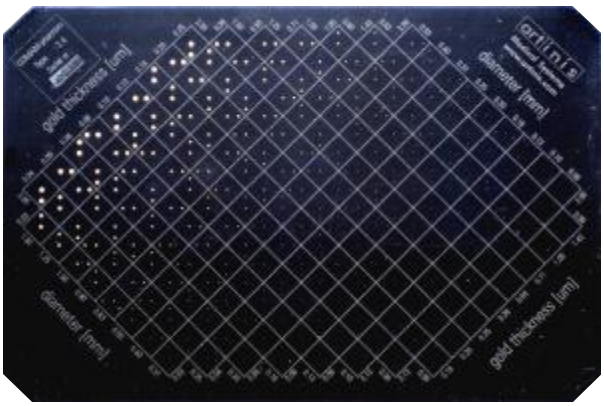
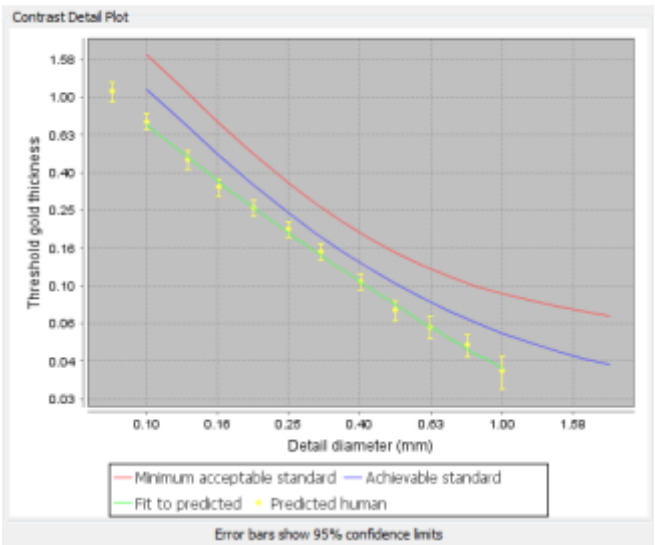
National Coordinating Centre for the
Physics of Mammography
Guildford, UK

CDMAM Analysis software v2.1

Developed at NCCPM to assist in image quality assessment of digital mammography systems

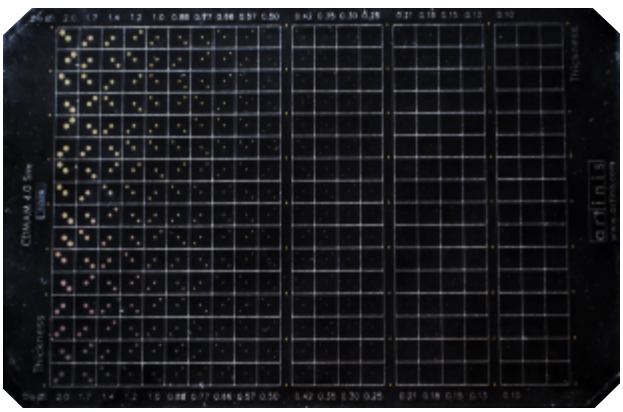
The standard test object for the assessment of digital mammographic image quality is the CDMAM test object, which contains an array of gold discs of varying of diameter and thickness. European standards have been set in terms of the threshold gold thickness for detection by a human observer of specified diameters of gold discs.*

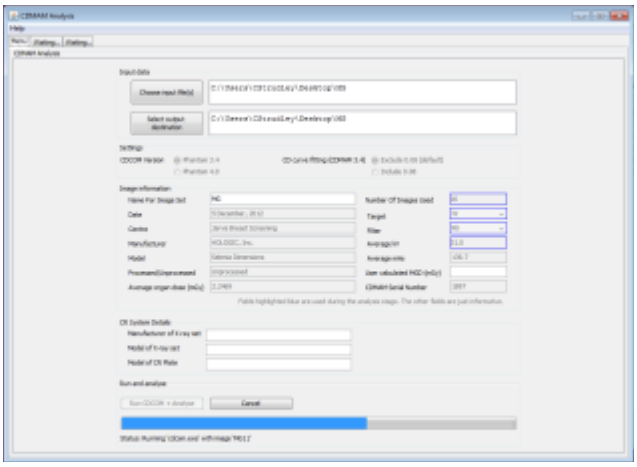




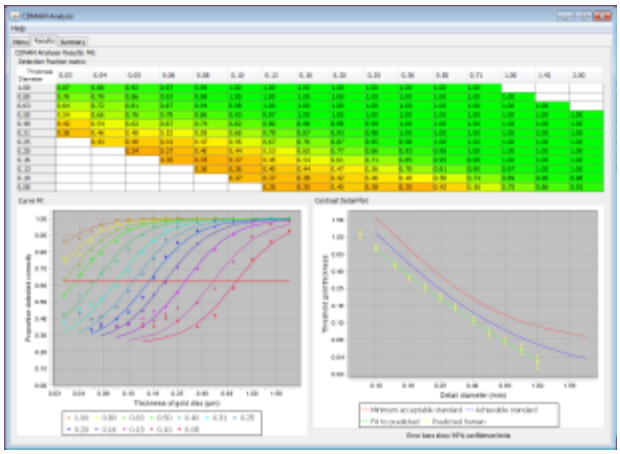
To reduce the time and variation involved in the scoring of CDMAM images by human observers, automated reading is preferred. NCCPM's CDMAM Analysis software runs CDCOM‡ (available from EUREF†) to generate a detection probability for each diameter and thickness of gold disc, and uses psychometric curve fitting to estimate a threshold gold thickness for each diameter. Results are converted to a predicted human result for simple comparison with the European digital mammography image quality standards.

