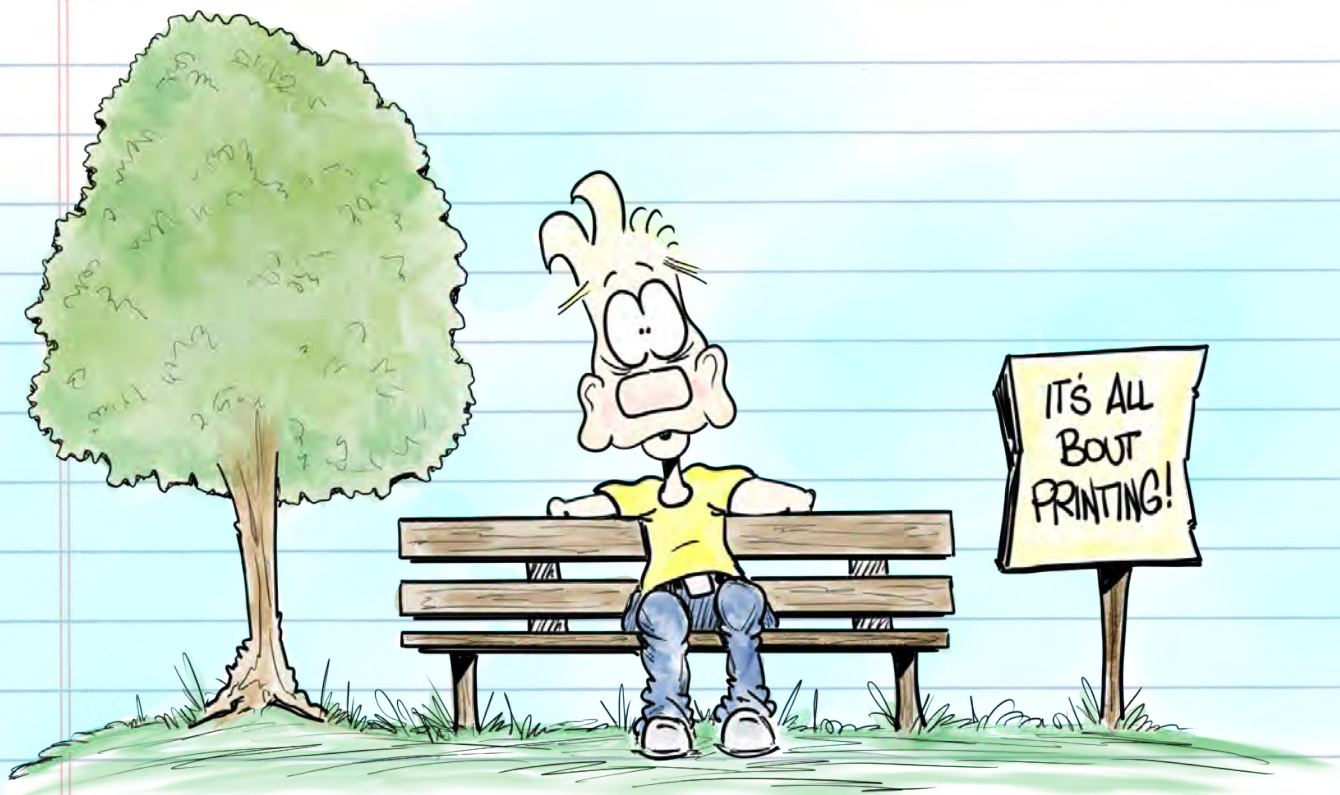


FROM DESIGN TO PRINT AND THEN SOME

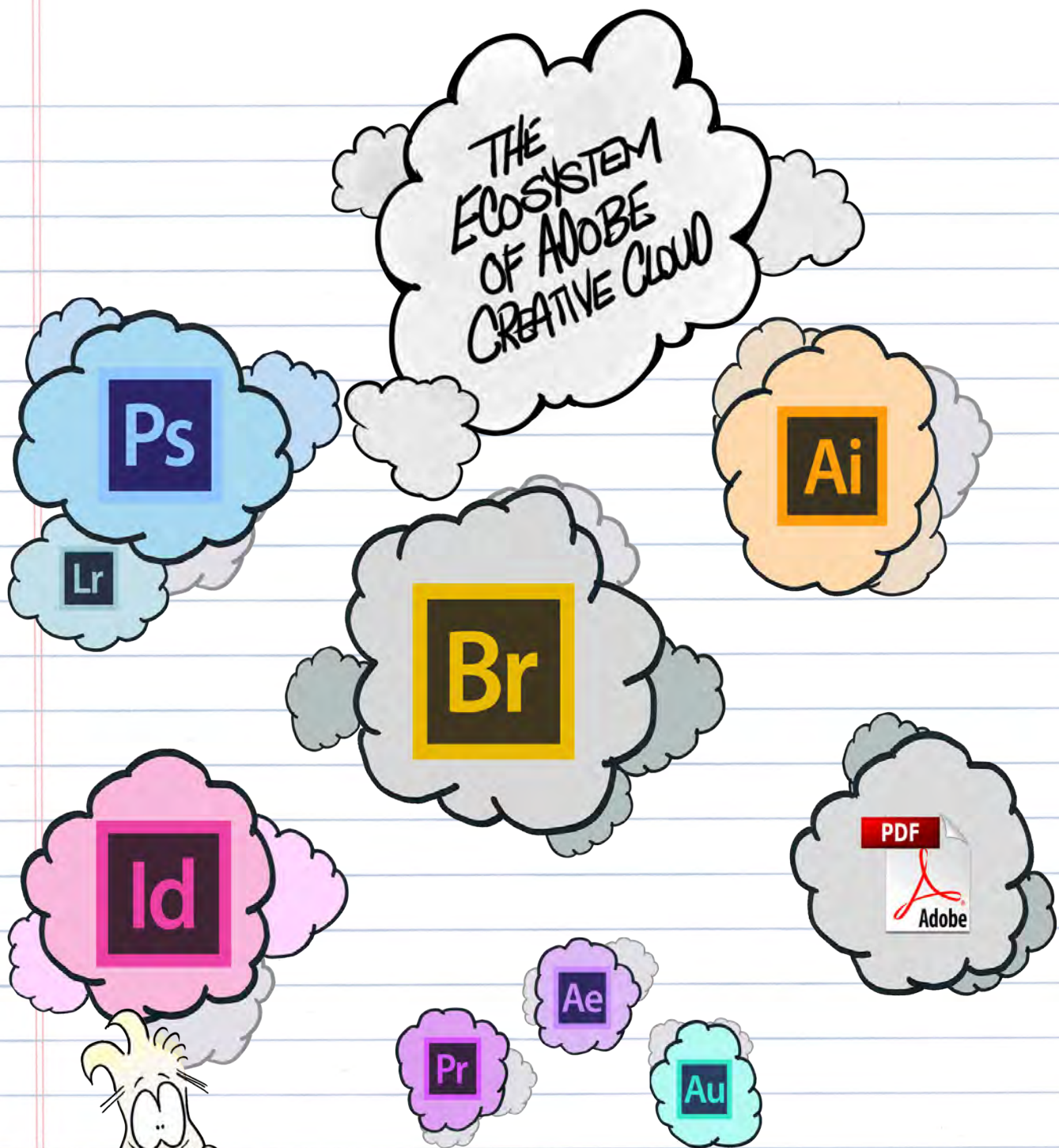




Color. We live in a world that is all color.

We see color all around us and want to put that in the things we print. But at times, that can become frustrating because the color isn't what we think we should be seeing. How do we get the color we have in our heads to the paper we are printing on?

Come along on the great journey of All Things Color, from Design to Print as we open the dark doors of how to finally have the color prints you've always desired.



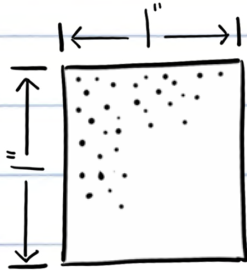
What does it all mean to you? The entire Adobe Ecosystem of products plus all the other graphic apps available, so many options. Why can't you just use Canva?



Bitmap = dpi

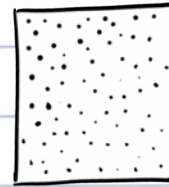
Adobe Photoshop is an image editing software that uses bitmap or raster images. A bitmap image is linked to its resolution and resolution is measured in DPI. Bitmap images are not easily scalable due to the link of the image to its resolution.

RESOLUTION:
THE DENSITY OF
PIXELS CONTAINED
IN THE IMAGE FILE.



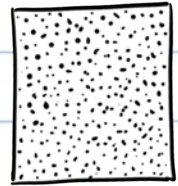
HOW MANY
DOTS CAN
YOU GET INTO
THAT 1 INCH
BOX?

