

# EFFECTIVE COLOR COMMUNICATION WITH PRINT SERVICE PROVIDERS

What everyone should know about taking  
jobs to print.

Presenter: **Dan Reid**



# SO WHAT'S THE BIG DEAL?

---

- Why can't my inkjet prints match final print conditions?
- How come the final prints do not meet my expectations?
- Why do I always have color problems with my print provider?



# THE PROBLEM

---

- Unfortunately, NO ONE actually runs their presses with recommended paper stock, print densities, and dot gain percentages.
- Each print provider offers a range of paper stocks often distinguishing them from their competitors.

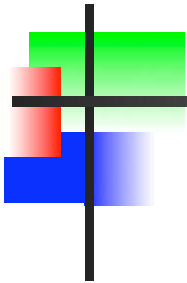


# THE PROBLEM - CONTINUED

---

- Most printing agencies don't normally rely on a densitometer or spectrophotometer to measure color objectively. If a print provider measures densities it is usually to "house" not standards based print densities.
- The press operator deviates from these densities to improve the look of print. All of this is happening based on his judgment of color.

# EVERYONE PERCEIVES COLOR DIFFERENTLY

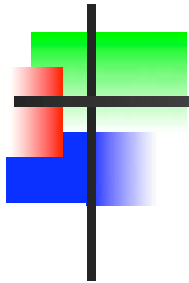


- Everyone perceives color differently. The only way to describe color objects, up until recently, has been color swatch books with recommended color separation values.
- Good idea if printers actually adhered to the print specifications
- A better approach is to use a color model based on how humans respond to color instead of device color values.  $L^*a^*b^*$  is a color model fashioned after how we respond to color. The basis for color management systems.

# WHAT THE HECK IS THIS ICC PROFILE THING?

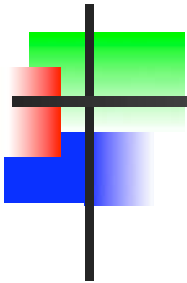
- Maps device numbers (RGB or CMYK) to  $L^* a^* b^*$  values.  $L^* a^* b^*$  is the common connection color space used in most color conversions.
- Contains multiple tables used for conversion (rendering intents)
- You should select a table (rendering intent) based on subject and destination print conditions

# ICC PROFILE RENDERING INTENTS



- Perceptual
  - Uses dynamic ( $L^*$ ) and colorimetric ( $a^*$ ,  $b^*$ ) compression to fit within destination color space.
- Colorimetric (proofing)
  - Absolute Colorimetric
    - No white or black point scaling
    - No color compression, color clipped into gamut (desaturated)
  - Relative Colorimetric
    - Source white point is scaled to destination white but without black scaling
    - No color compression, color clipped into gamut (desaturated)

# PHOTOSHOP'S BLACK POINT COMPENSATION



- Designed to scale the black of the source to printable destination black. Similar to relative colorimetric for shadows.
- Only available in Adobe products!
- Not a good idea always. Not recommended for screen proofing. Black appear too intense on screen compared to actual print output.



# MONITOR CALIBRATION

---

- Don't trust your eyes for measuring color!
- Need an *objective* not *subjective* approach to color calibration and characterization.
- Colorimeters for CRTs and Spectrophotometer for LCDs and CRTs. Removes subjectivity of monitor color accuracy -- repeatability.



# RGB vs CMYK

---

- This is like a war that never ends.
- Your monitor is always RGB!
- All input devices are RGB, always!
- CMYK is a radically different color model from your input and monitor color models (RGB).



# RGB WORKFLOW

---

- It's best to edit in RGB since your input device and monitor are RGB color model.
- After editing *proof* print separation characteristics and further edit using Photoshop Adjustment Layers.
- Finally duplicate image and convert using selected proof rendering intent with layer adjustments on.
- Archive original (RGB) file. Adjustment layers can be added or turned off for different print processes.

