



AUSTRALIAN CENTRE FOR PRECISION OPTICS

www.acpo.csiro.au

Technical Capability Statement

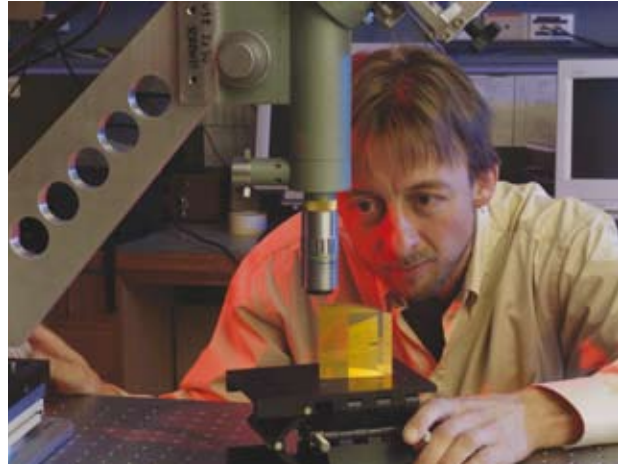
Brief history

CSIRO's Australian Centre for Precision Optics ("ACPO") is a multidisciplinary team of world class optical engineers, scientists and technicians.

ACPO is in the business of research, design and development to achieve high quality outcomes in optical fabrication, metrology, thin film coatings and instrumentation in the field of precision optics.

This capability originated from the measurement skills and research and development requirements of the National Measurement Laboratory.

ACPO has supplied custom optics components, assemblies and instrumentation to its commercial clients in the USA, Europe and Japan since 1990. ACPO now works with a range of clients to enable a deeper involvement with the science, the design and integration of leading edge optical systems for major international scientific and technological ventures.



The Centre

The Centre comprises a cohesive team, underpinned by the pioneering work of its scientists, several of whom are PhD's, with experience gained through industrial and research agency activities. Our marketable intellectual property is embedded in the proprietary methodologies and the manner in which scientific research, engineering and fabrication is networked to present a valuable solution and platform for our clients.

The Centre is located at the CSIRO laboratories, co-located with the National Measurement Institute, Bradfield Road, Lindfield, Sydney, NSW. The Centre occupies 1215 square metres of laboratory and office space. The facility includes an optical fabrication workshop, coating facilities, metrology laboratories and equipment and has access to a mechanical workshop and library.

ACPO's capabilities were developed through pioneering the Ion Assisted Deposition (IAD) process of optical thin films, developing proprietary polishing processes and state-of-the-art figure metrology techniques using phase shifting interferometry. ACPO is known for its research, design and development skills which enabled it to take on challenges in theoretical and experimental investigation. This led to production and testing of prototypes and the development of innovative solutions for a multitude of frontier projects.

ACPO's clients are:

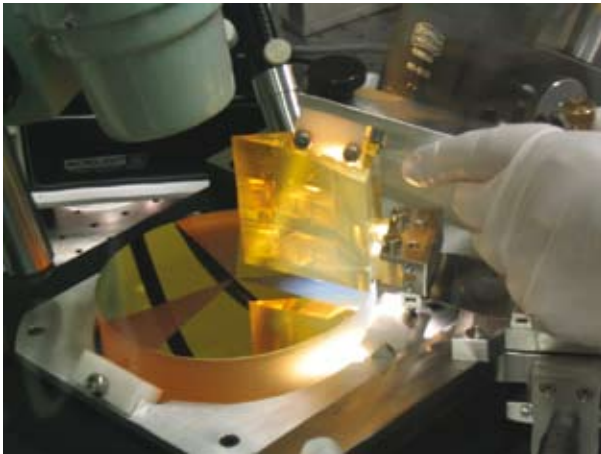
USA: JPL (Space Interferometry Mission), Caltech and MIT (LIGO project), University of Washington, Crystal Systems, Johns Hopkins University;

JAPAN: Canon, Nikon, AIST, NMIJ, Kyoto University, University of Tokyo;

EUROPE: Fisba Optik, Oxford Danfysik, INFN, PTB, Max Planck Institut, BAES.