NCCPM's CDMAM Analysis v2.1 is designed for use with the new CDMAM model 4.0 as well as the currently widely used model 3.4.

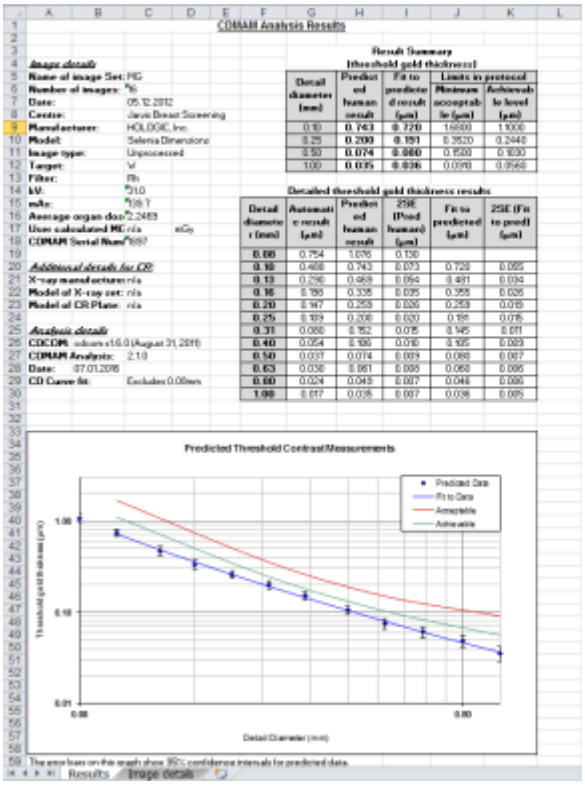




CDMAM Analysis v.2.1 has a user friendly interface. The window allows the user to select the CDMAM images to be assessed and displays a summary of relevant information sourced from the image headers.



When analysis is completed information displayed includes the smoothed detection fraction matrix, the psychometric curves used to generate the threshold gold thicknesses and a plot of the contrast detail curve compared against the European standard. Screenshots of these displays are saved for future reference.



CDMAM Analysis Results

Result Summary
(threshold gold thickness)

Detail diameter (mm)	Predicted human result	Fit to predicted result (µm)	Limits in protocol: Minimum acceptable (µm)	Limits in protocol: Achievable level (µm)
0.10	0.743	± 0.720	1.6800	1.1300
0.25	0.200	± 0.151	0.3520	0.2440
0.50	0.074	± 0.060	0.1500	0.1030
1.00	0.035	± 0.036	0.0910	0.0560

Detailed threshold gold thickness results

Detail diameter (mm)	Automatic result (µm)	Predicted human result	25E (Pred human) (µm)	Fit to predicted (µm)	25E (Fit to pred) (µm)
0.08	0.754	1.076	0.130		
0.10	0.468	0.743	0.073	0.728	0.055
0.13	0.256	0.468	0.064	0.481	0.034
0.16	0.180	0.335	0.035	0.358	0.026
0.20	0.147	0.255	0.026	0.253	0.018
0.25	0.109	0.206	0.020	0.195	0.015
0.31	0.086	0.152	0.015	0.145	0.011
0.40	0.054	0.100	0.010	0.105	0.009
0.50	0.037	0.074	0.009	0.080	0.007
0.63	0.030	0.061	0.008	0.060	0.006
0.80	0.024	0.048	0.007	0.046	0.006
1.00	0.017	0.035	0.007	0.036	0.005

Predicted Threshold Contrast Measurements

To facilitate the transfer of results to QC reports, an Excel spreadsheet is generated which lists the threshold gold thickness results together with associated confidence limits for the analysis and also records information about the images and version numbers of the software used to generate the results.

Further information:
Contact: Ken Young *or* Celia Strudley
National Coordinating Centre for the Physics of Mammography
Guildford, UK
e-mail: rsc-tr.NCCPM@nhs.net
website: www.nccpm.org

System requirements: *Use of CDCOM restricts use of CDMAM Analysis to Windows systems only. The required version of CDCOM is sourced by the user from EUREF. CDMAM Analysis v2.1 runs on a Java platform (minimum Java version 1.6 / Java 6). If preferred the software is available bundled with Java.*

**CDMAM, Artinis, Nijmegen, Netherlands (www.artinis.com)*
†EUREF, European Reference Organisation for Quality Assured Breast Screening and Diagnostic Services, Nijmegen, The Netherlands
‡CDCOM is available from the EUREF website (www.euref.org)