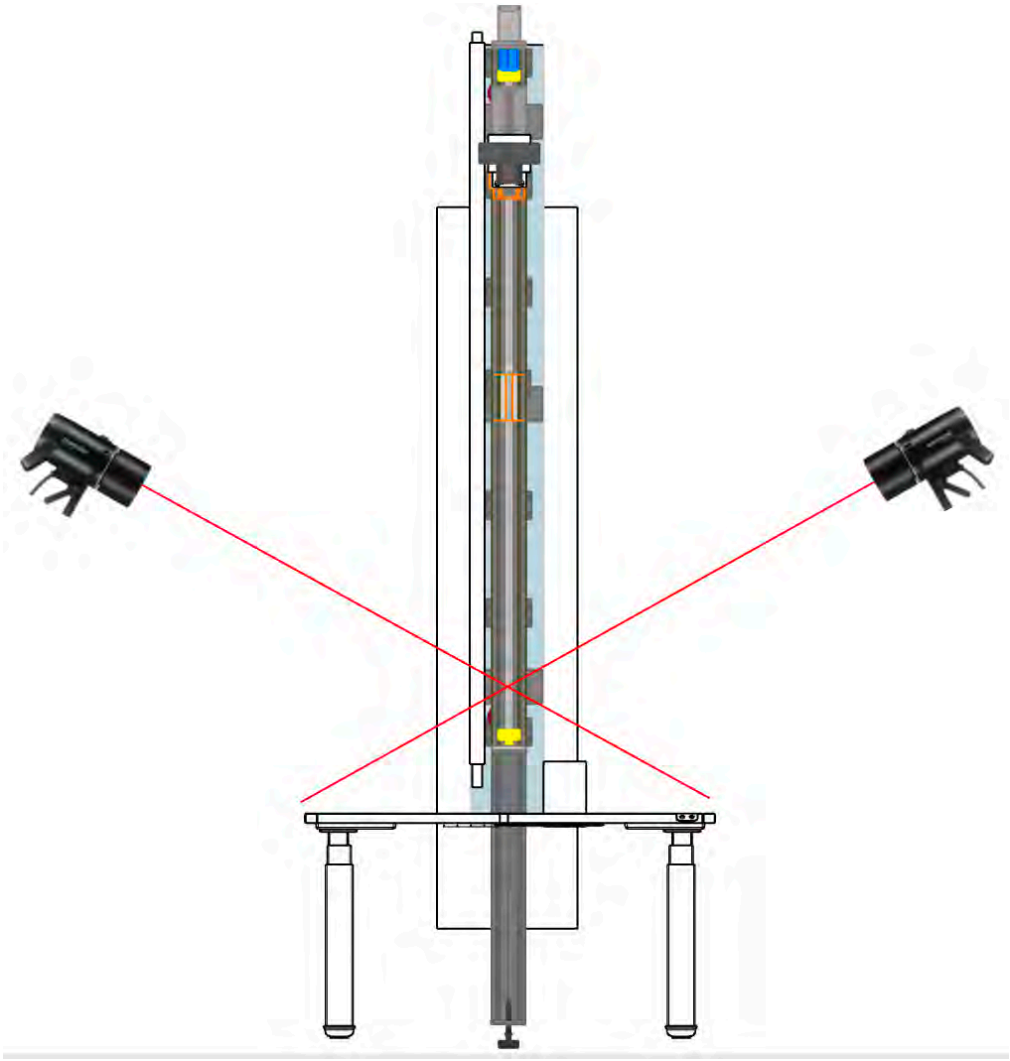


**Broncolor LED F160 - Cultural Heritage Copy Stand Application**

## Questions

1. How did you get started in photography and how did you end up doing the work you do now with cultural heritage institutions?
2. What does your testing process entail?
3. Tell us about a recent project you worked on.
4. Why do you choose Broncolor for your work?
5. What sets Broncolor apart for cultural heritage preservation work?

## How did you get started in photography and how did you end up doing the work you do now with cultural heritage institutions?

My lifelong passion for photography began at 11 years old when I received my first camera, a Kodak Brownie Starmite.


I never stopped making images and exploring all aspects of photography. Being an Army dependent gave me access to free darkrooms where I learned to process film and print. At the University of CT, I majored in Graphics and Photography and started my free lance photography career after graduating.

To make a living, I would shoot anything…friends weddings, images for city of Hartford slide shows, sports for Uconn, images for UConn newspaper, portraits, table top products, PR photos, etc. Was finally able to rent a live / work studio space in a factory building in downtown Hartford where I started getting corporate and commercial work mostly through ad agencies and audio visual producers. Added my first Broncolor lighting in 1979 to meet the needs of my evolving client base.

Business grew, so I moved to East Hartford to a much larger space and added lab services to my photo studio. An architect friend helped me design the space and we continued to evolve the business. I added employees and services and we became a combination of photo studio and service bureau. We were an early adopter of digital photography and became one of the first users of the Leaf and Kodak digital cameras. Since we were already doing computer slides and film recording, it seemed like a good idea to shoot digital and skip film and scanning. Leaf asked us to help sell their digital backs, so I added the “Photo Equipment Sales” to our list of services. Since I was used to creating workstations with workflows and training people, I used that formula to sell digital backs, which eventually led us to the cultural heritage world. We had become a reseller for Sinar Bron Imaging and the SBI rep in Boston was looking for a dealer/integrator with expertise using the equipment in a production environment to help museums. The Museum of Fine Arts, Boston was looking for more than the local dealer could provide, so we bonded and continue to work together today. This led to more opportunities with other cultural heritage organizations which has now become most of my work, although I still have some of my old commercial studio clients. Around the same time, Kodak contracted with me to be a digital consultant. Their color management and software development department in Lowell, MA made our studio their real world testing ground. The FADGI specifications that most museums and libraries use today were created by ex Kodak color engineers who are still updating their work today.
Currently, I am designing assembling and installing digital labs in museums and libraries. I also write the workflow manuals and provide training.

