Color Management

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Color Management [CM]

- What is it?
- Who Needs it? Why?
- About Printer Profiles
- To Create Printer Profiles
- Suggestions & Discussions?

CM: What is it?

- What is it?
  - Device profiles provide color management systems with the information necessary to convert color data between native device color spaces and device independent color spaces.
  - The specification divides color devices into three broad classifications:
    - input devices,
    - display devices and
    - output devices.
  - For each device class, a series of base algorithmic models are described which perform the transformation between color spaces.
  - These models provide a range of color quality and performance results which provide different trade-offs in memory footprint, performance and image quality.

http://www.color.org/iccprofile.xalter

CM: Who Needs it? Why

- Color Fidelity depends Intent.
  - What is being printed?
    - Needed: High End Photo, Posters, Banners,…
    - ~ Needed: Web Pages, Text Document, Home Photos, ….
  - Why is it being printed?
    - Needed: Color Matching intent, …
    - ~ Needed: Short term document use, …
  - Who is printing it?
    - Needed: Semi/Professional Photographer, Print Shops, …
    - ~ Needed: Home User, SOHO, General Office, …

CM: About Printer Profiles

- Printer Profile Factors
  - Printer Inks:
    - Number of Inks
    - Inks Color (= gamut)
  - Driver Dither/Halftone Algorithm
    - Type of Dither/Halftone (Speed Vs Size Vs Resources)
    - Dot Size of Printer Head (Fixed, Variable)
  - Color Transform Algorithm
    - Fidelity (Speed Vs Size Vs Resources)
    - Color Overlay Order
    - Linearity of Color "Addition"
- Summarized:
  - For each set of Inks & for each Driver a Profile is needed for each combination of
    - Media Type (Plain, Matte, Fine Art, Photo, CD/DVD, etc – 10 to 100 type of media)
    - Quality Intent (Draft, Normal, High, Photo)

CM: To Create Printer Profiles

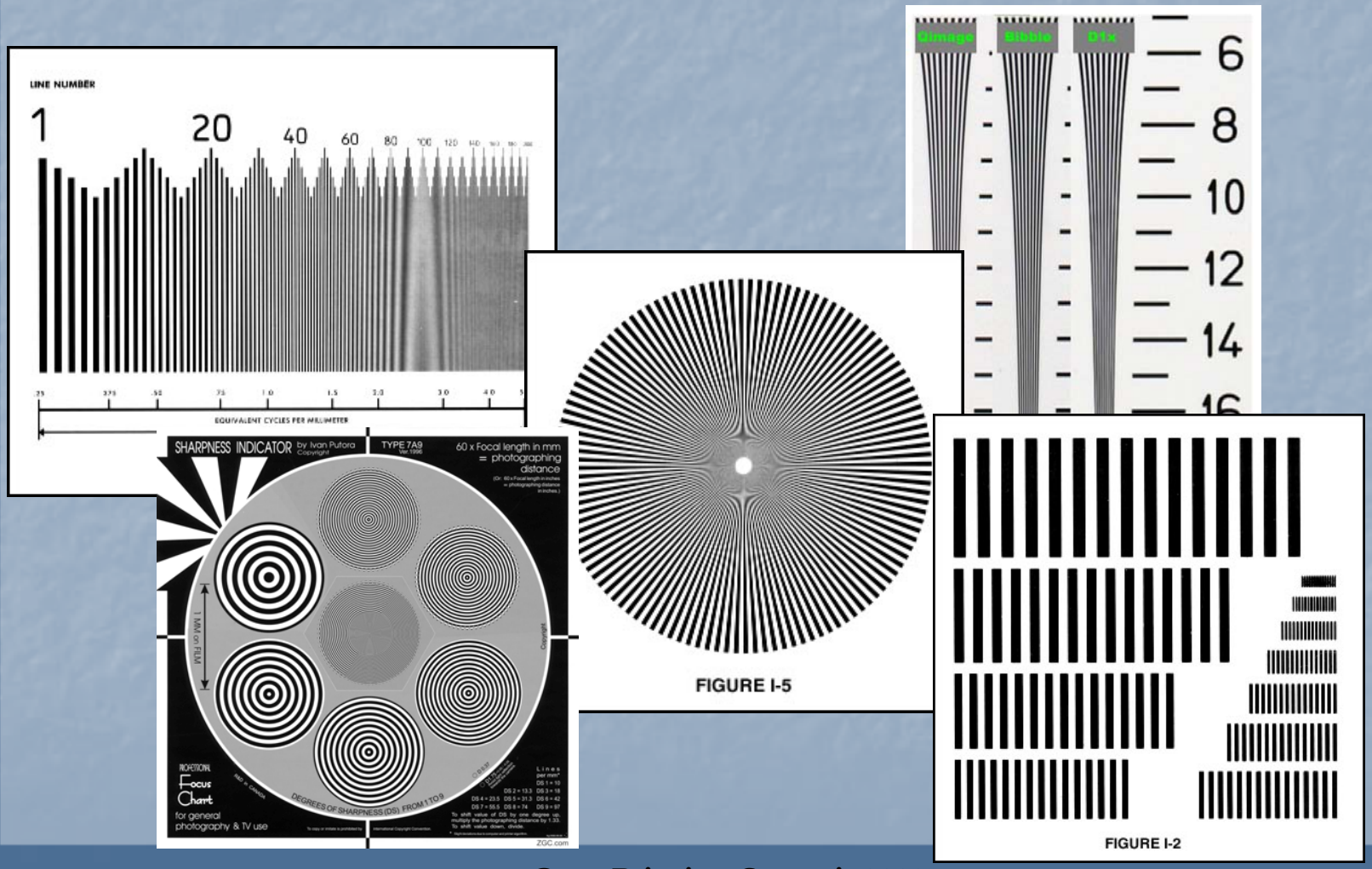
- Printer Driver Developer Needs
  - The Printer
  - Supply of Inks
  - Supply of Media Types
  - Spectrometer or External Measuring Service (Cost ~$30 USD per profile).
  - Test Time

- Issues
  - For "Open Source" Developer is profiling too costly; timely?
  - For Mobile/Embedded Platform Too Large
    - A Single ICC profile (for one mode) can be 6+ MiB (x media type x quality=?)
  - Can't Use Print Vendor Existing Profiles since they are the result of the Print Vender's Driver Algorithms not another's.
    - Windows: \Windows\system32\spool\drivers\color \
    - Mac: /Library/ColorSync/Profiles/
    - Linux: ??????????????

CM: Suggestions/Solutions

- Print-Vendors:
  - Supply ICC Profiles (see below for what media type and quality)
  - Allow Public Domain Use of ICC Profile.
- Non Print-Vendors
  - Use Printer-Vendors ICC Profile
    - "Close Enough": Ok for non-critical uses.
  - OpenPrinting Provides a Low Cost Profile Measurement Service.
- OpenPrinting and/or Color Management
  - Define a Base Set of Media Type that MUST BE Supported.
    - Plain, Photo, etc is often media supplier dependent
    - Thus, Must Define Media Type by some set of Attributes:
      - Brightness, roughness, etc.
  - Define the Nominal "Quality Settings" for Each Media Type that MUST BE Supported.
    - Does this mean DPI Range (Example: Normal = 300 to 400 dpi)
    - Does this mean an quantitative evaluation of a test image with resolution targets
  - Provide Profile Test Images and Instructions.

Resolution Targets



Media Type

- RFC's, documents & discussions that List Media Types.
  - More investigation is needed to define Media Types in terms of attributes that can be gotten from the WWW or label on media package.