LOW
RESOLUTION

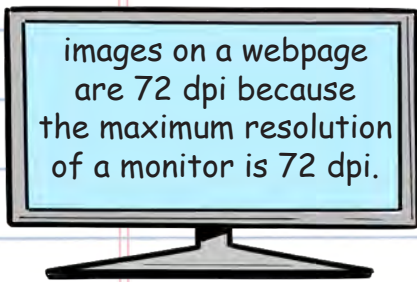


72 DPI

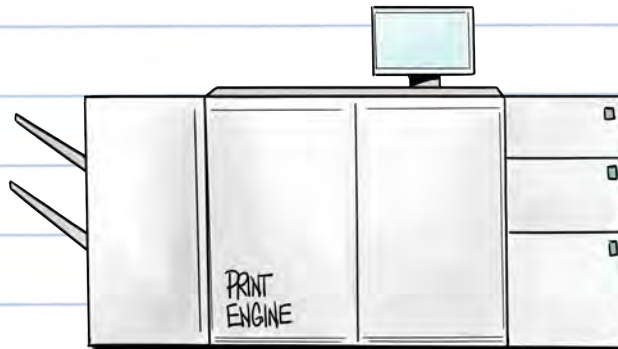
HIGH
RESOLUTION



300 DPI



A 72 dpi image will always be a 72 dpi image.



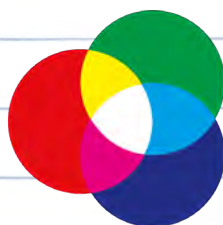
Images intended for print need to have a higher resolution, as the printing process allows for greater detail.



Photoshop by default lives in the RGB Color Space. While other color spaces can be used in Photoshop, the RGB color space remains the most typical starting point for images opened in Photoshop.

While Adobe has their own RGB Color Space, RGB Adobe 1998, the most common RGB Color Space used is sRGB.

It is important to know which Color Space is used for an image when it is time to print that image.

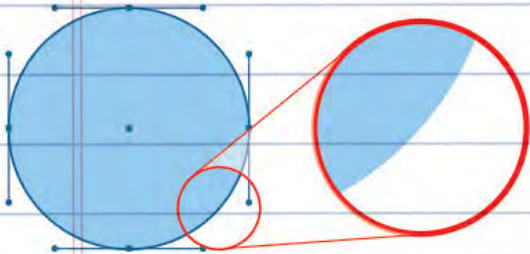


RGB
Additive
Colors



Adobe Illustrator CC

Adobe Illustrator is a vector based editing software. Vector images use mathematical calculations from one point to another that form lines and shapes. If you zoom into a vector graphic it will always look the same.



Vector Graphics contain points and line art that are defined mathematically.

Because vector graphics are not composed of pixels, they are resolution-independent. The vector shapes - also called objects - can be scaled and printed at any size without losing quality. It can be printed as large as and at the highest resolution that the printer or output device allows.



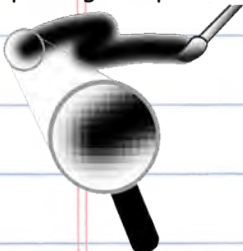
Adobe Illustrator uses a CMYK Color Space by default. The typical default Color Space is US Web Coated Swop v2. However, many industry standards are changing to the use of GRACoL 2013.



Adobe InDesign

The industry-standard publishing app lets you design and publish high-quality documents across a full spectrum of digital and print media.

painting with pixels



drawing with vectors



ADOBE INDESIGN ALLOWS YOU TO COMBINE BITMAP IMAGES FROM PHOTOSHOP AND VECTOR BASED GRAPHICS FROM ILLUSTRATOR AS WELL AS STATIC ARTWORK INTO THE SAME PAGE LAYOUT WHILE RETAINING THE INDIVIDUAL COLOR SPACES OF THOSE PIECES.

THE TYPICAL PUBLISHED PAGE LAYOUT IS IN A PDF FORMAT. THIS PDF CAN BE DISTRIBUTED ELECTRONICALLY OR PRINTED. IT IS DURING THE PRINTING OF THE PDF THAT ISSUES CAN OCCUR IF THE COLOR WORKFLOW IS NOT TAKEN INTO CONSIDERATION. COLORS CAN SHIFT IF THE COLOR SPACES USED DURING THE DESIGN ARE NOT USED AT THE PRINTER.



CANVA

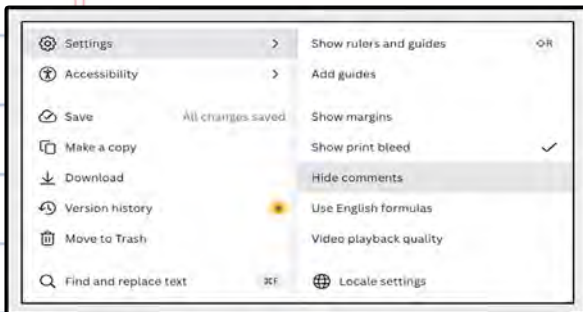
why are these pdfs so hard to work with?

The world is passing us by almost faster than we can keep up with it, and in the print shop you have files coming in that don't always print well. Often today, these

PDF files are being created with Power Point or another software program or app.

Canva is one of the top 10 online apps that tend to bring frustration into print shops. But why, and how do you deal with it?

Let's look at some settings for both getting started and then downloading the final document from the Canva site.



If the designer wants to make sure they get the "full bleed", they need to start in Canva by going to the document Settings and clicking the "Show Print Bleed". This will build in a print bleed area.

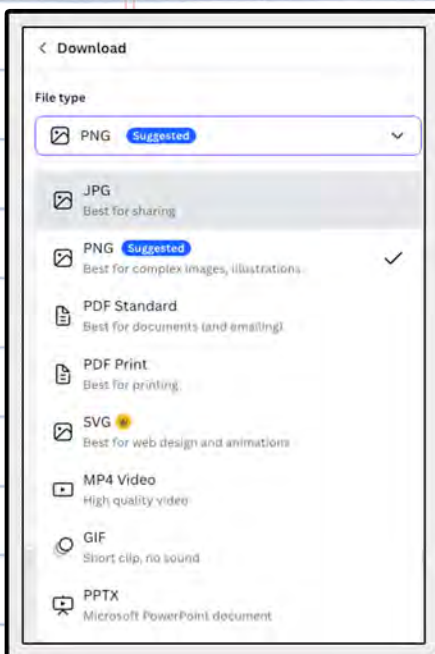
When the document has been completed, the designer needs to download it into a PDF file, or at least that is the most widely accepted format.

But Canva did not start out as a print document creation software. It really started as a "free" power point alternative.

They have added some help to get these documents to print better, but the designer must know what and where to look.

When downloading, there are multiple file types that can be chosen for the final download.

For the best print option, the PDF Print type should be used.



Don't stop there though. A few more steps need to be taken to get the best out of the Canva app.

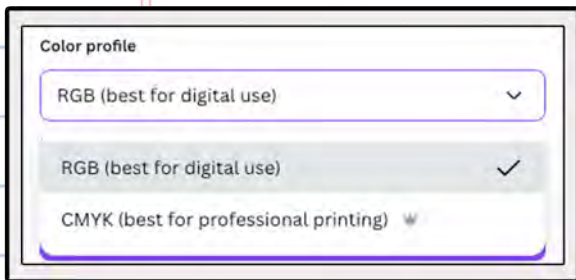
The Flatten PDF box should be checked.

An unflattened PDF can give more problems when it comes into the print shop.

Canva does not use a true Acrobat Distiller but emulates the distiller and that means not every PDF download will give the desired results when it comes time to print.



If a full bleed is desired, the Crop Marks and Bleed box should also be checked.



The Color Profile is a choice that may be open for debate and it isn't the position of this paper to give hard and fast rules but rather suggestions for achieving the best overall results.

Knowing that the printer lives in the CMYK Color Space, it would seem that the choice should be CMYK. BUT, the results may vary on these choices and some experimentation should be made.

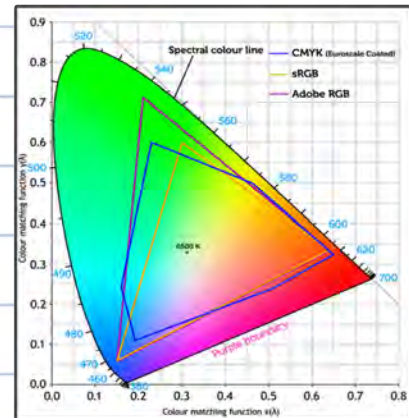
Knowing some of the ins and outs of this app can help you and your print operator work with your customers before trouble really starts.

