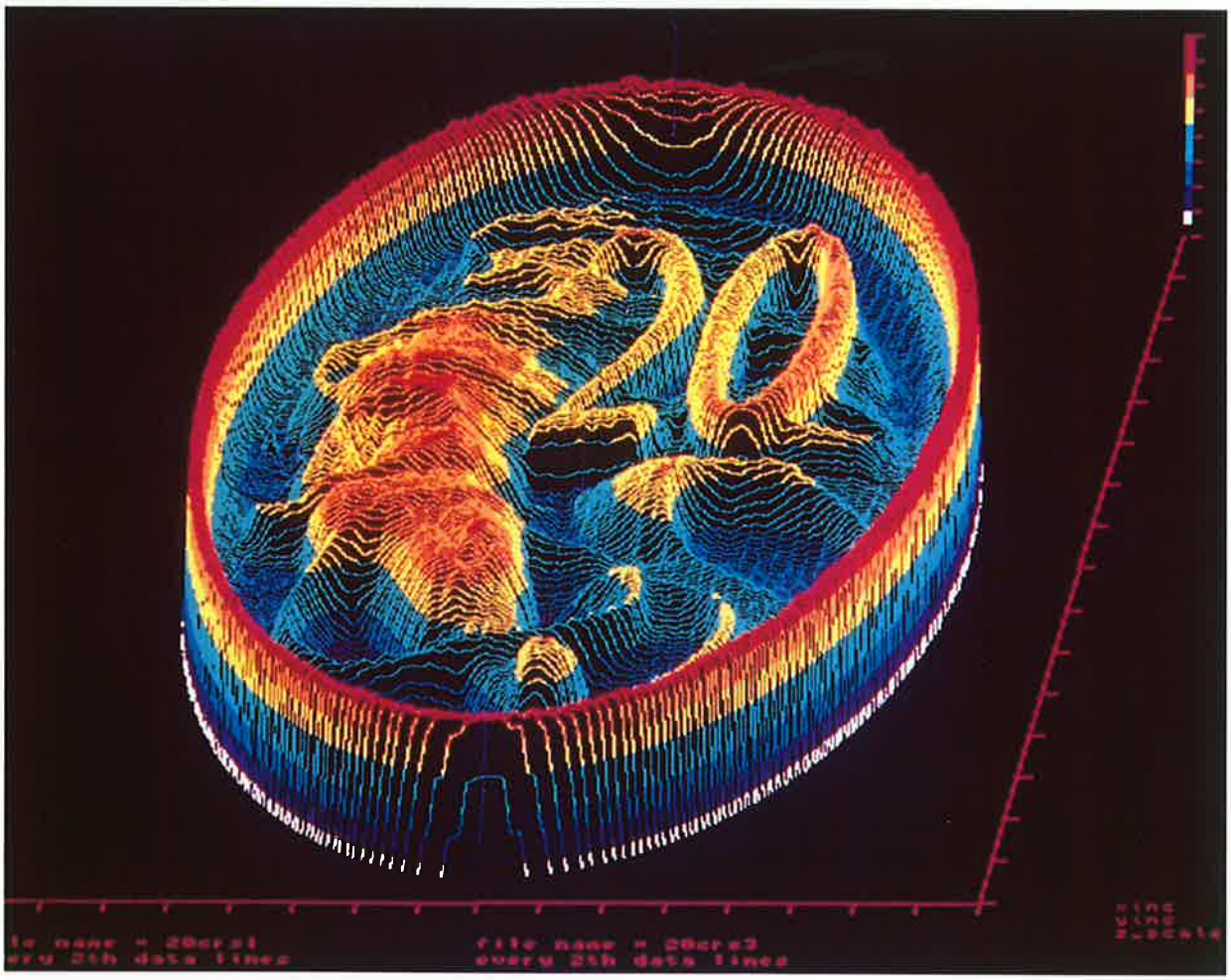
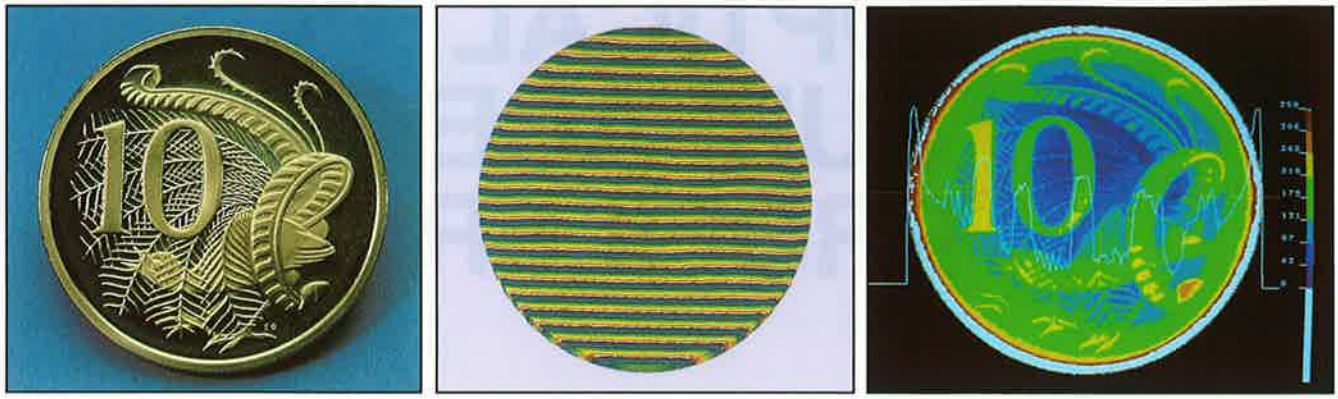
OPTICAL SURFACE PROFILER



