

# Spot color proofing and printing

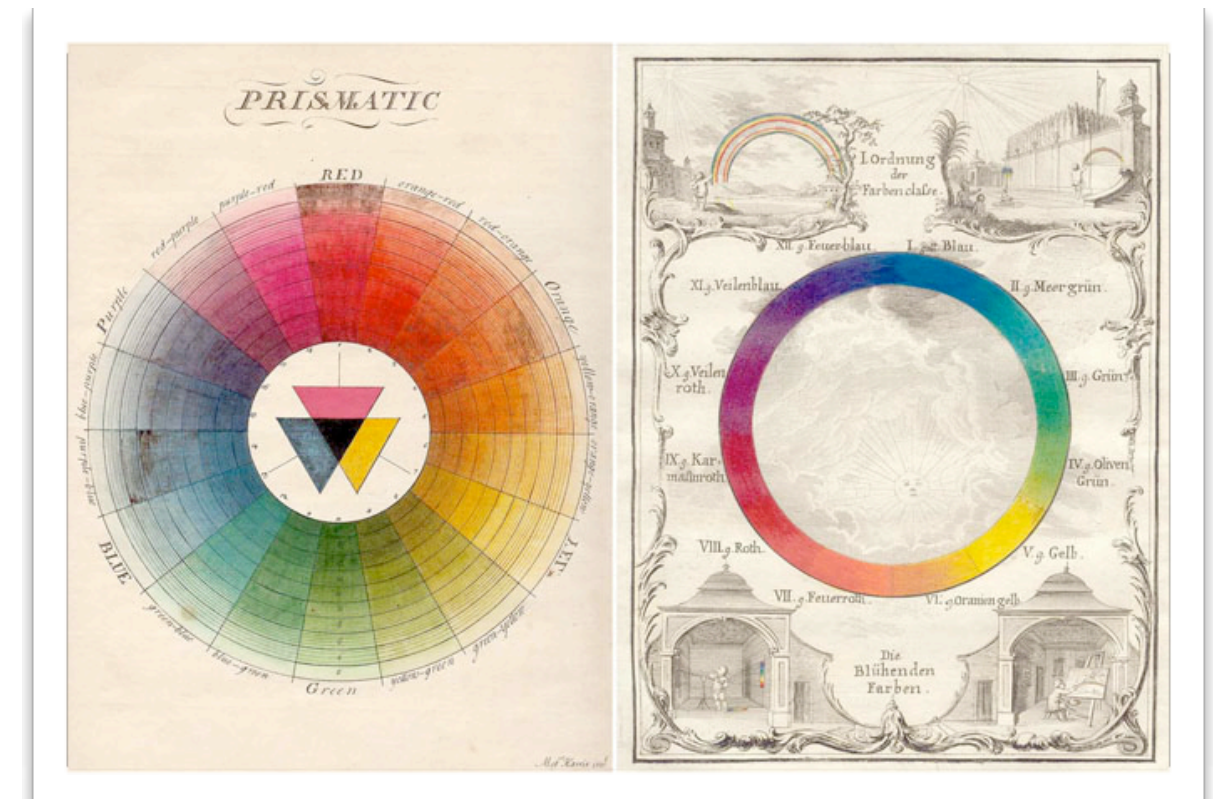
Considerations about spot color handling



Dietmar Fuchs, Product Manager

# Who is ColorLogic?

- We develop high-end Color Management solutions
- Founded in March, 2002
- Privately-owned, independent German company
- Our team has excellent skills and solid experience in the field of color reproduction, print and in the development of color management solutions
- Products:
  - ICC profiling and DeviceLink applications: **CoPrA, Reprofiler**
  - ICC compatible ColorServer **ZePrA**
  - Separation checking: **ProfileTagger**
  - Precalculated DeviceLink-Profile-Sets for all international printing standards: **DLS**



## A few of today's problems with spot color rendering

- Preview/simulation of spot colors in PDF rendering applications is not good enough
- There is not enough information about the color, gradation behavior and opacity for spot colors in today's PDF files
- Missing multicolor profile support in many image editing and PDF rendering applications
- Not much support for PDF/X-5n (multicolor output intent)
- We must not forget that proofing and production have different needs!
  - Proofing needs to accurately simulate what is in the file
  - Production needs to convert spot colors to process inks and needs to be able to print them flawlessly