Other off the shelf apps/software can bring similar issues and knowing a little can help stop the bigger headaches before they start.





A color space is a specific organization of colors. In combination with physical device profiling, it allows for reproducible representations of color, in both analog and digital representations.



CMYK Processing Method

Full (output GCR)

Full (Source GCR)

Pure Primaries

Within the *CMYK* color space, a range of colors can be achieved by combining the three primaries. This combination in its turn can be thought of as a hue component (which will require a maximum of two primary colors) and a gray component (a mixture of all three, in an appropriate quantity to give the required saturation). If the gray component is replaced by black ink, the same color is being achieved by using two primaries and black. The act of substituting a quantity of black for the gray component is known as "Grey component replacement" (*GCR*).

RGB Rendering Intents

Photographic (Perceptual)

Presentation (Saturation)

Relative Colorimetric

Absolute Colorimetric

Perceptual

Compresses the total gamut from one device's color space into the gamut of another device's color space when one or more colors in the original image is out of the gamut of the destination color space. This preserves the visual relationship between colors by shrinking the entire color space and shifting all colors – including those that were in gamut.

Saturation

Reproduces the original image color saturation (vividness) when converting into the target device's color space. In this approach, the relative saturation of colors is maintained from gamut to gamut. This render intent is primarily designed for business graphics, where the exact relationship between colors (such as in a photographic image) is not as important as are bright saturated colors.

Relative Colorimetric

When a color in the current color space is out of gamut in the target color space, it is mapped to the closest possible color within the gamut of the target color space, while colors that are in gamut are not affected. Only the colors that fall outside of the destination gamut are changed. This render intent can cause two colors, which appear different in the source color space, to be the same in the target color space. This is called "clipping."

Absolute Colorimetric

Colors match exactly with no adjustment made for white point or black point that would alter the image's brightness. Absolute colorimetric is valuable for rendering "signature colors", those colors that are highly identified with a commercial product.

COLOR MANAGEMENT

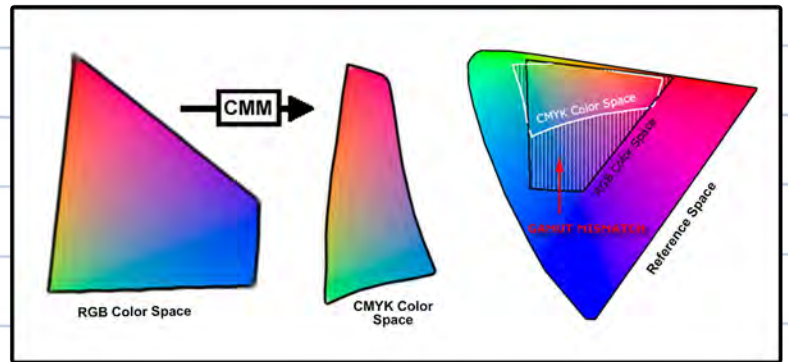
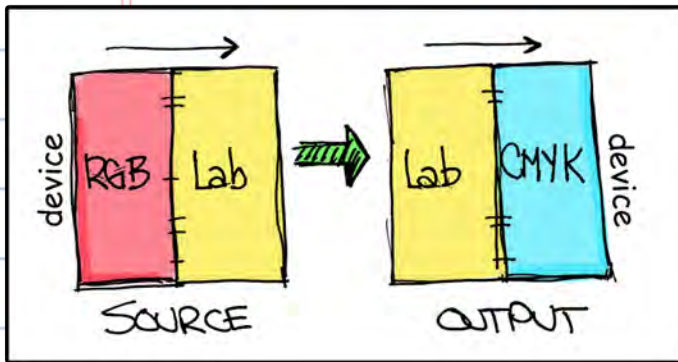
CMM Color Management Module

A software algorithm that adjusts the numerical values that get sent to or received from different devices so that the perceived color they produce remains consistent. The key issue here is how to deal with a color that cannot be reproduced on a certain device in order to show it through a different device as if it were visually the same color, just as when the reproducible color range between color transparencies and printed matters are different. There is no common method for this process, and the performance depends on the capability of each color matching method.

Color Space Conversion

Color space conversion is what happens when a Color Management Module (CMM) translates color from one device's space to another. Conversion may require approximations in order to preserve the image's most important color qualities. Knowing how these approximations work can help you control how the photo may change — hopefully maintaining the intended look or mood.

Each time a gamut mismatch occurs, the CMM uses the rendering intent to decide what qualities of the image it should prioritize. Common rendering intents include: absolute and relative colorimetric, perceptual, and saturation. Each of these types maintains one property of color at the expense of others.

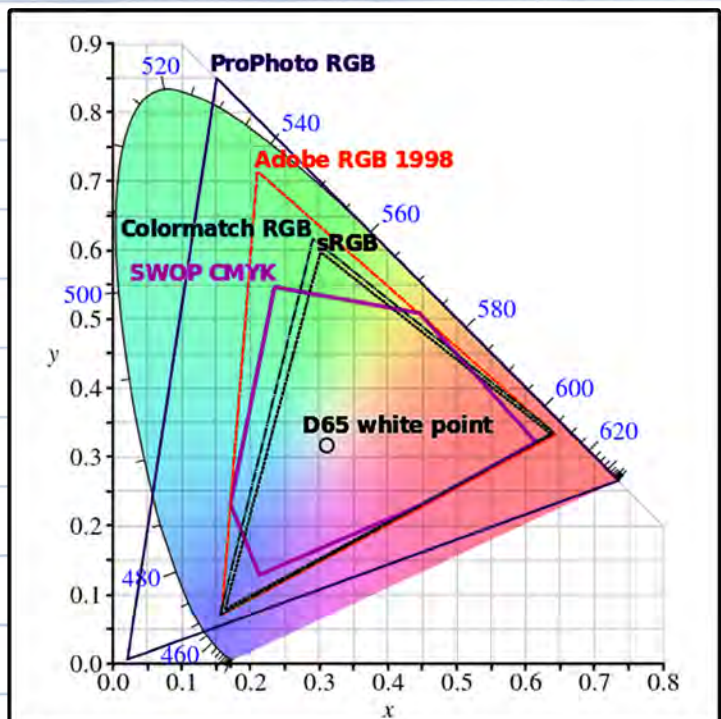


Gamut

In color reproduction, including computer graphics and photography, the gamut, or color gamut, is a certain complete subset of colors. The most common usage refers to the subset of colors which can be accurately represented in a given circumstance, such as within a given color space or by a certain output device.

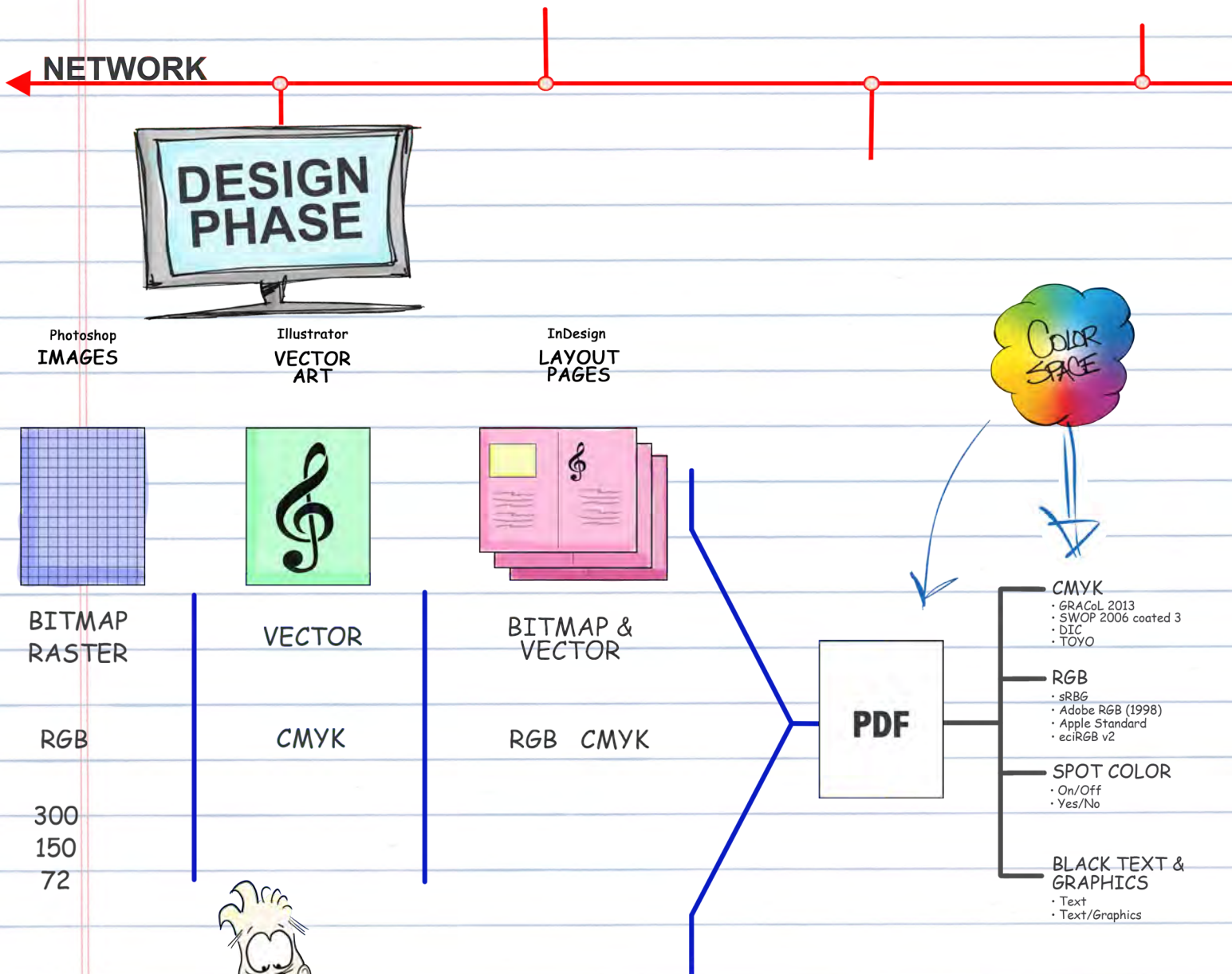
In color theory, the gamut of a device or process is that portion of the color space that can be represented, or reproduced.