## What does your testing process entail?

My cultural heritage color managed digital capture testing process varies depending on what is being archived, space available, camera, lighting, computer, software and other gear being used. However, all my testing employs the same basic steps and procedures.

I have created 2d and 3d color managed workflows for Hasselblad, Fuji, Canon, Nikon, and Sony cameras. The lighting is usually Broncolor strobes or LEDs. The software workflows can be Hasselblad Phocus, Phase One Capture One Pro, Adobe Camera RAW or Lightroom Classic (combined with manufacturers capture utilities, etc.)

The following testing and color management steps were used for a recent copy stand integration solution using a **Nikon D850 camera, Broncolor F160 LED lighting, and an Adobe Lightroom Classic / Photoshop workflow.**

The goal for this system was to create a well tuned, turn key copy stand system that delivers 4 star FADGI* results.

I started with a survey to determine the type and size of the **(1) objects to be archived** and the **(2) physical specifications of the copy stand room**. Once the specs are determined I create a **(3) list of the equipment needed** and setup a duplicate of the proposed system in my testing studio. Then I run tests to verify everything will work as planned. This allows us to make changes and enhancements and evolve the proposed list of gear before approvals and POs.

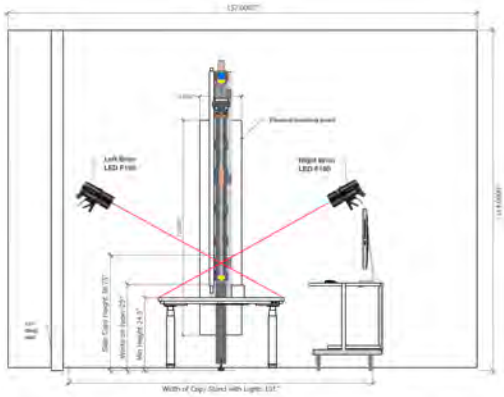
* *FADGI stands for "Federal Agencies Digital Guidelines Initiative". They produce the "Technical Guidelines for Digitizing Cultural Heritage Materials" PDF document which contains all the digital specifications for the various objects reproduced in cultural heritage digital labs*.
***Link - https://www.digitizationguidelines.gov***

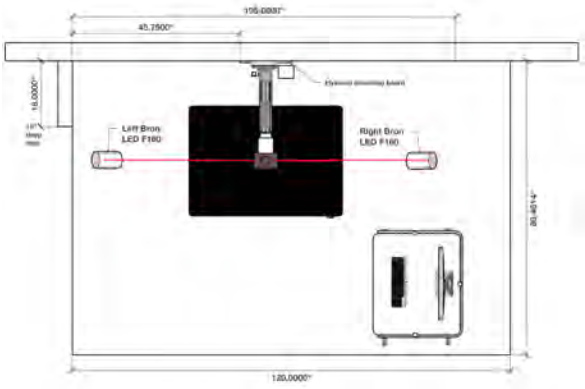
**(1) Objects to be archived:**

Photographs up to 11 x 14 in size
Other works on paper up to 11x14" in size
35mm slides (backlit transparencies)
Other film sizes up to 8x10

**(2) Physical specifications of the copy stand room:**

Start with space that the museum has allocated (room length and width and ceiling height). Designate windows and doors. Create a floor plan with equipment in place showing precise measurements.





# What does your testing process entail?

## (3) List of equipment needed:

**Hardware Used: (for daily production and process control)**

Nikon D850
AC Adapter Kit for Nikon
Sigma ART 50mm lens for prints and Tamron 90mm Macro Lens for 35mm slides and negatives
Ulsaker Motorized wall mounted copy column with geared head
Ulsaker 40” x 30” motorized adjustable height copy table
2 - Broncolor F160 LED lamp heads with table mounted support brackets
Calibrite SG and ISA Object Level 1X targets
Laser Level Kit
Calibrite ColorChecker Display Plus (to calibrate monitor)
iMac Computer (recent and powerful)

**Software Used: (for daily production and process control)**

Nikon Camera Control Pro 2 for capture and live view to focus and compose
Adobe Lightroom Classic for importing and organizing RAW files, applying all metadata, profiles, presets and exporting final tif master files.
Adobe Photoshop for custom edits, applying uniformity illuminance masks and stitching.
Adobe Bridge and Camera RAW to create test file of target for BCI6 camera profiling
Calibrate ccProfiler for monitor calibration.
DELT.ae website to enter custom reference numbers, analyze targets and verify FADGI rating.
Broncolor BronControl software to control lighting (recommend Enterprise mode).

**Gear and software for Ulsaker calibrating and setup procedures:**

**Testing Hardware:**

X-Rite I1Pro2 Spectrophotometer - to test color accuracy of Bron LED lights
X-Rite I1IO - to create custom reference files for color targets

**Measurement and Profiling Software:**

Basiccolor Input 6 (BCI6) to create camera profiles (DCP Adobe & ICC for C1Pro).
X-Rite i1 Profiler to create custom reference files for Calibrate SG and ISA Object Level 1X targets
DELT.ae website to enter custom reference numbers, analyze targets and verify FADGI rating.
Babelcolor CT&A software to verify color accuracy of each lamp head.

# What does your testing process entail?

**Sample Testing process:** ***(Process used for a recent installation at the Lincoln Center)***
**Nikon D850 / Adobe LRC (Lightroom Classic) Workflow with Broncolor F160 LED Lights**

N**ote:** *The following process is an overview of my testing and profiling system to create and tune an accurate and efficient copy stand system. It is not a training manual. After a system is installed, I provide detailed training with documentation to enable photographers to be up and running quickly and producing accurate images.*

**Testing "Proposed" System in Ulsaker Studio:**

Using Ulsaker Studio test equipment, we setup a duplicate of the proposed system in the Ulsaker testing studio, using the newly created equipment list and the space measurements as a guide. We use this setup to run tests in our test studio to verify that items being shot will meet the FADGI thresholds and achieve 4 star ratings using the museum's provided room specifications. This test also determines if there is enough room for lenses and lights to accommodate all desired sizes of art in the collection.