OSP 130

superior technology - superior capability

OSP 130



Stages in the process of relief measurement: (a) coin (b) partly processed grating image of coin (c) pseudo-colour relief map

OSP 130 measures, without direct contact, the profiles of all the master tooling used in the minting process - casts, reduction punches, master dies and working hobs and dies. Measurements are made simultaneously on a grid of more than 500 by 500 points across the surface of the tool. The measurement system is interfaced to a computer with customised, menu-driven software, enabling analysis of data.

How OSP 130 Works

A white light projector is used to project a periodic grating onto the tool surface to be measured. A solid state camera views the projected grating on the surface and the computer digitises the intensity pattern. The grating inside the projector is then moved under computer control to a number of different positions and the digitised images of the projected grating are stored in the computer. By using our proprietary image analysis procedures an accurate map of the tool's surface is obtained.

Set Up and Operation

Simply enter the nominal diameter and height of the object to be measured and the instrument will automatically move the camera and projector to their correct positions. The instrument is then calibrated by a series of measurements on a reference surface. Finally, the test object is measured. The acquired data is processed in a matter of minutes. Shiny surfaces such as those on metal tooling must be converted to a matt white finish. A surface treatment has been developed which is quick to apply, simple to remove and does not alter or damage the surface relief detail. Some tooling, such as white plaster or silicone casts can be measured without surface preparation.

Software

A high performance 32-bit 386 microprocessor-based PC and MS DOS operating system provides control of the set-up and measurement procedure and data acquisition. The software calculates surface relief and characteristic parameters, provides interactive graphics and generates measurement reports. The software is used in either a batch mode or a user-select menu mode. The batch mode is useful when a measurement and analysis procedure has been predefined. Either mode is simple to use.

Repositioning

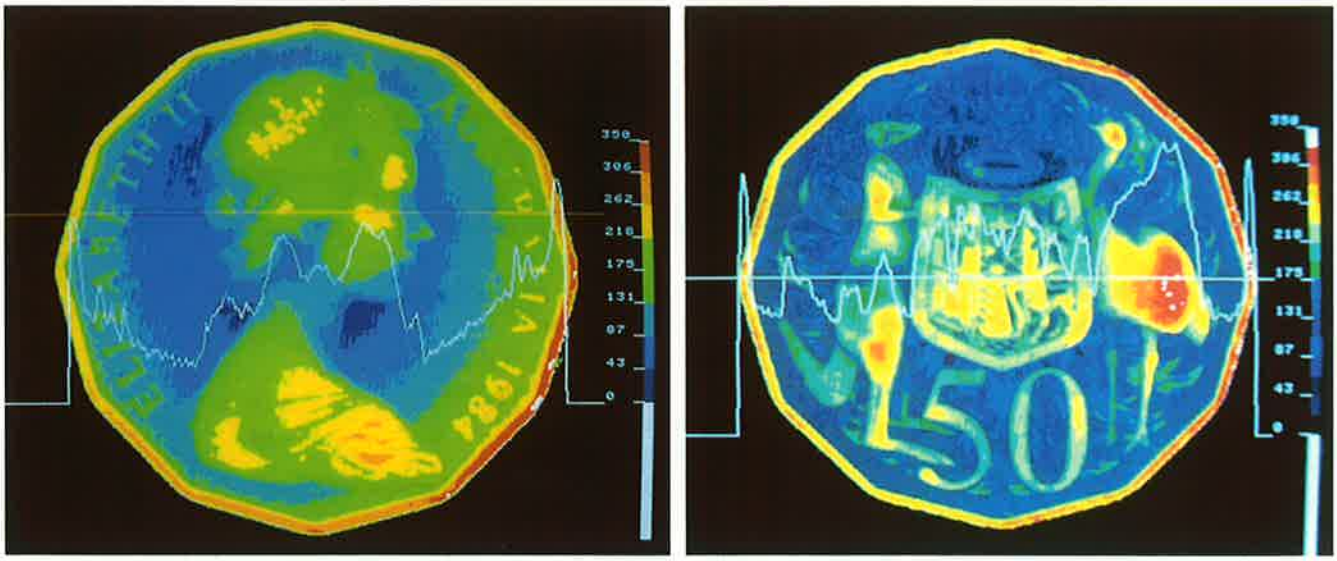
Tools may be accurately repositioned on the OSP 130. This allows direct comparison of relief and other features on any tool during various stages of treatment, fabrication or use.