When certain colors cannot be expressed within a particular color model, those colors are said to be out of gamut. For example, while pure red can be expressed in the RGB color space, it cannot be expressed in the CMYK color space; pure red is out of gamut in the CMYK color space.



COLOR MANAGEMENT WORKFLOW

File Facing



The Designer has the responsibility to make sure that what is being designed can actually be printed.

Working in the proper color spaces and knowing what the print engine gamut is can help the designed work print with the correct expectation.

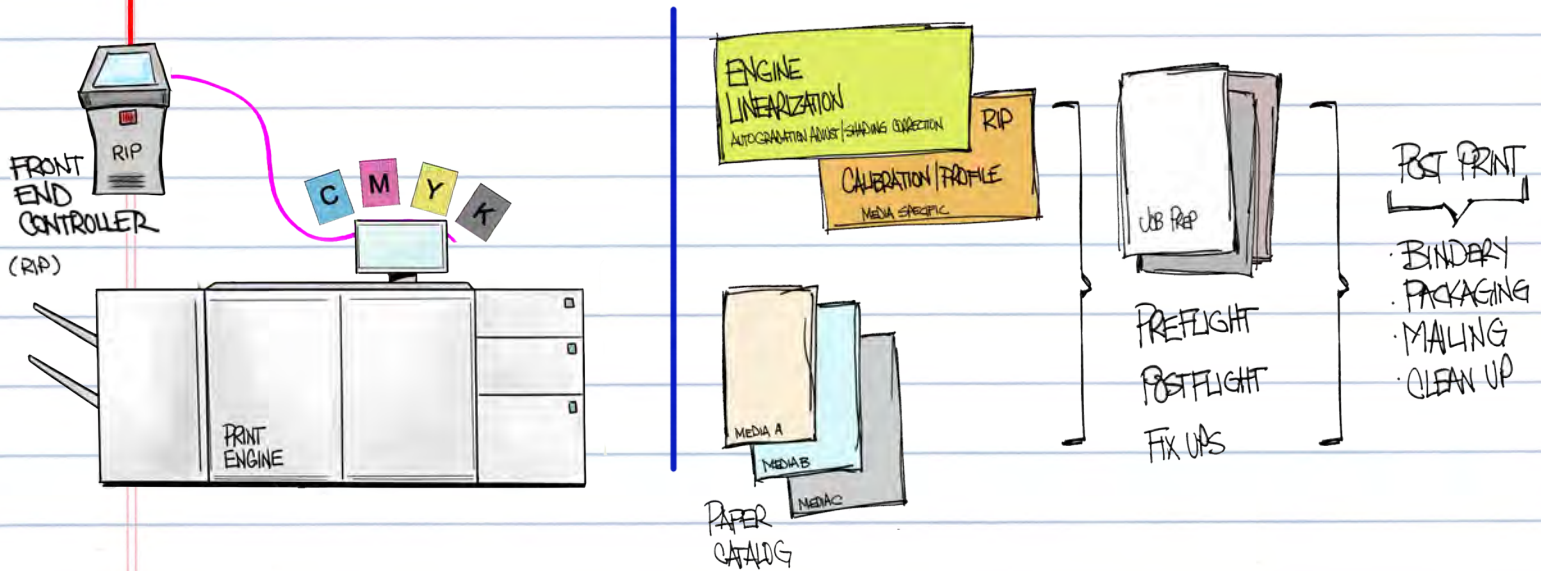
There are times that the Designer has no idea what engine their work will be printed on, and in that case there is no substitute for a well trained Print Operator.

Many things go into designing a document for print, and sometimes when the document does not print to the level of expectations, the fault may lie in what and how the Designer put the pieces together during the design phase.

COLOR MANAGEMENT WORKFLOW

Engine Facing Functions

PRINT PHASE



The Operator has the responsibility to make sure the printed document looks as close to what the Designer created as possible. This means that the Operator must make sure all of the Engine Facing Functions are carried out and correctly adhered to.

The operator maintains the print engine in between service calls taking care that the engine is linearized and calibrated for each day of printing. Along with that, the Operator maintains the paper catalog for the print engine, as well as preparing the electronic job submitted by the Designer.