## A few of today's problems with spot color conversion

- One Lab value for the full tone of a spot color only is not good enough
- Simple rendering of Lab values with abs. col. to the target color space is not sufficient for closest  $\Delta E$  calculation
- Often too many channels are produced when converting spot colors
- Gradations of converted spot colors tend to be unsmooth when printing
- Converting spot colors to process colors might change overprint behavior
- Missing opacity information for calculating overprints from spot colors with other process and spot colors

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- See an example on the next slide





- **Accurate Spot Color matching and conversion to CMYK and Multicolor printing systems.**

100%	Total
0%	Cyan
0%	Magenta
0%	Yellow
0%	Black
100%	PANTONE Cool Gray 7 C
0%	DirtyLabOrange
0%	PANTONE 717 C
0%	PANTONE 562 C
0%	PANTONE 5825 C
0%	PANTONE 801 C

PDF document containing spot colors

114%	Total
39%	Cyan
31%	Magenta
30%	Yellow
14%	Black

Spot Color conversion using other solutions

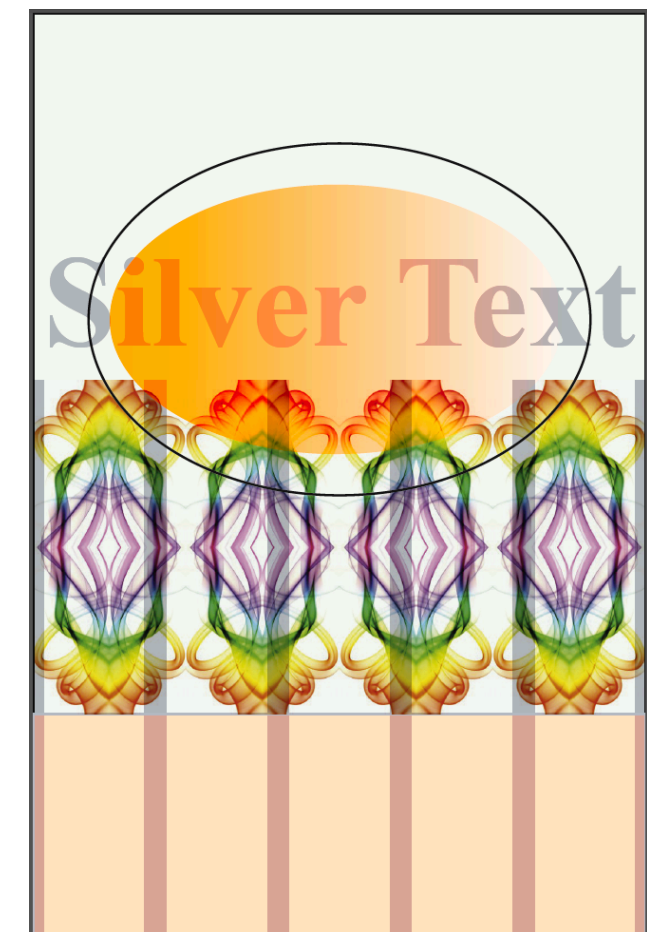
49%	Total
0%	Cyan
0%	Magenta
0%	Yellow
49%	Black

Spot Color conversion using ZePrA



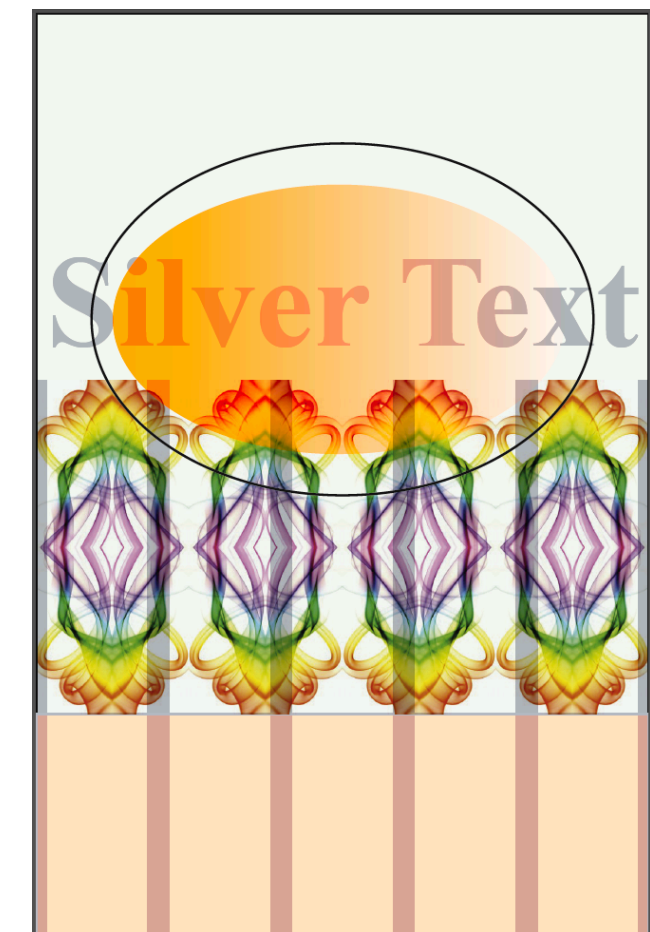
## Proposed solution from the ICC and GWG