**List of Steps:**

1 - Environmental room preparation
2 **-** Electrical Plan
3 - Create "Ulsaker Reference Folder" on computer desktop
4 - Calibrate Targets and save measurement files for use in BCI6 and the DELT.ae analysis site
5 - Foundation Setup
    A-Setup Lighting -
        (1) Setup BronControl Enterprise Mode
        (2) Adjust settings on each lamp head
        (3) Position and angle Lights
        (4) Testing Accuracy of F160 LED lamp with Babelcolor CT&A
    B-Position camera at 600 PPI height
    C- Laser Level camera
    D-Setup standard test target shot
    E-Set Nikon Camera settings in NCCP2 utility
    F-Setup Adobe Camera RAW (ACR) settings to create BCI Profile target Image
    G-Create Camera DCP Profile in BCI6
    H-Load "New" camera profile in ACR and create Master Curve (for new profile)
    I-Process Test target file in ACR and photoshop
    J-Upload "Processed" target file to DELTae site and analyze results.
    K-Setup Lightroom Classic to shoot Production Images
    L-Compare Art Illuminated by Bron LED lighting to your Calibrated Monitor image
6 - Daily Process Control

**1-Environmental room preparation:**

Ceiling above and wall behind the copy stand must be black. Use curtains to block off excess ambient light from windows or overhead room lighting, etc. This is especially important for LED lighting due to the longer exposure time versus strobes. We shoot an ambient light test using our standard speed and aperture to determine if any additional unwanted stray light is illuminating our art surface. Black plywood should be attached to the wall for mounting motorized copy column. Museum facilities technicians should prepare the space before installation and training.

# What does your testing process entail?

**2-Electrical Plan:**

***Create Electrical Plan showing power usage for:***

Bron LED Lights - 2 plugs
Motorized Copy Camera Column - 1 plug
Motorized adjustable table - 1 plug
AC Adapter for Camera - 1 plug
Disable and cover with black any overhead ceiling lights.
Apple iMac - 1 plug
AC powered USB Hub - 1 plug
Plugs should be located in logical positions for all equipment
The museum's electrician should update power as requires before installation.

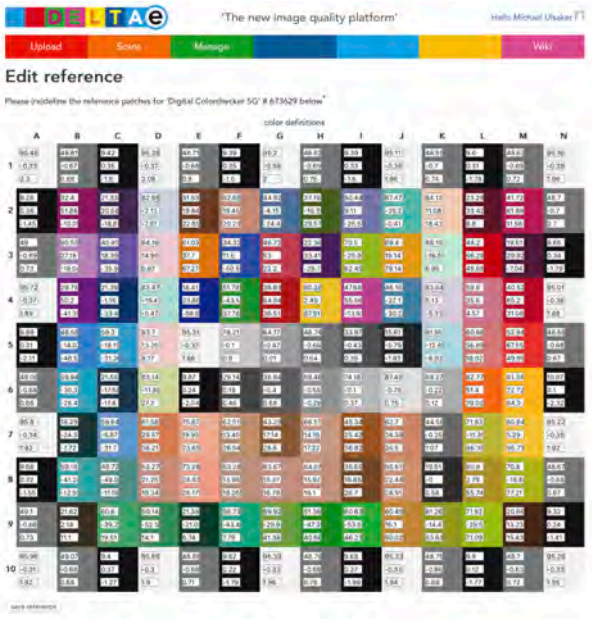
**3-Create "Ulsaker Reference Folder" on desktop which contains:**

Camera Profile & Presets folder
Target calibration Measurements folder
Manufacturers Manuals Folder (for all equipment; camera, lights, etc.)
Ulsaker Custom Manuals folder
Misc Notes folder
Testing Target files (for profile creation and DELT testing) folder

**4-Calibrate Targets and save measurement files for use in BCI6 and the DELT.ae analysis site**

I use i1Profiler software and the i1Pro2 spectrophotometer to create custom measurement reference files of the Calibrite SG and the ISA Object level 1X target. Hasselblad Phocus, the DELTae website and BCI6 will use these measurements to create a lower (better) Delta E result for more accurate color.

Enter reference values on DELTae site.




Read values of SG target using i1iO Automated Scanning Table.

Read values of Object Level 1x target with i1Pro2

# What does your testing process entail?

**5-Foundation Setup:**

The following testing process is used to create a complete turn key copy stand solution. Most of these steps are only done once to create a well lit and profiled foundation.

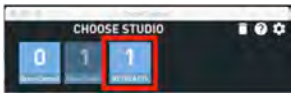
**A - Setup Lighting:**

**(1) Setup Enterprise Mode**

Follow the instructions in the appendix of this document to setup the “Enterprise Mode”. Enterprise mode connects the F160 LED lamp heads to your WIFI router and the bronControl software will allow control of each head from your computer.

Control the lamp heads.


Choose WIFI router.



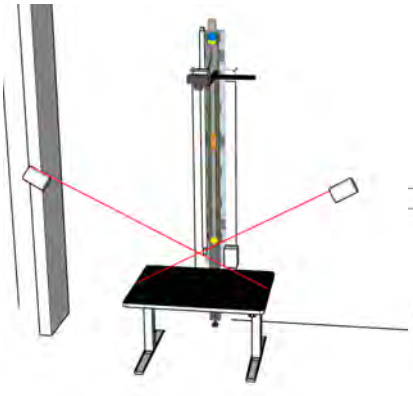

**(2) Adjust settings on each lamp head**

Set power on Broncolor F160 Lamp head to 10 to start. If necessary, a minor power adjustment may be needed. Color temperature should be D5500 / 0G

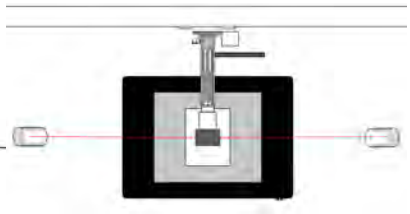

**(3) Position and angle Lights**

Distance from light mount to center of lens - 42.5” (For LC prints up to 11x14)
LED Lamp head height above table surface - approximately 36”
LED Lamp head angle adjusted until head points to opposite end of tabletop.