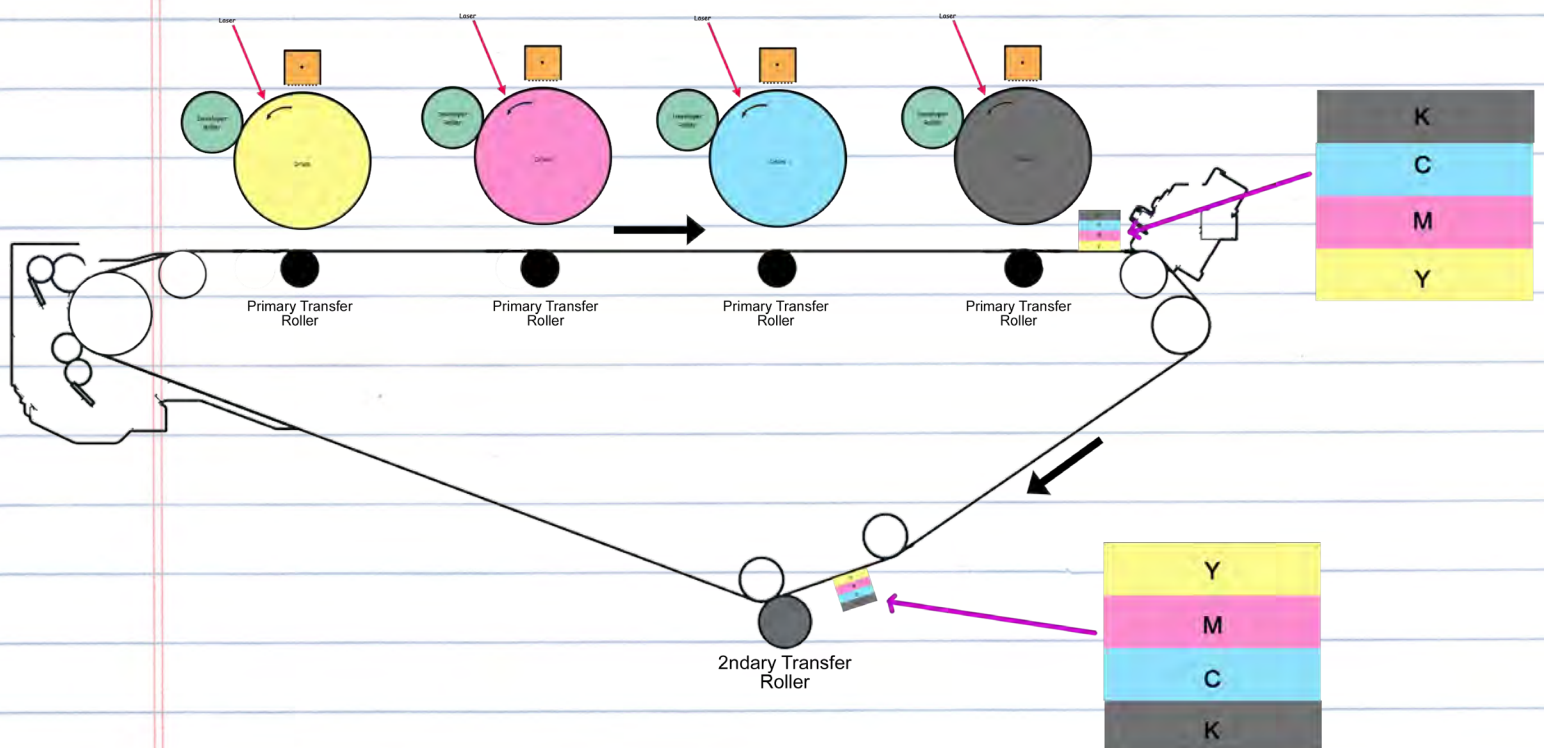
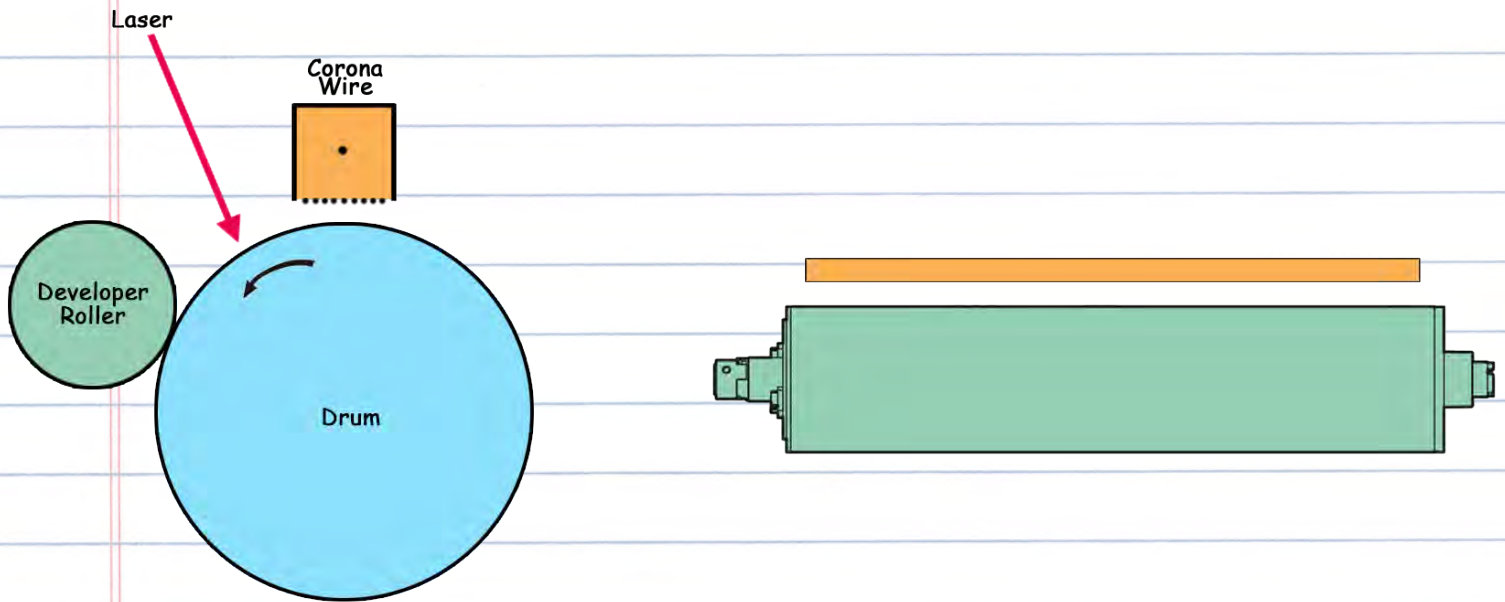
Not only must the Operator make sure the engine is ready for printing, but the job parameters must also be correctly set including the color spaces to print in. The correct set up will make sure the job is printed correctly. By doing all of the work on the print side, the Operator helps to keep customers happy which in turn keeps the Owner happy.

And we all know that when the Owner is happy, they stay out of the print room helping to keep the Operator happy.



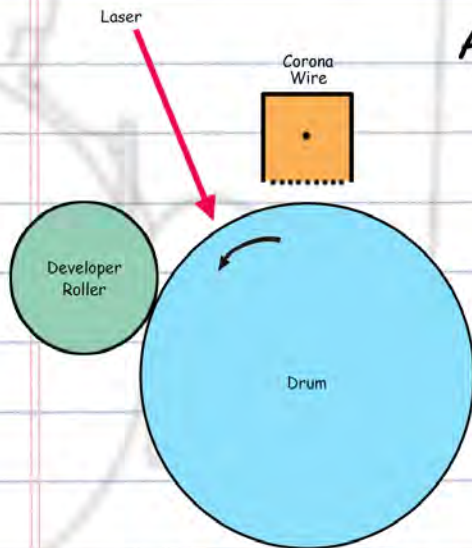
Forming the image

The simple science behind the magic



What am I doing when I have to do ALL these engine adjustment things?

Maintaining the print quality of the printer engine is of over all importance to guaranteeing the repeatable quality output. The linearization of the print engine is the way to make sure the output is reliable and repeatable.



Auto Gradation Adjust - PASCAL Control

AGA is part of the linearization correction process of the printer engine. It allows the engine to correct internal image creation processes.

AGA should be performed to recalibrate the machine when you notice irregularities in the color of the copies or prints, such as when copies or prints turn out to be different from the original in gradation, density, or color.

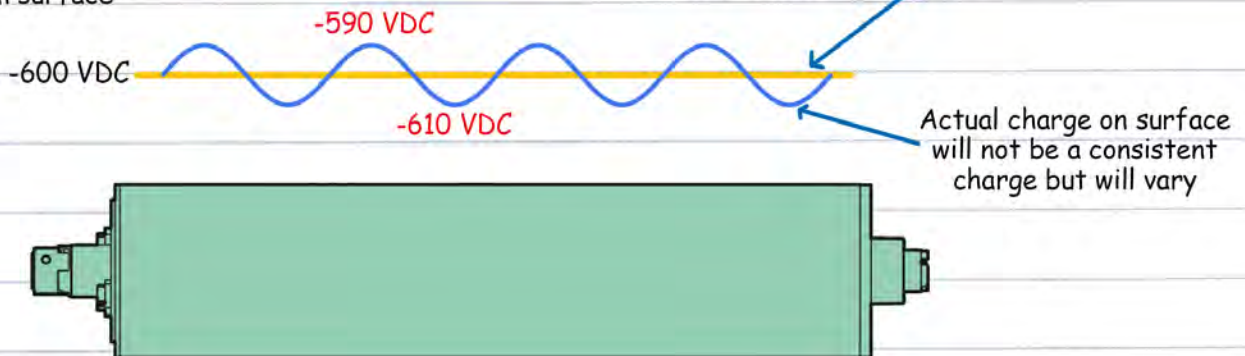
Make sure to perform this function in the stable room environment (i.e. temperature and humidity). The color may become unstable due to the rapid changes in room environment, especially soon after starting up an air conditioner during summer or winter season.

maintain the correct charge levels throughout the system for the best output consistency

Shading Correction

Corrects the slightly uneven densities that occur in the halftone density area of a printed image

Charge on the drum surface

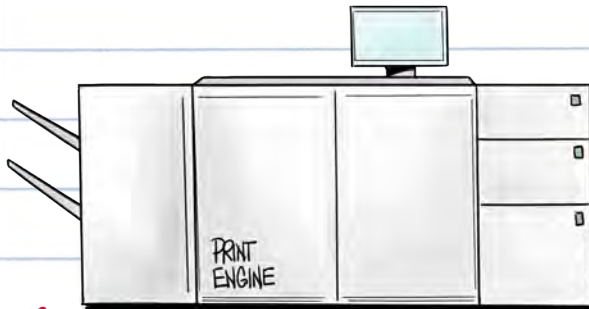


Through AGA and Shading Correction, the engine is linearized helping to keep the quality of the output at a constant state in-between the necessary service appointments.

