

COLORIMETRY

The Colorimetry program at INMS collaborates, partners, and consults with the public and private sector to develop new and improved facilities and standard procedures for the accurate measurement and specification of colour and light. These requirements are important in a wide range of applications and industries including

- computer-aided design and desktop publishing
- quality and process control of manufactured color products
- colour reproduction technologies, such as film, and television
- transport safety—airport runway lights, and signal lights
- colour imaging systems, displays, cameras, scanners.

Colorimetric measurements are traceable to the International System of Units (SI) through INMS-maintained photometric and radiometric scales.

Measurement facilities include state-of-the-art spectroradiometers, ccd-based colorimetric camera, uniform luminance light sources, and daylight observation booth.



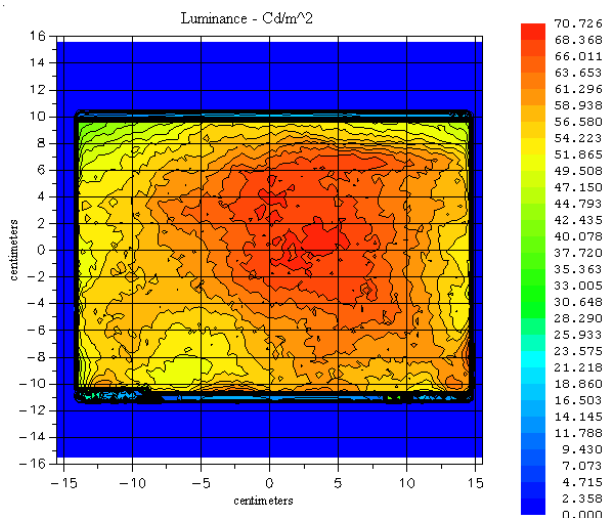
Visual Display Characterization

Calibration of display colorimeters and direct measurement of displays often require the design of custom configurations.

For example, an integrating sphere, 1.6 m in diameter with an internal tungsten halogen lamp, has been constructed to test displays under ambient lighting conditions. The white and black of the display are measured remotely with an imaging spectroradiometer, allowing the calculation of spectral reflectance factors. The contrast ratio can then be predicted for any level and any spectral composition of the ambient illumination.

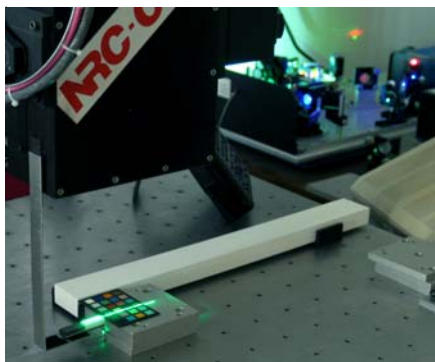
Using a 512 x 512 CCD-based colorimetric camera, the entire display screen can be measured and the contrast ratios mapped.

This new characterization service will assist clients, such as manufacturers of flat panel displays.



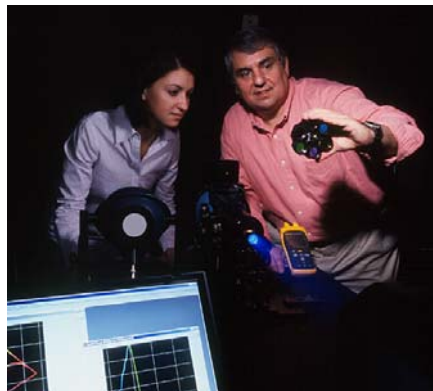
Cooperative R&D provides opportunities to develop novel products and methods, and to customize reference instruments and standards to meet the more demanding needs of today's end-users.

One such project, in partnership with the NRC IIT, led to the improvement of the colorimetric performance of the NRC developed 3D laser scanning technology used for museum applications. This digital scanner is designed to capture the shape and colour of three-dimensional objects such as paintings, sculptures and archeological artifacts, which can then be computer-rendered with high realism.

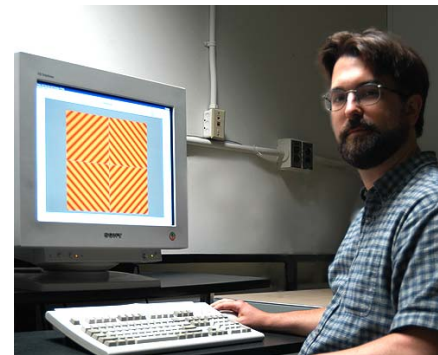


Colour scientists at INMS used spectral estimation techniques to determine the optimal scanning wavelengths, which contributed to the development of the first known 3D multispectral digitizer.

INMS, Canada's national metrology institute (NMI), is working with metrologists at the NMIs of the United Kingdom and the United States to develop a transfer standard for the display industry.



A first prototype called the Gamut Assessment Standard (GAS) is an apparatus with an integrating sphere light source and a set of optical filters designed to simulate photometric and colorimetric conditions common in electronic displays.



Research in colour science is conducted both in fundamental areas such as modelling color appearance and image quality, and in applied areas such as industrial colorimetry.

INMS researchers have designed an experimental interface to measure colour difference discrimination in human observers. Current tests are measuring the influence of texture and pattern on the ability to discriminate colour. Test results will improve the metrics in industrial colorimetry for setting colour tolerances, with potential reduction in production costs in a wide variety of colour reproduction technologies.

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