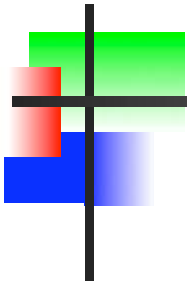


# THE PROBLEM

---

- A CMYK scan is always a conversion from RGB to CMYK for specific print conditions
- CMYK is device, ink, paper, and separation specific
- CMYK print color varies not only from press to press but also paper, ink, and separation parameters.
- Ideally we should send RGB tagged data and have the service provider convert to CMYK. Not a reality today.

# THE KEYS TO PREDICTABLE COLOR REPRODUCTION



- Early communication with your print service provider
- What do they recommend for CMYK color settings? Don't argue - make their life easy so your job prints well.
- The Print Provider is always correct! They know their equipment!



# JUST CONVERT TO SWOP

---

- Uh, which SWOP are you talking about?
- How many SWOP ICC profiles do you have installed in your computer?
- SWOP ain't worth SWOP!

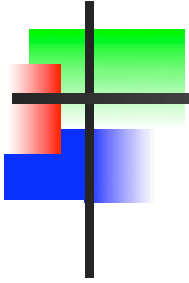


# CONVERT TO SWOP?

---

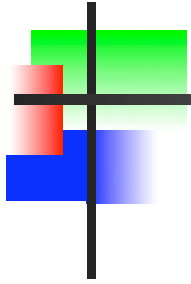
- What is SWOP? *Standardized Web Offset Publication*
- What does SWOP do for me?
- Which SWOP ICC profile should I use?

# ANALYZING SWOP ICC PROFILES



- TAC, dynamic range  $L^*$  limits.
- Black generation curve
- Correct colorimetric tags populated?
- What is the data based on?

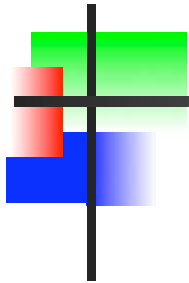
# SO NOW WHAT? ANY GOOD NEWS?



- We *do* have aim or target values to shoot for
- SWOP TR001 data for coated and uncoated papers.
- Adobe ICC profiles for Sheet fed presses.

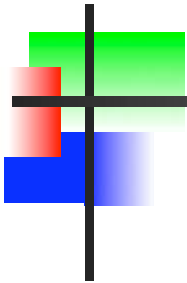
# US WEB OFFSET (SWOP) v2

## (USWEBCOATEDSWOP.ICC) (PHOTOSHOP v6<sup>+</sup>)



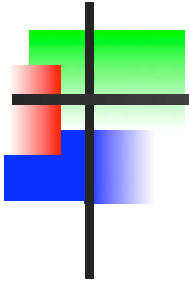
- Based on TR001 *Colormetric* data from actual press runs in mid 1990s on coated and uncoated stocks.
- Should be a reasonable target for converting as a destination.
- Has a compressed dynamic range and color gamut.

# ADOBE US SHEETFEDCOATED.ICC



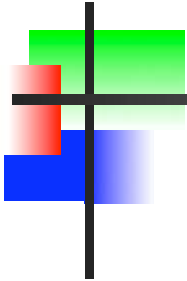
- Not sure where the data came from.
- Seems reasonably close to the CTP Sheet fed presses I have worked with.

# APPLE GENERIC CMYK PROFILE



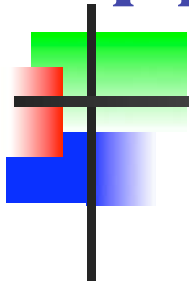
- Generic CMYK Profile in OS 9 and 10.1 is a terrible ICC profile. DO NOT USE.
- Generic CMYK in OS 10.2 is based on TR001 (coated?) data but scales the black data, normally  $L^* 15$ , to  $L^* 0$ .
- Use only as source and not destination in conversions. Designed for getting a better black in conversions as a source profile. If used as a destination profile plugged unprintable black will result.

# ASSIGNING ICC PROFILES FOR SCANS AND CAMERA FILES



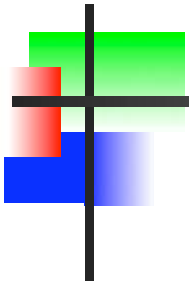
- What to do when the image is not tagged with a ICC profile. What to do if you don't know the origin of the file.
- Use Assign profile function to tag image data with a profile. Preview option available unlike the Profile Missing warning when opening a file.