Artificial Rims

For tools without rims or surface curvature, these effects can be added in software to allow calculation as if they were present. This permits optimisation of tooling parameters prior to the formation of a physical rim or curvature and allows better comparison between various items of a tooling set.

Range of tools used in the minting process. All can be measured by the OSP 130

OSP 130



Pseudo-colour relief maps of Australian 50 cent coin

OSP 130

The OSP 130 has been custom-designed to improve the metrology and quality control capabilities of the Royal Australian Mint. It is offered for sale to other Mints, and can be designed for their applications.

One-Person Operation

A major feature of the OSP 130 is its ease of use. The close proximity of the instrument to the computer means one operator can carry out the entire measurement and data analysis procedure and produce the test reports.

Major Time Saving

The instrument dramatically reduces the time a die or hob spends in the metrology lab, resulting in substantial improvements in productivity. It takes approximately 10 minutes for calibration and alignment and 5 minutes to make the measurement.

Immediate Software Display

The menu-driven software produces and displays the profile data almost immediately. Once the data is stored, the part can be removed from the instrument and returned for general use.

On-line Decisions

The OSP 130 can assist in quality and process control by providing answers to these questions :

*Has wear in the hob or die reached the limits of tolerance?
*Are there significant differences between hobs?
*Is the die profile optimised for the press?
*What are the effects of heat treatment and hardening of tools on the relief detail?
*What are the optimum profile parameters for different materials?

Optical surface profiler hardware

OSP 130

Specifications

Measurement Technique	Phase stepping moire profilometry
Instrument Dimensions	1.1 x 1.7 x 2.5 metres
Projector	White light with physical grating
Detector	760 x 570 pixels TV camera
Data acquisition time	Less than 1 minute
Typical measurement time	Less than 15 minutes
Spatial resolution	Better than 1/500 of object diameter
Object repositioning accuracy	Better than 1/500 of object diameter
Height measurement accuracy	Typically better than 1% of maximum relief
Calculated parameters	3D relief, low and high points, rim diameters, rim to low and high points, background convexity or curvature, volumes of impression, statistics of profiles
Computer	386-based PC, with MS DOS
Hardcopy	Pseudo-colour relief plots, 2D section profiles, calculated parameters, user-defined reports
Archival Storage	Floppy, hard disc or streaming tape
Software	Menu-driven cursor and mouse control. Development mode and batch mode

Objects Measured

Types	-ve or +ve plaster, silicone-rubber and epoxy cast models; reduction punches; master dies; working hobs; working dies; coins; proof coins; medallions
Sizes	10 mm to 300 mm diameter

For further information contact:

Optical Technology Program
CSIRO Division of Applied Physics
PO Box 218, Lindfield NSW 2070 Australia
Telephone: (02) 413 7211
Telex: (AA) 26296
Facsimile: (02) 413 7631
International Facsimile: 612 413 7631

CSIRO AUSTRALIA

in collaboration with

AUSTRALIA

The Controller
Royal Australian Mint
Canberra ACT 2600 Australia
Telephone: (06) 283 3244
Telex: (AA) 61599 [RAMCAN]
Facsimile: (06) 281 5808
International Facsimile: 616 281 5808

ROYAL AUSTRALIAN MINT