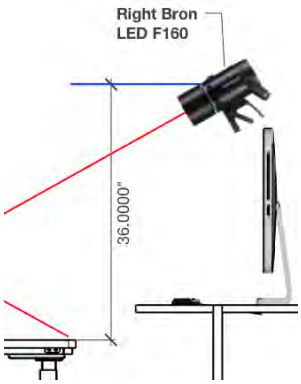
Aim Lights to opposite table edges



Lights centered on lens position



Lights approximately 36” above table top

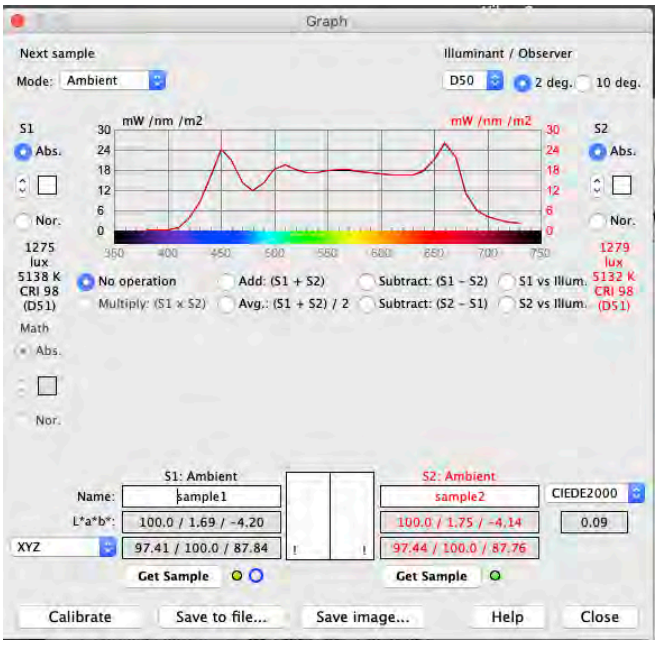


# What does your testing process entail?

**(4) Testing Accuracy of F160 LED lamp with Babelcolor CT&A**

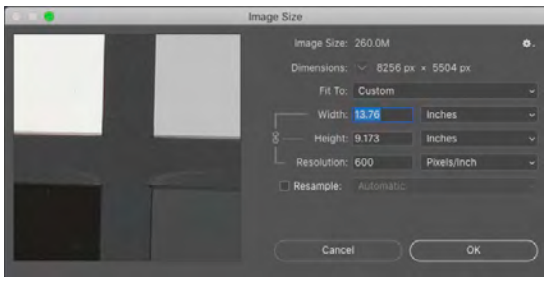
We use Babelcolor CT&A to create Color Temp tests of each lamp head with i1Pro2 Spectrophotometer to verify color accuracy.

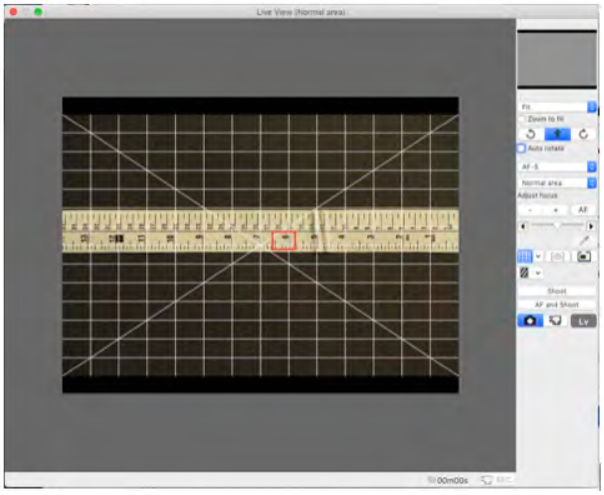
Graph & Image of i1pro on stand:




**B-Position camera at 600 PPI height**

Place a ruler on the copy table under the camera with the Sigma ART 50mm lens mounted. In Nikon Camera Control 2 Software, turn on live view and raise or lower the camera until the viewfinder can see 13.76” from left to right in focus. You are now at 600 PPI height.



## What does your testing process entail?

### C-Laser Level camera

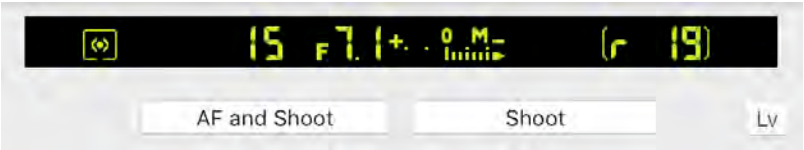
Laser leveling is an easy way to insure the camera's sensor is parallel to the surface of the copy table to maximize sharp focus in all 4 corners of the image. Adjust geared head until red laser beam reflects off of mirror filter directly onto the source of the beam.


### D-Setup standard test target shot

Turn on "Live View" in Nikon Camera Control 2. Setup Targets with $1 Bill (focusing $1 bill is mounted on matte board to match test target's thickness)


### E-Set Nikon Camera settings in NCCP2 utility

1/15 Second Shutter Speed (Bron LED Lights at 10 power) F/7.1



# What does your testing process entail?

**F-Setup Adobe Camera RAW (ACR) settings to create BCI DCP Profile target Image**

**Shoot and open RAW file of targets in Adobe Camera Raw (ACR).**

**Use the following settings**

Use “Adobe standard” for camera profile
Use Linear Curve
Load Lens Profile in “Optics” and select the “Remove Chromatic Aberration” check box.
No Sharpening (Set “Detail” amount to 0)
Set “Calibration Process” to Version 2
White Balance on G5 Patch of SG target or #15 patch of ISA target
ALL Exposure adjustments set to 0

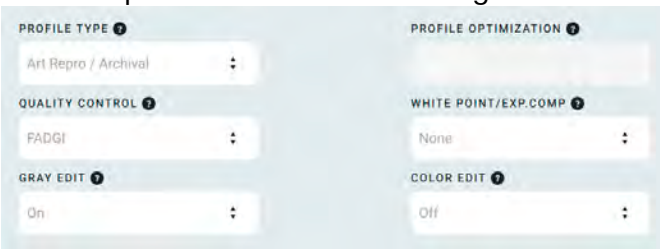
Shoot f stop sharpness test. try different f stops and choose the sharpest one.
Lay a white matte board over the targets with all lights out. Shoot white matte board for ambient light test. Analyze image with eyedropper. Make adjustments, if needed, to eliminate unwanted stray light. Remove white matte board.