# CHECKING YOUR INPUT DATA FROM SCANNERS AND CAMERAS



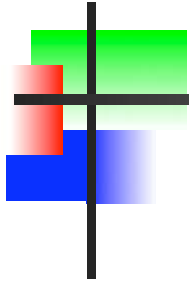
- What are we looking for in a histogram?
- What are good black/white point target values regardless of printing process?

# QUICK EASY COLOR CORRECTION



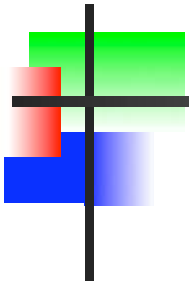
- Photoshop 7's auto color feature
- Reverse LUT animation
- Adding points on a curve

# SO WHAT'S THE QUICK ANSWER WHEN USING PHOTOSHOP?



- Configure Color settings with US Pre-Press template.
- Rendering intent and engine
- Check correct monitor profile is being recognized.

# PREVIEWING PRESS SEPARATIONS IN PHOTOSHOP



- Photoshop soft-proof options
  - Black point compensation
  - Simulate ink black, and paper white
- What's out of printable range? Gamut Warning.

# CAN MY DESKTOP INKJET SIMULATE PRESS COLOR?

- A couple things need to be qualified first
  - Postscript RIP needed to check fonts and placed objects in page layout programs
  - Ink/paper/resolution combination must result in a larger dynamic range ( $L^*$ ) and color gamut ( $a^*$ ,  $b^*$ ) to accurately simulate press conditions.
  - Paper tint must be close to actual paper stock for decent paper tint simulation.

# CAN MY DESKTOP INKJET SIMULATE PRESS COLOR?

- CONTINUED

- Photoshop 7's Print Preview window
- Must convert to print process first before soft proofing to local desktop printer.



# THE PDF ADVANTAGE

---

- Based on Postscript
- Encapsulates Fonts, Images and Vector objects into single compressed file.
- Software available to check for common printing errors against Committee for Graphic Arts Technologies Standards (**CGATS**) standards



# SO WHAT'S THE HOLD UP?

---

- PDF format allows for screen resolution and RGB files. Fonts are not always included.
- PDF/x initiative verifies document compliance for printing.

# PDF/X-1:A (v1.3)

(ISO 15930-1:2001)

- The first PDF format that checks for problems typically encountered in printing a PDF document
- Harmonize all objects to CMYK colorspace for printing.
- Ensures no unpredictable separation to CMYK as designer/client takes responsibility.

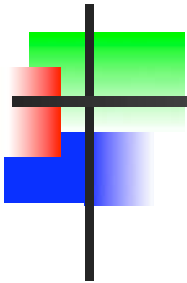


# OTHER FLAVORS OF PDF/X

---

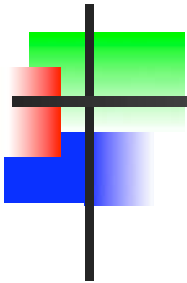
- PDF/X-2 (v1.4)
  - OPI
  - ICC profiles
  - Does not require fonts be embedded
  - Transparency support (v1.4)
- PDF/X-3 (v1.3) ( ISO 15930-3:2002 )
  - ICC profiles
  - Basically PDF/X-1 but with ICC profile support.
  - Unless print provider is color managed and hip to the game.
  - Just ratified earlier this month!

# SWOP COMMITTEE GIVE PDF/X 1-A, THUMBS UP



- September 2001 SWOP calibration test kit available as PDF/X-1a
- Latest revision to SWOP recommends delivery using PDF/X-1a

# CREATING PRINT READY PDF DOCUMENTS



- Acrobat Distiller can't create PDF/x compliant files alone. Must be checked by separate application
- InDesign v2 creates a good PDF v1.3 but needs preflighting to verify PDF/x conformance
- Need preflight tools to check for PDF/x-1a compliance to ensure proper printing
- Latest revision to SWOP recommends delivery using PDF/X-1a

# EFFECTIVE COLOR COMMUNICATION WITH PRINT SERVICE PROVIDERS

What everyone should know about taking  
jobs to print.

Presenter: **Dan Reid**