Optical Coatings

- Design and construction of High-Vacuum Deposition systems such as used for Ion Assisted Deposition (IAD).
- Development of in-situ multi-wavelength ellipsometric monitoring of optical coatings enabling layers of almost any thickness (not just $\lambda/4$ or $\lambda/2$ layers) to be deposited with very high accuracy.
- Deposition of oxides and metals for spectral performance at wavelengths from the UV to the NIR.
- Deposition of a large number of dielectric layers to achieve demanding spectral response e.g. colour balanced laser notch filters with an optical density of >4 and filters for DWDM.
- Customised Ion Beam Sputtering facility that enables the deposition of very low loss and super-smooth coatings for applications such as Laser Gyro Mirrors and Gravitational Wave Detectors.
- Comprehensive design capability for optical coatings using a variety of materials and deposition systems.
- Characterisation of optical coatings to determine spectral transmittance and reflectance response, stress and distortion due to coatings, microroughness, scattering, absorption and material properties.



Contact:

Dr Bob Oreb
Chief Operating Officer
Phone: + 61 2 9413 7303
Fax: +61 2 9413 7200

Ms Katie Green
Manager, Materials and
Fabrication
Phone: + 61 2 9413 7522
Fax: +61 2 9413 7200

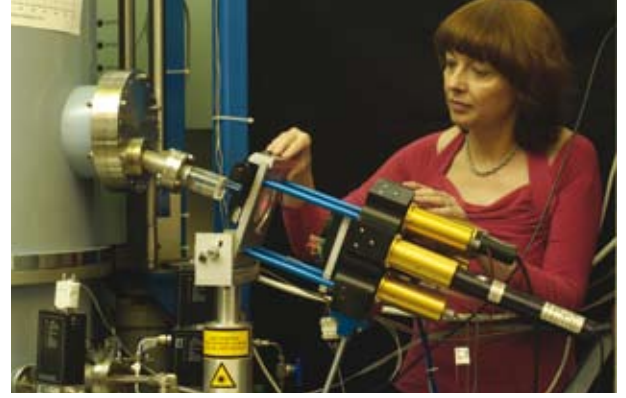
Dr Roger Netterfield
Chief Scientist
Phone: +61 2 9413 7120
Fax: +61 2 9413 7200

acpo@csiro.au
www.acpo.csiro.au

Our laboratories are at
the CSIRO campus in
Lindfield, SYDNEY, NSW.

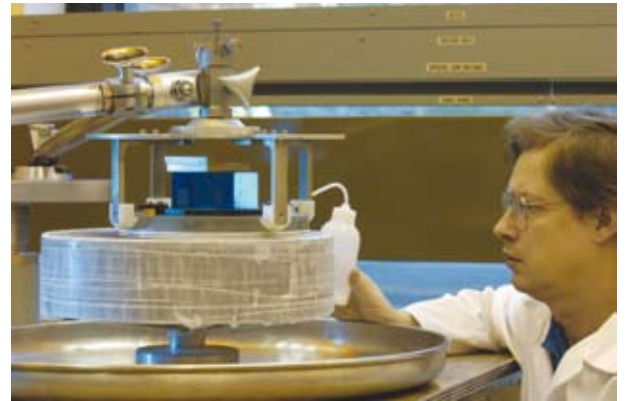


ACPO is a fully owned centre of CSIRO,
Australia's most trusted and respected science
and technology research organisation.



Optical Systems

- Design and construction of complete instruments for scientific and industrial application e.g. tunable narrow band filters for solar astronomy, interferometers for measurement of precision optics, ellipsometers for measurement of thin films.
- Modelling and characterisation of instrument performance and development of algorithms for precision metrology.
- Development of an optically based non-destructive testing facility using holographic and electronic speckle principles.



Precision Engineering

- Proprietary polishing processes involving Teflon laps up to 1.2m in diameter.
- Fabrication of planar and spherical surfaces in a variety of materials to ultra-high precision surface-form ($\lambda/100$ PV) and finish ($\leq 10/5$, 1 Å rms).
- Extensive experience in working with glassy materials, electro-optic and non linear materials, crystals and metals (e.g. Zerodur, ULE, silica, LiNbO₃, YAG, CaF₂, sapphire, Cu and Ti).
- Micro- and nano-assembly of precision components such as retro-reflectors, beam-splitters, interferometers and a variety of instruments.