Color Management at the Printer Level

Calibrations & Profiles

1



Canon

1. Auto Gradation Adjust
2. Shading Correction

2



Front End Controller (RIP)

1. Calibration/Profile

Linearization

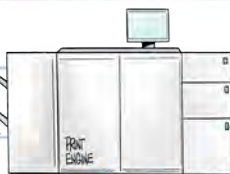
(Maintains the Engine at the benchmark quality)

1. Auto Adjust **RICOH** imagine. change.

(Can be Operator initiated)

CREATION OF A PROFILE

1



PROCESS WILL NEED TO BE REPEATED OVER TIME

2

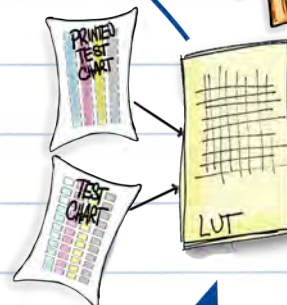


3



PROFILE CREATED BY THE RIP FOR THE TYPE OF PAPER STOCK USED

4

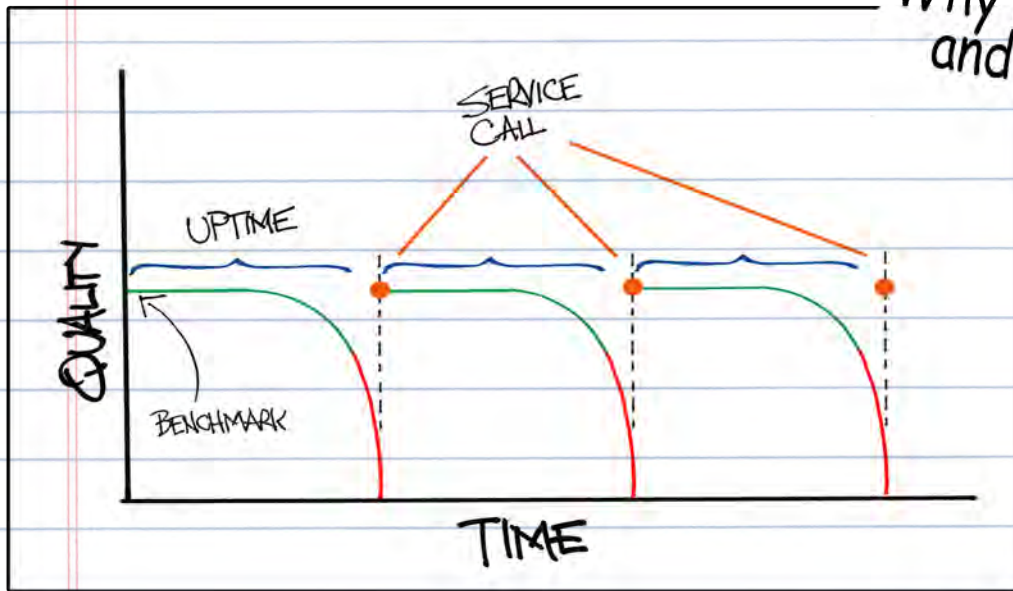


CORRECTED VALUES



PROFILE

Why Linearize a Device
and what is it doing
for us?



HOW TO SUSTAIN THE
QUALITY BENCHMARK
IN BETWEEN SERVICE
CALLS

1 Linearization

Linearization is a 2 step process that helps to maintain the engine's quality by adjusting internal components to compensate for environmental changes. Without performing the linearization adjustments, over time, the print quality will degrade.

2 Profile

Simply put - A good ICC Profile provides an accurate description of the characteristics of a digital or working color space at a given point in time.

A profile is the condition of a device at a single point in time describing or defining the CIE Lab (or CIE XYZ) values that correspond to a given set of RGB or CMYK numbers.

A snapshot of what that device can produce at that moment in time based on the overall values of the environment both inside and outside that device.

LUT Lookup Table

A Lookup Table is an array that replaces runtime computation with a simpler array indexing operation.

The savings in terms of processing time can be significant, since retrieving a value from memory is often faster than undergoing a computation or input/output operation. The tables may be pre-calculated or even stored in hardware in application specific platforms. Lookup Tables are also used extensively to validate values by matching against a list of valid (or invalid) items in an array.

Terms that are good to know.

D-max (image density correction control)

Controls the variation in image density caused by the change in environment, or deterioration of the photosensitive drum or toner.

D-half

Regulates gradation correction in the main controller of the printer in order to achieve optimum gradation characteristics regulation of the gradation correction in order to achieve optimum half tone image.

ATR sensor - adjusting the toner to developer mix ratio.

PASCAL - Auto Gradation Adjust

Patches are created and read by patch sensors. Corrections are made to obtain the ideal image characteristics.

Shading Correction - Improves minor shading issues that typically appear in the halftone areas of a printed image.

Canon

The recommended application of adjustments is:

1. AGA (Auto Gradation Adjustment)
2. Shading Correction
3. AGA (Auto Gradation Adjustment)

RICOH

The recommended application of adjustments is:

Auto Linearization controls at startup or initiated by operator and then RIP profiling.

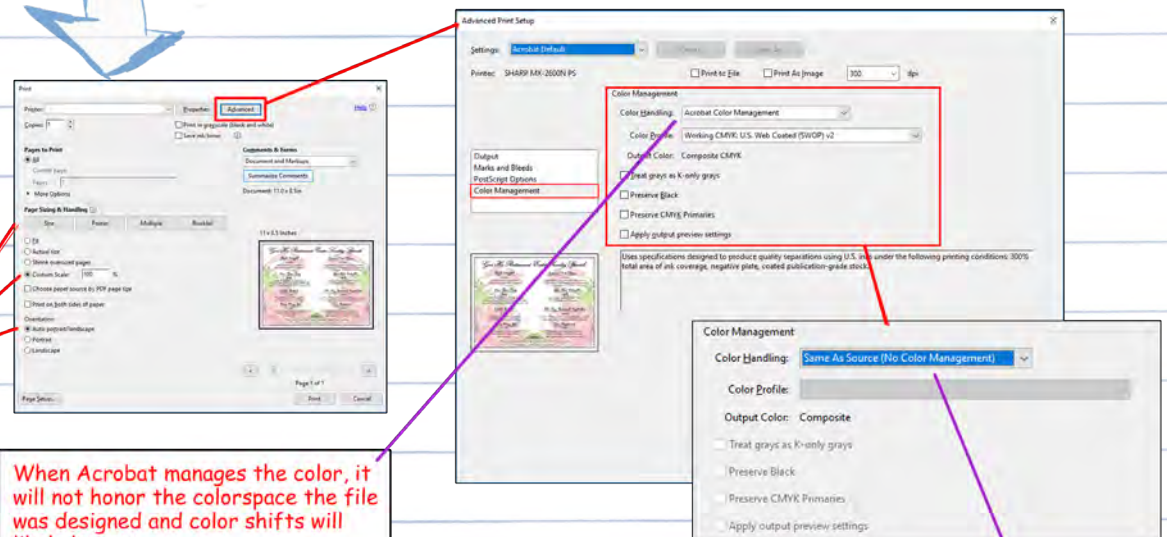
What to Check when Prints Don't Print Right

First - remember that the initial print dialog box is Acrobat's (or whatever program you are currently using) it is not the printer's properties.

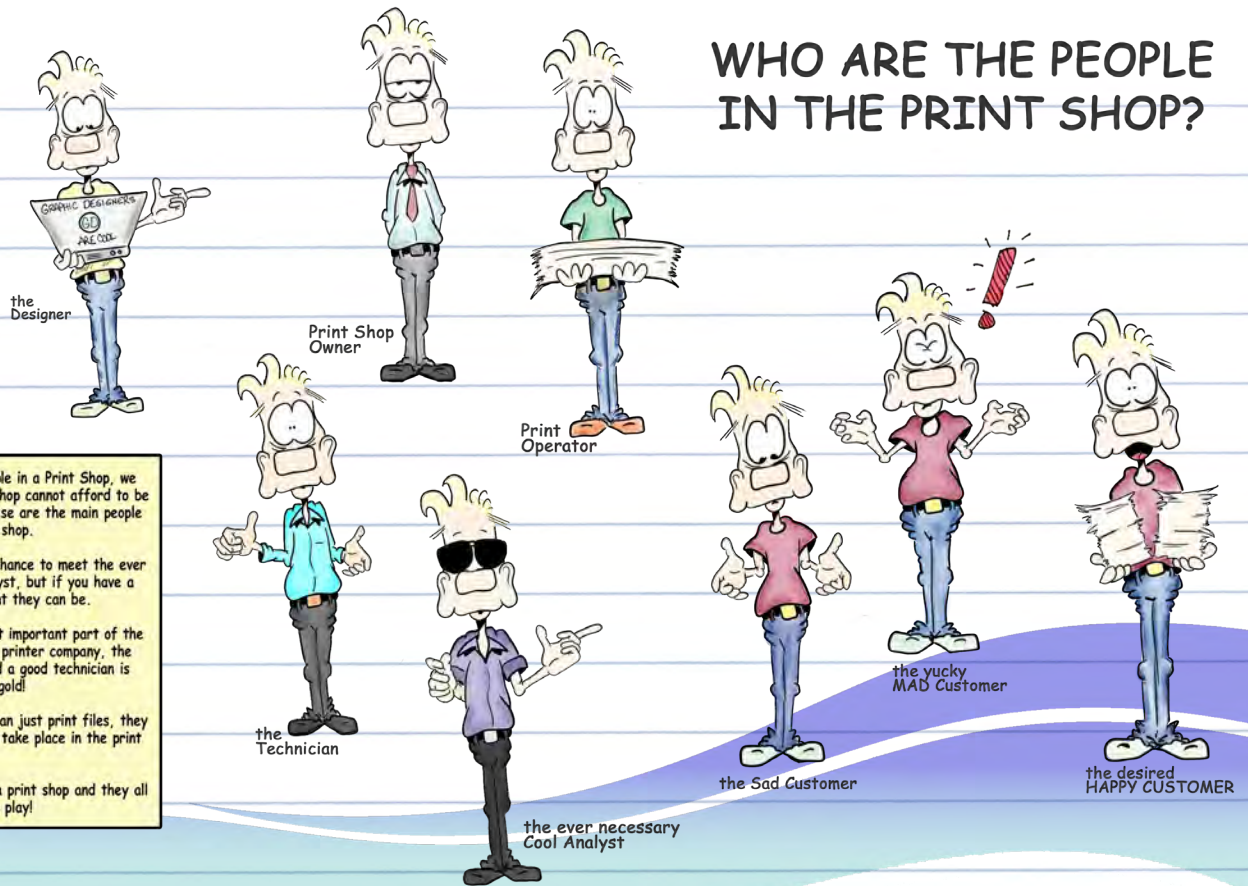
These wonderful quick check boxes can cause many unwanted issues at the printer.

