The Commonwealth Scientific and Industrial Research Organization (CSIRO) is Australia's main research institution, comprising 35 Divisions and research units, grouped into 6 Institutes with over 2000 professional scientists and engineers. It carries out scientific research in support of most major areas of Australian economic and community interests, principally in the physical and biological sciences and technologies. Legally, CSIRO is an independent statutory authority created by the Commonwealth of Australia. Around 70% of its funding comes directly from the Government; the balance is from contractual arrangements with public and private sources.

The Division of Applied Physics performs a dual function. It is Australia's national standards laboratory (the equivalent of NIST and the USA), but also supports applied physics projects in areas as diverse as plasma processing, thin film research, high temperature superconductivity and conveyor belt monitoring using NDT methods. Much of this work is done in close collaboration with industry, often under contract. Like all of CSIRO, the Division is committed to maximise commercial opportunities for its research and has over the last year negotiated an increasing number of contracts for competitive or pre-competitive research; these include licence agreements, joint venture, fee-for-service and sale of goods such as optical components.

The Royal Australian Mint is the Australian Government's manufacturing facility for circulating coin, collector coin and official medals and regularly fills export orders particularly for the Pacific Basin region. A significant R & D Budget is maintained by the Mint in pursuing research into such fields such as optical profiling, computer engraving, thin films and tool and die steel for minting purposes.

O S P

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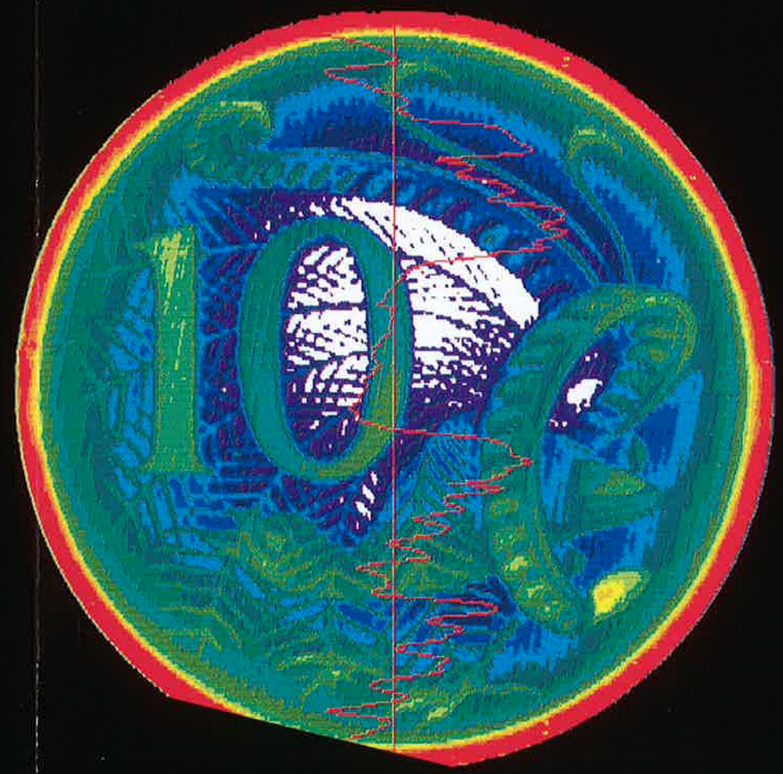
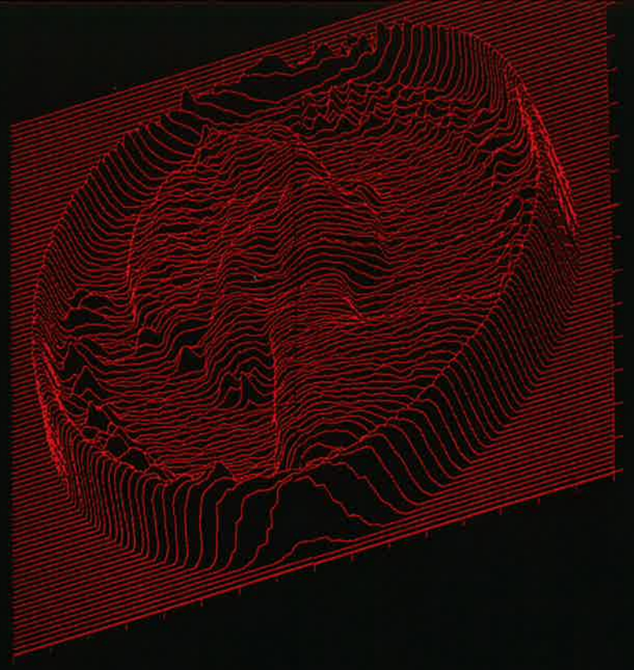
O S P



OPTICAL SURFACE PROFILER (OSP)

CSIRO DIVISION OF APPLIED PHYSICS IN COLLABORATION WITH

ROYAL AUSTRALIAN MINT



INTRODUCTION: CSIRO Australia, in collaboration with the Royal Australian Mint, has developed an optical profiling instrument specifically for measuring plaster models, dies and hobs used in the coin manufacturing process. The OSP replaces the traditional stylus instruments used for chord profile measurements. It also has significant advantages over such instrumentation since the measurement is non contact, allowing plaster models to be profiled; it measures the profile over a 2 dimensional grid of points rather than along a single line, and it is considerably faster - set up time is minutes and the data is recorded, analysed and stored on a magnetic disk in seconds. The OSP is highly recommended as a metrology instrument for total quality control during all stages of die manufacture. **TECHNICAL INFORMATION**: The optical measurement principle used by the OSP is based on the well-known moire effect: a striped pattern of light is projected onto the piece to be profiled. The illuminated piece is viewed at an angle with respect to the projection system; changes in the shape of the illumination pattern due to the surface profile of the object are observed by a OCD camera, stored in a computer and analysed (in less than a minute) to recover a map of the surface profile. **APPLICATIONS**: The OSP has been designed to provide all the dimensional data required by the metrology laboratory in a Mint. The surface profile data can be analysed to provide: ➤ height measurements relative to a reference surface along any chord ➤ volume of displaced material ➤ effective convexity of the die ➤ comparisons between measured and stored profiles to yield information on wear and the accuracy of transfer of relief profiles between plaster models, dies and hobs.

SPECIFICATIONS: ➤Measurements made on a 500 by 500 point array covering the surface ➤Range of workpiece diameters which can be measured is 10 mm to 300 mm ➤Proprietary non-destructive surface preparation technique enables measurements to be made on highly reflecting or diffusely reflecting surfaces ➤Accuracy of measurement at each point is 1% of the maximum peak-to-valley height ➤Instrument occupies a volume around 1m x 1m x 2m height ➤Instrument is applied with a 386 computer, a colour monitor and licence on the customized software; software will support printers (colour or b/w) which can be supplied with system if necessary. **FURTHER INFORMATION**:

For further information about the optical surface profiler and its applications. Please Contact either:

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