- Adding spectral information for each spot color in a PDF file is a good suggestion
- Adding this information in the next PDF 2.0 specification would be a valid improvement



## Proposed solution from the ICC and GWG

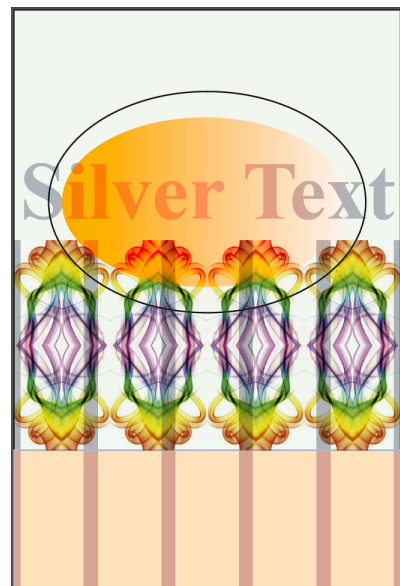
- Adding spectral information for each spot color in a PDF file is a good suggestion
- Adding this information in the next PDF 2.0 specification would be a valid improvement
  
- But there is no suggestion on how to do the conversion for production
  - What should be the target?
  - What is just acceptable or what should a very good result look like?
- Potential uncertainty in the example PDF for spot colors printed on white
  - FOGRA 39 has a white point of 95/0/-2 but the white of the substrate the spot inks are printed on differs slightly?
  - That would be a typical situation if spot characterization data is added to a PDF, so that a recommendation which white point to take would be needed
- We need better example files than this one in order to talk about quality!





# What have we done with the example PDF file - Step 1

- Extraction of the spectral data from embedded CXF and importing in our color server ZePrA spot color library



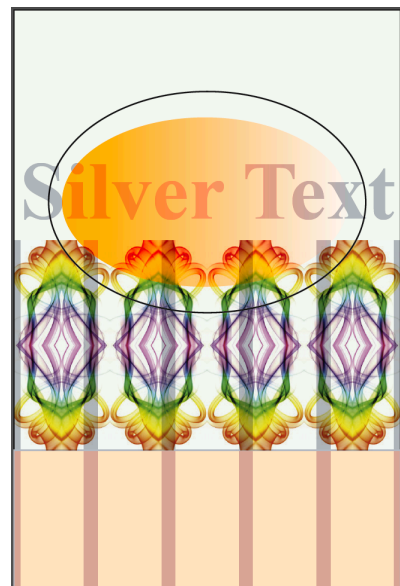
The screenshot shows the ZePrA Color Server Application interface. The main window is titled 'Manage Spot Colors' and displays the 'Manage Color Libraries' section with the library name 'GWG\_OrangeSilverWhite'. Below this, the 'Define spot colors' section shows a list of colors: Orange, Silver, and Spot\_White, each with the information 'Remission, 11 tone values'. An 'Edit Spot Color' dialog box is open, showing the 'Name' field set to 'Orange' and a 'Use template' dropdown set to '11 Patches'. The dialog also displays a table of color values for different percentages (0% to 100%) and fields for L, a, and b values.

Percentage	L	a	b
0%	94.5	-0.3	0.6
10%	89.1	8.4	5.2
20%	85.2	14.7	8.9
30%	80.9	21.8	13.3
40%	76.6	29.5	19.0
50%	72.8	37.1	25.8
60%	69.4	43.8	33.3
70%	65.5	51.4	42.4
80%	62.0	58.1	54.1
90%	61.8	59.4	63.4
100%	50.0	0.0	0.0

At the bottom of the interface, there are buttons for 'Auto Setup...', 'Overview', 'Configurations', 'Queues', 'SmartLink Setup', 'Create Gradations', 'Spot Colors', 'Stop', and 'Start'. The status bar at the bottom indicates 'ZePrA v3.5.1, (C) 2008-2013 ColorLogic GmbH' and 'This NFR version expires 2013/07/31'.

