanometres over apertures of 400mm
- microroughness to sub-Angstrom resolution
- precision interferometry and scatter measurements of coated and uncoated substrates
- ellipsometric measurement at multiple wavelengths
- transmittance or reflectance from ultraviolet to infrared
- absolute measurement of sphericity to 5nm uncertainty.



Ultra-flat and super smooth: Examining an End Test Mass for gravity waves.

Optical systems

We design and construct complete instruments for scientific and industrial applications. For example, tunable narrow band filters for solar astronomy, inter-ferometers for measurement of precision optics and ellipsometers for measurement of thin films.

Precision optical engineering

ACPO's skilled opticians have extensive experience machining, grinding, polishing and super-polishing hard-to-handle materials such as calcium fluoride, sapphire and lithium niobate. Our embedded polishing processes produce planar or spherical surfaces to ultra-high precision surface form and finish even over large diameters.

We have extensive expertise assembling intricate and complex components using techniques including optical contacting and nano-positioning. We achieve nanometre precision and angular tolerances of 0.1 arc second.

Specialised coatings: Aligning the ellipsometric laser monitoring system for optical coating.