Shoot targets and adjust light power until white point (E5 Patch) is approximately 235
White balance on the SG target’s G5 patch.
Save Master Settings file and name it (click on three dot icon and choose “Save Settings…”
Set the “Workflow Settings” in Camera Raw Preferences to:


Click on “Open” to apply settings and RAW target file will open in Photoshop.
Re-place and shoot white matte board filling the camera’s frame.
Load Master Settings Bre-BCI6 Preset to apply settings to white image and open in Photoshop.

**G-Create Camera DCP Profile using Target Image in BCI6**

Open BCI6
Select Art Repro/Archival with Preset that has your target’s custom reference file…
Select Expert mode and turn shading on to use our White reference file




Create and name -
Keep BCI Camera Name as prefix
Added_RA_LC_Date_Version (Example: Nikon D850_RA_LC_8_13_2022_v1)
Process and create profile.
BCI6 automatically saves DCP profiles to the Adobe/CameraRaw/CameraProfiles folder

## What does your testing process entail?

**H-Load “New” camera profile in ACR and create Master Curve (for new profile)**

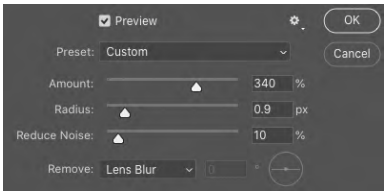
Re-open same RAW NEF target file used for BCI6 DCP profile creation in ACR.
Load new BCI6 DCP profile made from NEF RAW file of targets.


Make new curve to match grayscale values in ISA target and save it.
Name it - ND850_CRV_LC_8_13_2022_v1
**Note:** *This curve must always be used as a companion that “Completes” the camera profile.*
White Balance on G5 patch of SG target
Check E5 patch and adjust exposure (light power) until it reaches 95 L value or 240-245 RGB
Save new Master Settings file (these settings will be used for all production images).
Save as tiff 8 bit, upload to DELT.ae and review results.

**I-Process Test target file in ACR and photoshop**

Output to tif 16 bit / eciRGBv2 to Photoshop
Shoot White IU (full frame) image, white balance and open in Photoshop
Create and apply Photoshop Illuminance Uniformity Mask using white image with target file.
Apply gaussian blur to white image.
In Levels adjust brightest area with white slider until barely 255 and save.
Create Illuminance uniformity mask - copy and paste processed white image onto target image and select “Divide” mode in “Layers” (this process creates perfect uniformity of lighting).

Apply Photoshop Smart Sharpening to target image:

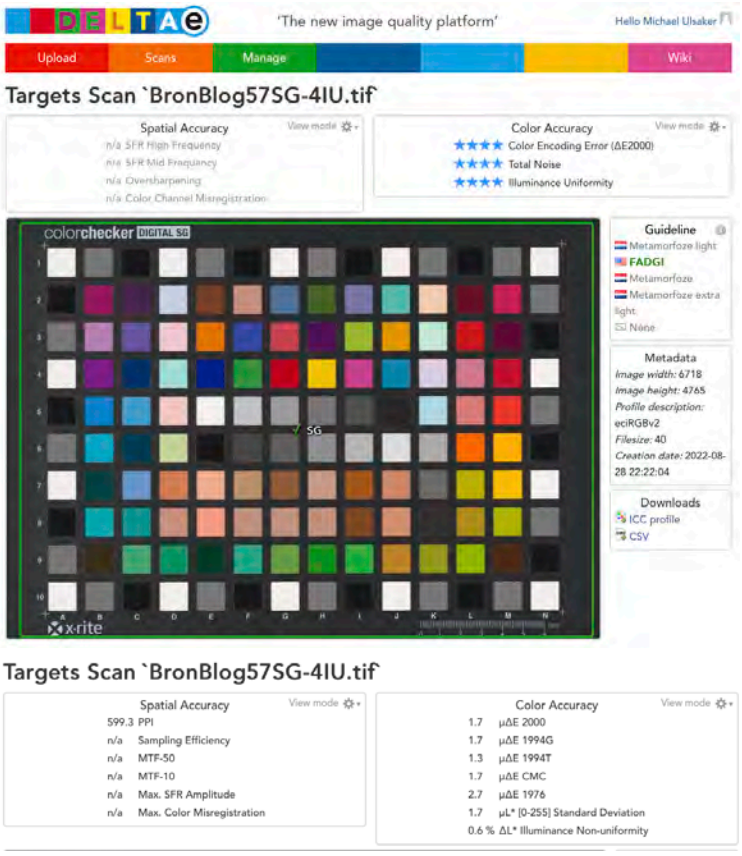


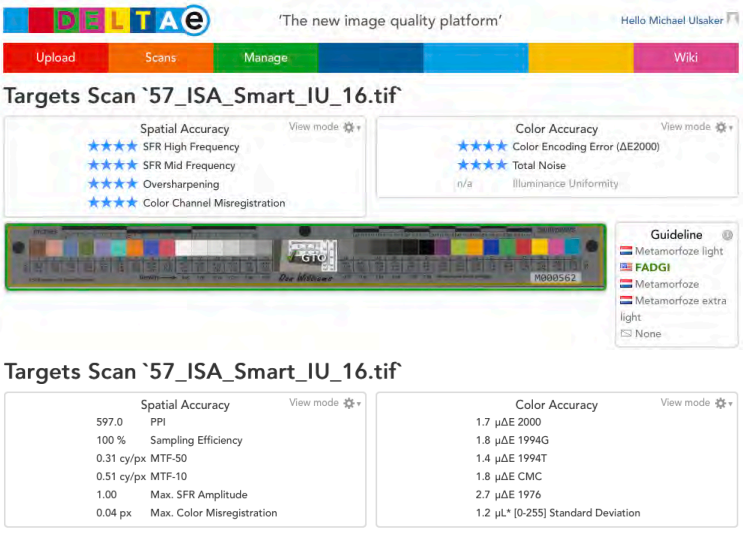

**J-Upload “Processed” target file to DELTae site and analyze results.**

Login to “Free” analysis site to upload your target tif file and see your FADGI results.
https://deltae.picturae.com/upload