When Acrobat manages the color, it will not honor the colorspace the file was designed and color shifts will likely happen.

Setting Acrobat to "Same As Source" tells Acrobat to let the color management of the file to take place outside of Acrobat and gives the control back to the designer or print operator.



WHO ARE THE PEOPLE IN THE PRINT SHOP?



While these represent most of the people in a Print Shop, we know that there are others that a print shop cannot afford to be without, but the facts are facts and these are the main people you will meet in a print shop.

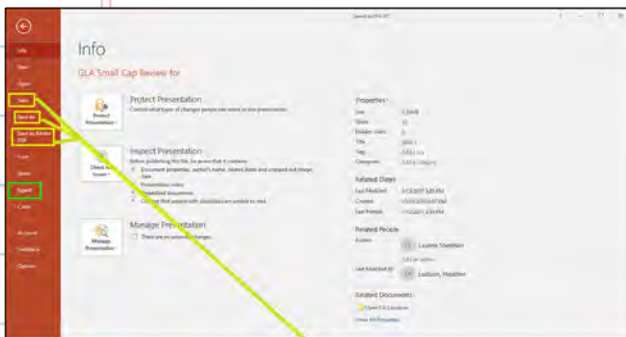
Certainly, the customers rarely get the chance to meet the ever necessary and usually vibrant Cool Analyst, but if you have a good one, you know how important they can be.

Of course the technician can be the most important part of the people in a print shop. Often from the printer company, the technicians keep everything running and a good technician is worth their weight in gold!

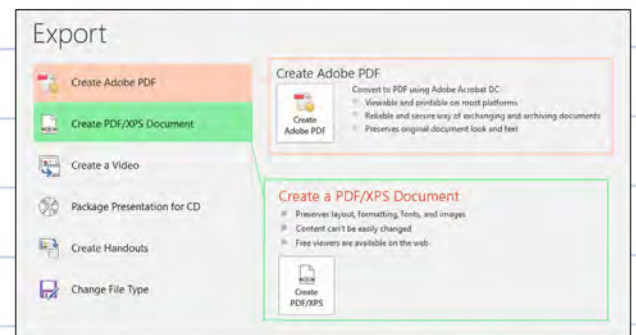
The operators will many times do more than just print files, they will take care of many other things that take place in the print shop.

All in all, these people are the people in a print shop and they all have important roles to play!

Power Point to PDF



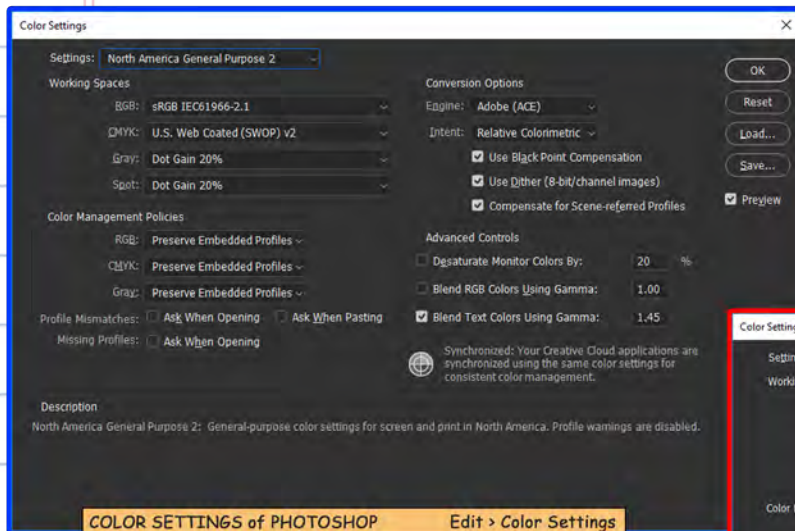
There are several choices that can be made when saving a PPT out to a PDF. Save, Save As and even Save As Adobe PDF, any of these might be just fine but if the PDF doesn't print as expected, you may want to consider using the Export feature.



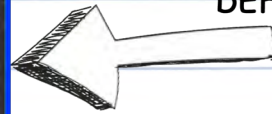
The Export feature can be the best route to go when printing the PDF is what the end game will be. But not each Export is the same. While "Export - Create Adobe PDF" is good, the "Export - Create a PDF/XPS Document" will preserve the design as it was intended to be and will usually result in the closest print to screen match possible.

When printing the PDF from Acrobat, choose Same as Source under Color Management to preserve the PDF color.

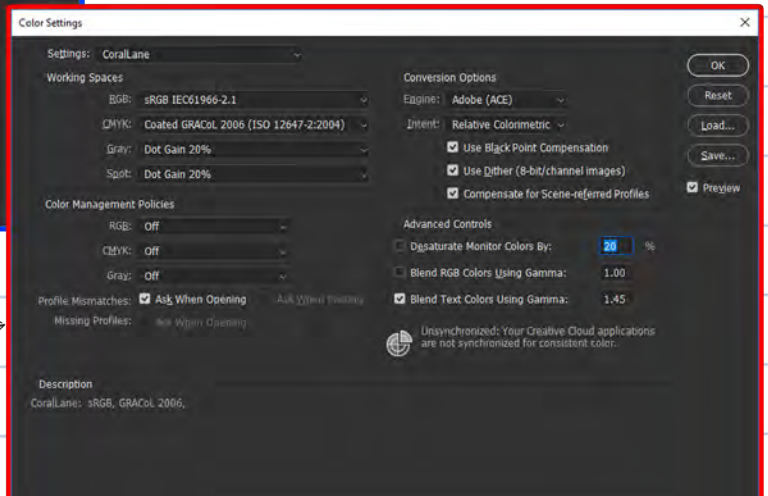
PHOTOSHOP COLOR SETTINGS



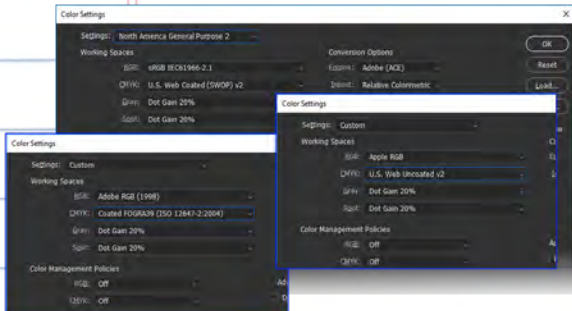
DEFAULT SETTING OUT OF THE BOX



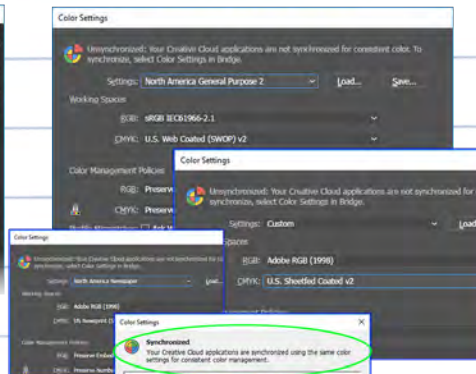
CUSTOM SETTINGS APPLIED FROM ADOBE BRIDGE



