

CIE Division 8

Technical Committee 8–03: Gamut Mapping

Minutes of 19 November 1999 Meeting in Scottsdale, AZ

Compiled by Tim Kohler and Jan Morovic

1 Attendees

Attendees are listed in alphabetical order and TC 8–03 members are marked with a *.

Gus Braun *	John McCann *
Karen Braun	David McDowell
Yoav Bressler	Ethan Montag *
John Dalrymple	Jan Morovic (TC Chairman) *
Edward Elikhis	Hideto Motomura *
Mark Fairchild *	Todd Newman (Division Director) *
Paul Foerts	Elizabeth Pirrotta
Patrick Herzog *	Yue Qiao
Po-Chieh Hung	Peter Roberts
Naoya Katoh *	Raimondo Schettini *
Tim Kohler (Minute Taker)	Kazuhiko Takemura
Matty Litvak	J. A. Steven Viggiano *
Lindsay MacDonald	Brad Walker
Marc Mahy *	Geoff Woolfe *

2 Agenda

1. Introductions
2. Gamut Mapping Experiment at Canon Information Systems
3. Gamut Mapping Testing Guidelines
4. Gamut Mapping Algorithms
5. Color Spaces
6. Next Meeting

3 Gamut Mapping Experiment at CIS

Todd Newman presented the results of an experiment that was performed at Canon Information Systems. The experiment was designed to verify Jan's thesis results.

3.1 Some key differences

23 observers, some were graphic arts professionals and some were novices. CAM97s2 was used. *Realistic conditions* – ambient illumination, monitor→print, same white point. *Expanded image set* – 9 images, 7 photographic, 2 computer generated. *Four algorithms* – CARISMA, GCUSP99, CLLIN, LCLIP – Jan's code was

used for CARISMA and GCUSP99 and a Mountain range gamut description was used for the other two.

3.2 Problems

Device neutrals were far from zero chroma, especially in CAM97s2. Neutrals were corrected by a linear shift of each J plane such that $a=b=0$.

3.3 Results

Average for all images – CARISMA is better but not significantly. Photographic images – CARISMA is significantly better. Chart image (Business graphic) – CARISMA worst, GCUSP better.

4 Guidelines

Two types of tests were outlined: subjective accuracy and preference whereby it was agreed that subjective accuracy is to be the obligatory rendering intent to be used and that at the same time participants in the co-ordinated research should also be encouraged to consider (as an option) the preference rendering intent in their experimental work.

4.1 Images

Tony Johnson will send images from ISO TC-130. GMA testing will use some set of common images. Some images with memory colours should also be included. The images will be limited in gamut to physical media.

4.2 Media

Patrick Herzog presented. CRT monitors only, LCD displays were not suitable for testing. The issue was raised that devices should not be eliminated by class, rather they should be included based on quality, ability to be characterised, and stability.

Both Simulation and Real Media are OK for Compression. Simulation is not suitable for expansion. Simulation should be as close as possible to a real situation.

Researchers should report dpi, MTF, and viewing distance for the media. There was discussion about how to measure MTF.

The point was made that the testing document should use “some commercial software” rather than “Photoshop” when discussing the problem of some software performing additional, unwanted color management.

4.3 Viewing Conditions

Tony Johnson will propose guidelines. It was mentioned that it is most important to report the viewing conditions used rather than limit researchers to a set of specific conditions.

4.4 Measurement

Phil Green from the London College of Printing is working on this section. There was some discussion about which measurement backing standard to use. Some felt that the backing should be similar to the actual backing to be used. However, others felt that it may be difficult to follow this in practice.

Also, a question about UV inclusion was raised. The inclusion of filtering of UV should be considered for this section.

4.5 Gamut Boundaries

Ján Morovic mentioned that he recommends the “Segment Maxima” method used in his GMA code. Tim Kohler reported that the ICC Reference Implementation had been using the Mountain Range Gamut Boundary description.

Todd Newman said that he will report on Gamut Boundary description encoding methods.

It was suggested that the guidelines should primarily contain instructions for coding gamut boundary information rather than recommend a method for calculating gamut boundaries. Nonetheless a list of possible methods (Including Segment Maxima and Mountain Range) can be provided as options.

Further, there was some discussion about whether and if so then what information should be provided about the gamuts of media and images used in experiments conducted according to the guidelines.

4.6 Gamut Mapping Algorithms

Ján Morovic recommended that CARISMA and Minimum Delta E_{BFD} should be obligatory in all testing so as to provide a pair of values which can be the basis for comparing the results of different experiments.

4.7 Color Spaces

Gus Braun reported that he and Fritz Ebner recommended IPT as the space in which gamut mapping algorithms are tested.

5 Next Meeting

Tentatively scheduled to occur during Colour 2000 in Derby, UK on either 13 or 14 April 2000.