## What does your testing process entail?

View your results:



## What does your testing process entail?

**K-Setup Lightroom Classic to shoot Production Images**

***Setup LRC with same settings from the ACR test:***

Open LRC
Create new catalog
Setup Auto Import (NCCP@ utility destination folder is the LRC “Auto Import” folder)
Load Camera DCP profile (Made in BCI6)
Load Companion Curve created in ACR for New DCP Profile
Set Calibration Process to Version 2
Create new Master user settings preset

**Shoot Production Images:**

Shoot actual museum objects from collections for “Production Test” and apply Illuminance Uniformity Mask to insure lighting uniformity.

**L-Compare Art Illuminated by Bron LED lighting to your Calibrated Monitor image:**

Accurate Lighting for viewing and editing:
Turn on 1 lamp only with Barn doors (adjust barn doors if light strikes your monitor)
Reduce power using bronControl until illuminated art matches the monitor’s intensity.
**Note:** *Monitor should be calibrated!*
Confirm accuracy of digital image on screen to Art and edit if necessary

Image on monitor

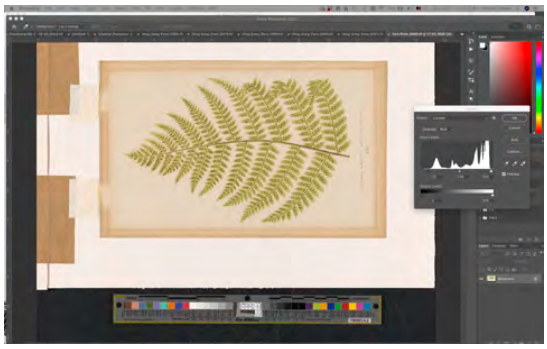


Image on copy table

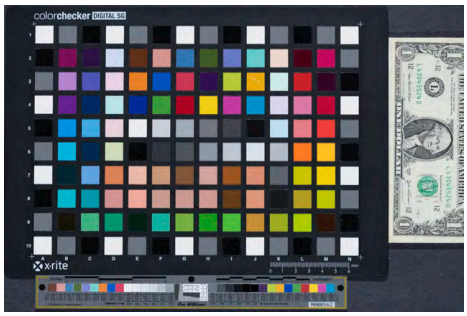
## What does your testing process entail?

**6-“Daily” process control routine:**

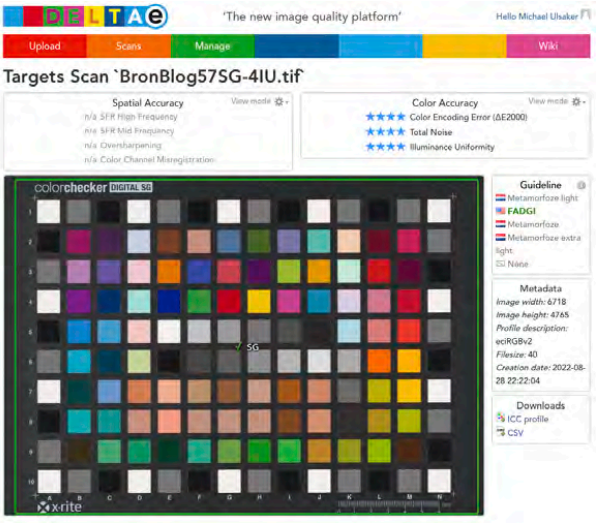
A “Daily” process control routine, which is quick and easy, is used to verify that all is working correctly before shooting begins. In a production environment it is always possible for a setting to be accidentally changed, so it is good to have a quick QC check routine before starting a shooting session.

**Steps:**

Open LRC and Nikon Camera Control Pro 2
Turn on Live View in NCCP2
Setup standard target setup.




Set camera to 600 ppi height
Make sure Lighting is angled and positioned correctly
Make sure standard power and other settings on are correct on lamp heads
Make sure Master User Preset in is selected LRC
Export the file to a tif 8 bit image and upload to the DELTae site.
Analyze results. If good…proceed with shooting daily production.