## Step 2

- Calculate full tone spot colors to target color space (in our example an RGB printer) with closest dE00
  - Orange: 0.9 dE00
  - Silver: 0.1 dE00
  - Spot\_White: 0.6 dE00



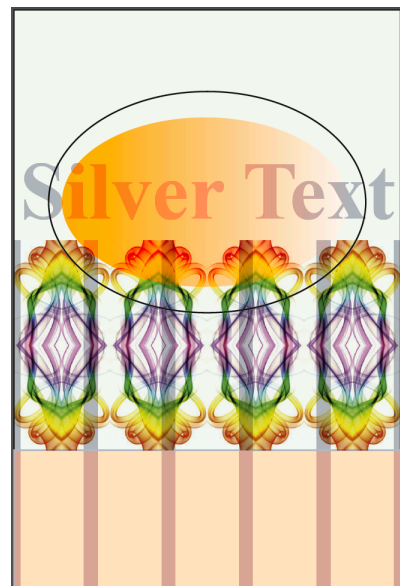
The screenshot shows the ZePrA Color Server Application interface. The main window is titled "Color Server Application" and "Define Configurations". The configuration is set to "ICC-GraphicArtsExperts-SpotColors". The "Convert with" dropdown is set to "GWG\_OrangeSilverWhite". The "Calculation method" is set to "Use as few channels as possible". The "Processing of undefined spot colors" is set to "Move file to Error folder".

Name	Conversion	Value
Orange	Output values (automatic)	GWG_Orang
Silver	Output values (automatic)	GWG_Orang
Spot_White	Output values	255.0 255.0

The "Edit Spot Color Conversion" dialog box is open, showing the configuration for the "Orange" spot color. The "Name" is "Orange", the "Conversion" is "Output values", and the "Library" is "GWG\_OrangeSilverWhite". The "Apply to" is set to "Images and Vectors". The "Calculation method" is "Use same method as in configuration". The "Optimize output values" section is checked, and the "Automatic" checkbox is also checked. The output values are: Red 255.0, Green 102.2, and Blue 93.1. The "DeltaE-76" and "DeltaE-2000" buttons are visible. The "Information" section shows the "Original Lab" values (60.3 62.4 69.7) and the "Actual Lab" values (59.7 59.4 67.0), with a "DeltaE / 2000" of 4.1 / 0.9. The "Paper white simulation" checkbox is checked. The "OK" and "Cancel" buttons are at the bottom right.

## Step 3

- Rendering of the PDF to a 7 channel pixel file
- Converting CMYK parts from FOGRA39 to profiled RGB printer, spot inks with spot color library and combinations of spot and process inks with mathematical overprint models
- Print on the Epson 4880 using the normal RGB driver with CMS disabled



**ugra** Ugra Proof and Print Certification Tool

Date: 2013-5-7 10:39:58      Printer: Epson 4880  
 Reference: ISO Coated v2 (FOGRA39L)      Paper: CGS Proofing paper  
 Device: eye-one      Inktype:  
 Job: Proof von ISO Coated V2      Notes:

Category	Delta	Limit	Result
Paper (dE)	0.87	3.00	OK
Average (dE)	1.88	3.00	OK
Maximum (dE)	4.88	6.00	OK
Primaries (dE)	3.10	5.00	OK
Primaries (dH)	1.59	2.50	OK
Average Gray (dH)	0.56	1.50	OK
UGRA-Score			65.3%

✔ Proof is certified!

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Signature

## A look in the future

- As soon as the spot color data is defined to be in PDF 2.0, we will adapt our color server software to take advantage of the valuable additional data.
- The PDF creation side needs easy access to additional spectral spot color information to embed them in the production PDF file.
- Where does the spectral information about the spot colors come from and how valid is it for the desired design job?
- Proofing and Workflow tools should be able to automatically detect embedded spot color information and either use it or replace it with other/better suited information.
- Extracting the spectral information and using them for verification will be important.

**Thank you for your attention**



**for all of your  
Color Management needs**