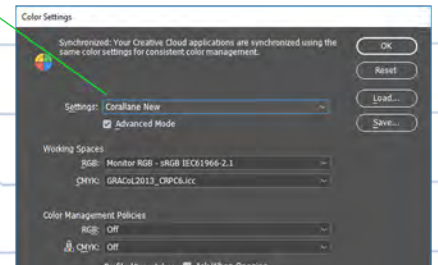
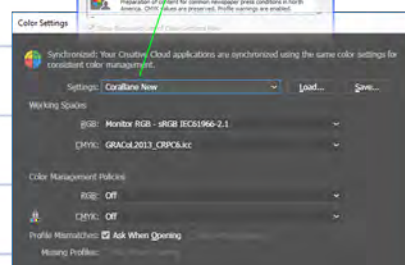
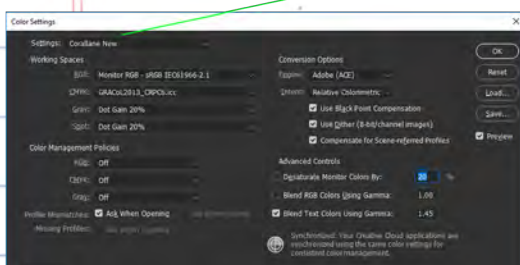
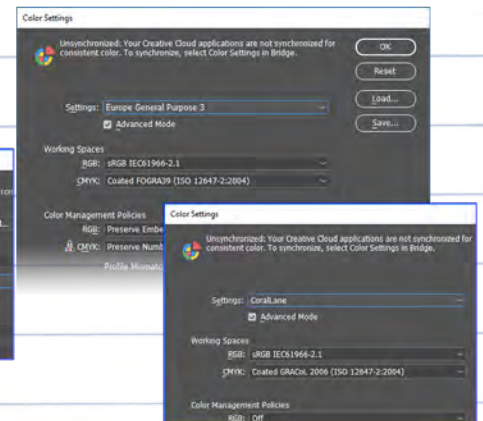
PHOTOSHOP



ILLUSTRATOR



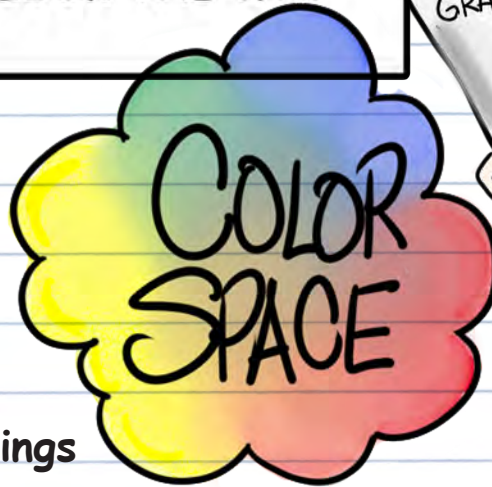
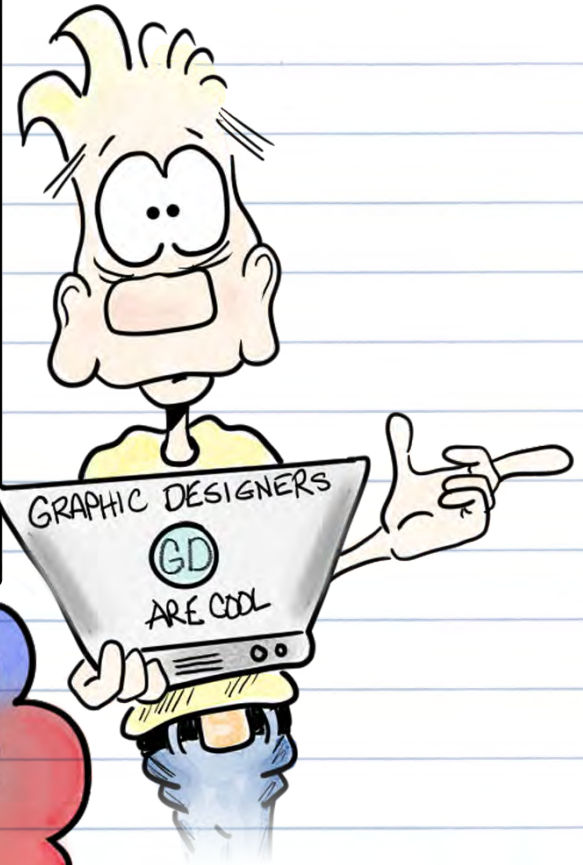
INDESIGN



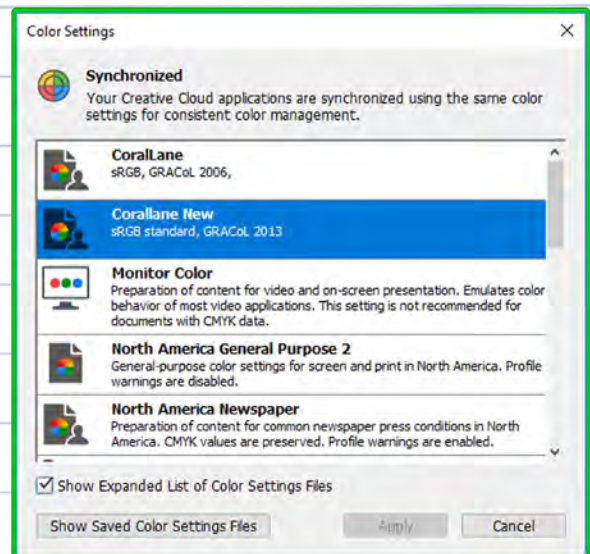
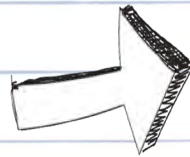
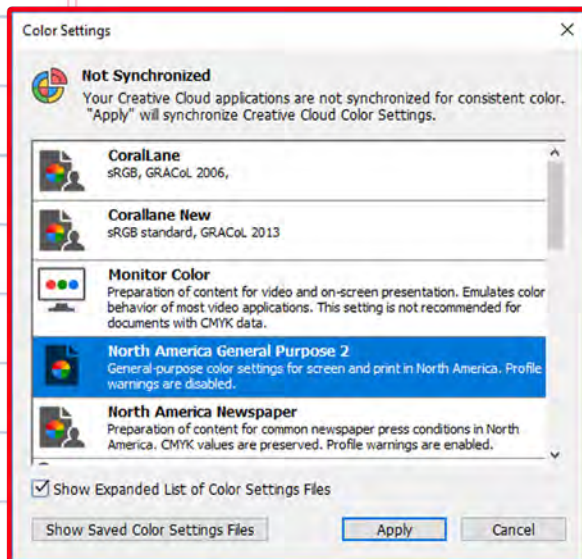
THE POINT IS...

MOST PEOPLE, DESIGNERS OR NOT, DON'T KNOW WHAT COLOR SPACE THEY ARE DESIGNING IN AND SOME DON'T EVEN KNOW WHAT A COLOR SPACE IS.

SO HELPING THEM UNDERSTAND HOW HAVING THE COLOR SPACES SYNCED BETWEEN PROGRAMS WILL HELP THE PRINTED DOCUMENT LOOK THE WAY THEY WANT.



Adobe Bridge Settings



Adobe Bridge is the center point for ALL Adobe graphics applications. It acts as a central hub for managing creative assets, particularly for users of Adobe's Creative Cloud suite. It allows for efficient browsing, organization, and editing of files, including photos, vectors, videos, and 3D files. Bridge streamlines workflows by enabling batch renaming, meta data editing, and integration with other Adobe applications.



By day, Matthew Watkins is a Color Analyst in the Digital Printing World and at night or on the weekends you can find him behind his drawing table or behind one of several types of cameras and then possibly in front of his computer either editing files like this one or video and maybe even a photo or two.

He holds several industry certificates including but not limited to, Idealliance G7 Expert, EFI Fiery Expert, Adobe certifications, some Microsoft certifications and other things that say he might actually know something about something.

For the most part he is a self proclaimed color nerd/geek and loves nothing more than to learn all he can about the wonderful fun filled universe that is all things color.

He is also a certified trainer and enjoys giving as much of his knowledge away as others will let him. "Sharing is the best part of knowing something."

He is married to the best wife in the whole wide world and has four of the best kids you could come across. He resides in the state of confusion and Illinois, which some might say are one in the same. On a hot summer day you might find him lounging in the back yard pool or in front of the TV if the Cubs are playing. If, of course, he has the day off!

Should you like to reach him, he can be found at his LinkedIn page:
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