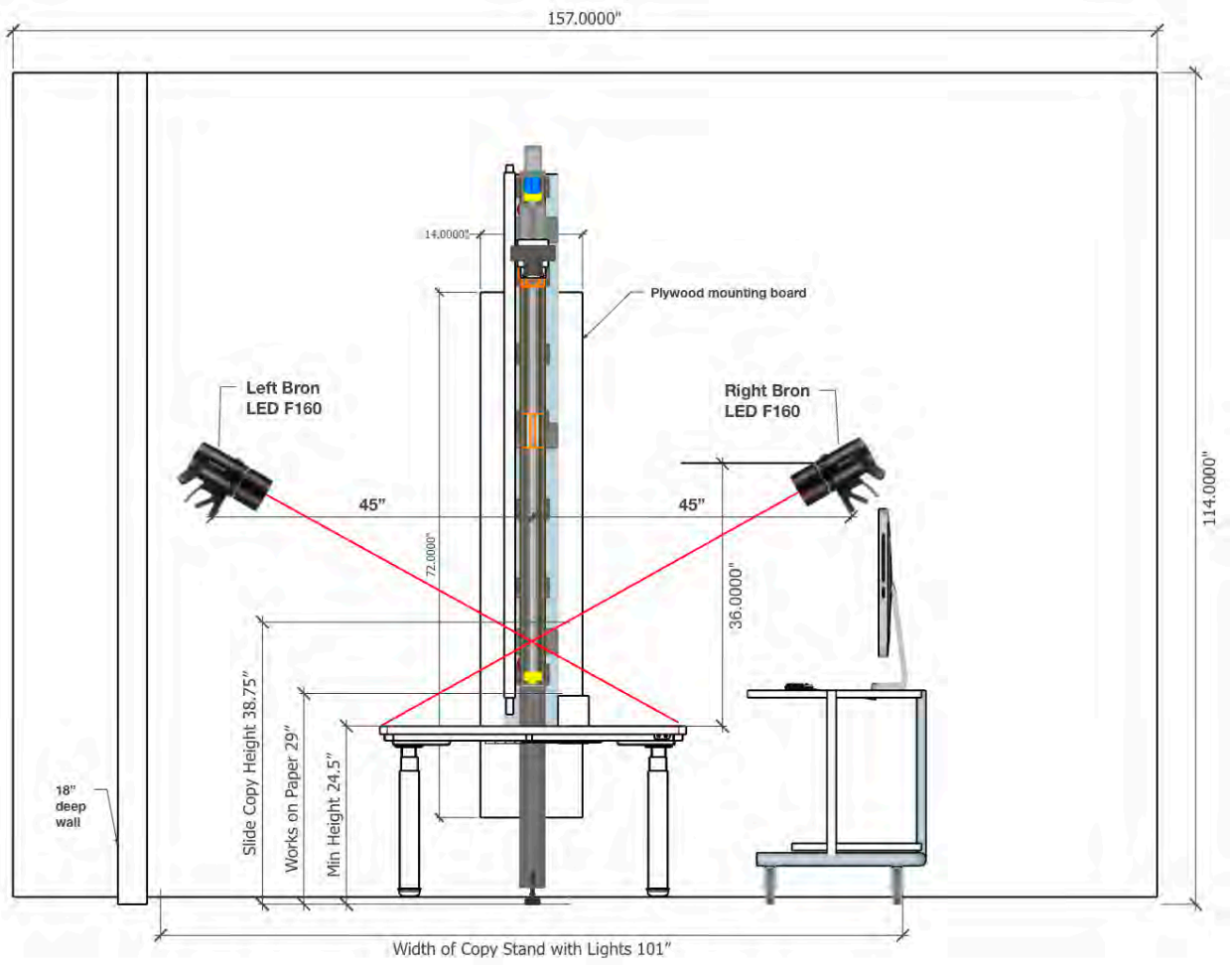



If not, adjust, fix issues, re-test and then proceed when good.

## Tell us about a recent project you worked on.

In the spring of 2022 I was contacted by the Lincoln Center to help them create a copy stand system that would achieve 4 star FADGI quality. Items to be digitized were photographic prints and works on paper (up to 11” x 14” in size) and 35mm to 8x10 transparent media. Images are to be used in large video walls displayed in various hallways. The copy stand space was limited to an 80.5” by 120” section of a much larger room where other people would also be working on various tasks. They wanted LED lights instead of strobe because there was concern strobes flashing may disturb the other activities in the room. I chose the Broncolor F160 LED because I knew it would provide the coverage we needed. precise color and achieve FADGI 4 star color accuracy. Because the room had a wall of windows, we added black curtains to surround the copy stand system. This gave us complete light control with the Broncolor’s precise 5500K since all ambient light (from windows and other room light sources) were eliminated. For the transparencies back light source we chose the Kaiser FilmCopy Vario Kit and their Slimlite Plano LED for larger film types. For the reflective art we chose the Sigma ART 50mm and the Tamron SP 90mm f/2.8 Macro D for transparencies. All of this was thoroughly tested at our testing studio and passed all FADGI 4 star requirements. I previously used Broncolor strobes, but now feel that both of their LED lamps and strobes are excellent copy stand options.

Front view of Lincoln Center motorized copy stand with adjustable height table with lights placed 45” from center of copy table (lens position)



## Tell us about a recent project you worked on.

Top view for copy stand system showing total space allotted.

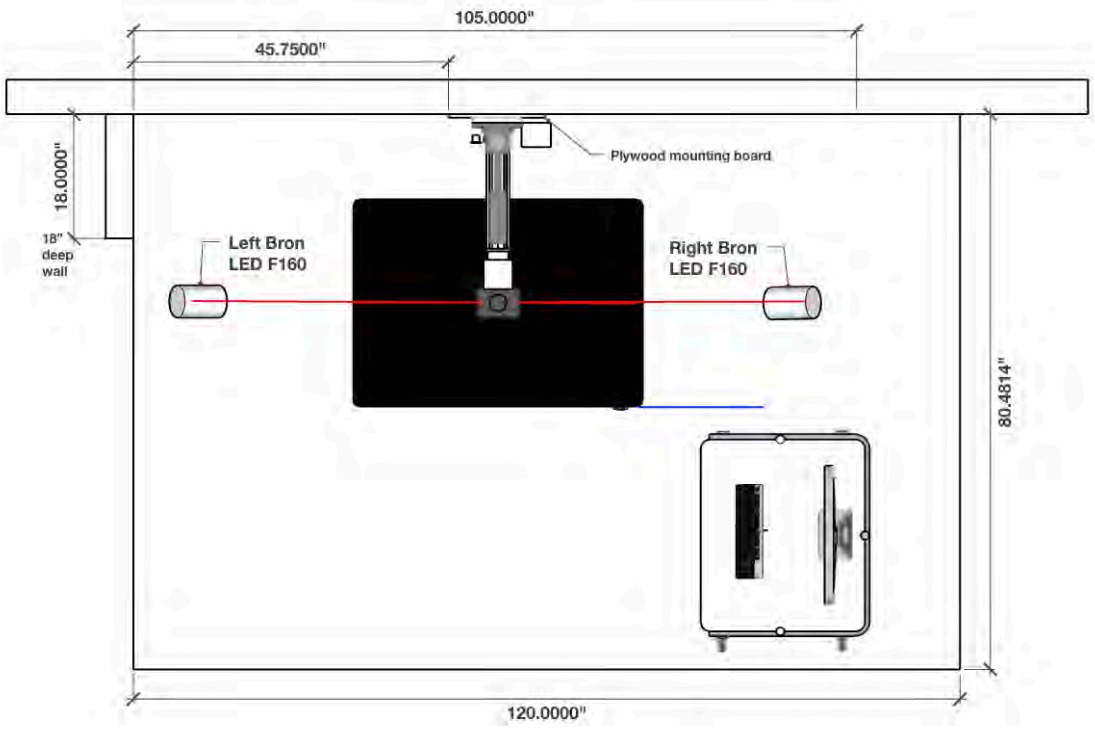



Photo of installation (before curtains were added)
Since space was limited, we attached lights to table mounted brackets.

