

W1.1 Image Quality of Printers

W1.1 2001 - 051

MicroUniformity

Robert E. Zeman

Sept 7, 2001

Reference: W1.1 2001 - 048

Micro Uniformity Ad-hoc Group Meeting, Sept 1, 2001 1:30PM EDT

(Tele)present: Paul Kane (Kodak), Robert Zeman (Chair, Kodak), George Chiu (Purdue), Bill Kress (Minolta-QMS)

The meeting started with a brief review of our status by RZ, who then inquired about the status of the tasks to which we agreed in the last meeting. PK noted that the electronic versions of the targets had been generated and would be printed next week, hopefully to be in member's hands before the next teleconference. The banding samples were awaiting some further discussion anticipated today. GC had, just prior to the meeting, submitted a proposal for a psychophysical experiment, which we discussed. BK questioned that the procedures outlined suggested a threshold study, whereas he believed that a supra-threshold study was needed, so that the degree of nonuniformity could be assessed. Others agreed that we needed to characterize continuous levels of visual response to determine how 'nonuniform' a sample may appear. GC questioned the effect of mean density level at which the samples should be generated. PK stated that if the experiment were done in L^* , the same L^* fluctuations at several different mean L^* 's should give the same perception, which could be easily verified. PK also mentioned that threshold sensitivity is well-published, and that we could run the study from sub- to supra-threshold, verifying agreement with the previous threshold studies and extending beyond those. We then discussed how the samples should be designed for changes in frequency and amplitude, and what grid one should create varying these parameters. PK agreed to take a stab at this, using existing contrast sensitivity curves as a guide for the layout.

GC mentioned that since we are the microuniformity group, that implies a lower bound on the banding frequencies that need to be examined. PK stated that we can set up the results in terms of cycles/visual degree and specify a viewing distance.

BK raised the waveform of the banding as a point of consideration, mentioning that one frequently observes that banding is not sinusoidal, but triangular, square or more complex. We all agreed that the visibility of different waveforms is likely different. GC suggested that we could study this sensitivity as well. RZ objected, stating that while this would be interesting, the task is becoming too large for such a small group, many of which participate at a very low percentage of activity. We agreed that more opinions on this point are needed.

RZ called MD afterwards to ask about progress on the spectrogram approach. She said that she is not allowed to share the (rather large) software which includes that analysis, but is committed to writing the necessary code herself and will report on her progress by the next meeting.

The following tasks were agreed upon:

1. PK will print identical targets for all committee members.
2. PK will systematically vary banding as an attribute for psychophysical study.
3. GC will study the experimental design for a rank-ordering type psychophysical test.
4. All will review some of the links for spectral analysis that GC sent.
5. RR will re-examine files of textures and voids for suitability.

Next Teleconference: Friday, Sept. 21st, 1:30 EDT. Phone number: 1-888-394-5271

Robert E. Zeman
Eastman Kodak Company
1700 Dewey Ave. 1/67/RL
Rochester, NY 14650-1860

Phone: (716)-722-7090
Fax: (716)-588-1999
email: robert.zeman@kodak.com