# Why do you choose Broncolor for your work?

There are so many reasons I think Broncolor makes the best lighting for my work. Although most of my current focus is on the “Cultural Heritage” world, my work also includes personal imagery and many “Commercial” clients. Broncolor covers all situations. They make the best engineered light shapers in the world. Creative photography often requires lighting work arounds to get the look one is seeking. I almost always find the right light shapers in Broncolor’s inventory to meet those needs.

I have been using Broncolor lighting since 1978. In 1996 we became a Leaf and Broncolor dealer and added more Broncolor lighting for our photo studio. These beautifully engineered lighting tools were and still are the best lighting for digital solutions. As a company, Broncolor continually studies light and innovates the best tools for photographers who need the best possible quality.

**My Client Installation types:**

Over the last 24 years I have installed Broncolor lighting in hundreds of all types of studios across the country. Almost all of them use Broncolor.

***Subjects They Cover:***

Splash Photography, portraits, tabletop product, dancers, interiors, catalog, food, general commercial, advertising, sports, shoes, industrial, advertising, creative fine art exploration, jewelry, musical instruments, watches, outdoor gear, clothing, mystery jig saw puzzle books, art marketing, Cultural Heritage Digitization, etc.etc.

**What makes Broncolor so great:**

Beautiful gradations, small precision lights to place in strategic areas, parabolic light that models a persons face so well there is no need for extra lights. Specialty lights like Satellite reflector, Fresnel Spots, Snoots, Strip lites, Light Sticks, Paras etc. Essentially, Broncolor studies, designs and manufactures lighting that solves most imaging requirements that photographers encounter.

**Durability:**

The equipment is extremely well made and long lasting. I (and many of my clients) have lamp heads that are over 30 years old that still work with the latest power packs.

**Flexibility of components:**

Most items in the system work together or have adapters. The same reflectors and other light shapers work with LED and strobe heads. Even Picolites have an adapter to attach standard Pulso reflectors.

**Scoro Asymetrical Power Packs:**

Scoros can go from 3200 ws of power to a minuscule 3 ws. This allows for maximum creative control. One can also achieve extremely fast durations for freezing motion. The control and precision is amazing and has always allowed me to create the result I need. Due to the asymmetrical design, each head can be controlled individually. That is like getting three power packs for the cost of 1.

# Why do you choose Broncolor for your work?

**Color Accuracy and precision exposure:**

Many of my applications use multiple images that are assembled in other software. These require extremely precise exposure and color, which Broncolor routinely delivers.

- Auto merging images to assemble panoramas in Photoshop
- Stacking Images for extended focus.
- Tiling images on XY tables for high res reproduction of large art.
- 360 turntable images
- Photogrammetry
- Multi-Shot cameras (every exposure must match perfectly)

**Color accuracy: (Exceeds 4 star FADGI quality)**

Image of DELT.ae 4 star ratings


**BronControl Software:**

No ladders needed to change settings when light is in a high position.
Enterprise Mode - convenient WIFI control from computer. Can switch between shooting and viewing modes without leaving your seat.
Efficient workflows; more shots per hour.

**Great Tech and Repair Support:**

Experienced repair technicians at the White Plains, NY Mac Group facility
Professional experienced reps around the country.

**Enormous inventory of light shapers**

Excellent light shaper and lamp head engineering.
Broncolor has a light shaper to solve almost any conceivable lighting situation.

**Huge power for extreme back light - tomato & leaf images**

Creative modeling of light possible using the power of a Scoro and the wrap around light of a large Bron soft box as a back light.

# What sets Broncolor apart for cultural heritage preservation work?

**Precision of color and accuracy of detail:**

The big challenge for cultural heritage digitizing is to create a true and verifiable representation of the original art. Accurate color, rendering of surfaces and enough detail are the key ingredients. Broncolor has the best color accuracy available and a wide array of light shapers to correctly articulate the various surface qualities possessed by fine art objects. Since scholars all over the world study art and antiquities on the internet, there is a need for proof of accuracy. This is why so many museums and libraries are adhering to the FADGI* standards. Art that is delivered in digital form usually has a FADGI supported target in the picture. This can be analyzed to verify the accuracy of the digital file.

* *FADGI stands for "Federal Agencies Digital Guidelines Initiative". They produce the "Technical Guidelines for Digitizing Cultural Heritage Materials" PDF document which contains all the digital specifications for the various objects reproduced in cultural heritage digital labs*.
***Link - https://www.digitizationguidelines.gov***

**LED or Strobe?**

Broncolor has LED and strobe options. Both use the same reflectors, so strobe users who add the LED capability can leverage their legacy light shaper investment. Both work well with multi-shot cameras which are very popular in Cultural Heritage institutions due the the perfect detail rendered.

**Multi-Purpose Rooms:**

Often, copy stands are squeezed into rooms where other people are working on other tasks. The Broncolor LED lights are a good choice because the flashing of strobes can be distracting to the other people. However, these setups often need curtains to block off unwanted ambient light. Since curtains darken the copy stand area, the LED lights can also act as task lights for the copy stand area.

**Accurate Viewing Lights for Analysis and Image Editing:**

It is most convenient to analyze and edit the image file with the art still sitting on the copy table. The color temperature setting on a Broncolor F160 LED light will match your calibrated monitor precisely. It should be set to the same color temperature and intensity to match the monitor. Dimming a Bron LED does not affect the accuracy of its color temperature.

**Note:** ***Monitor should be calibrated!***

Image on monitor

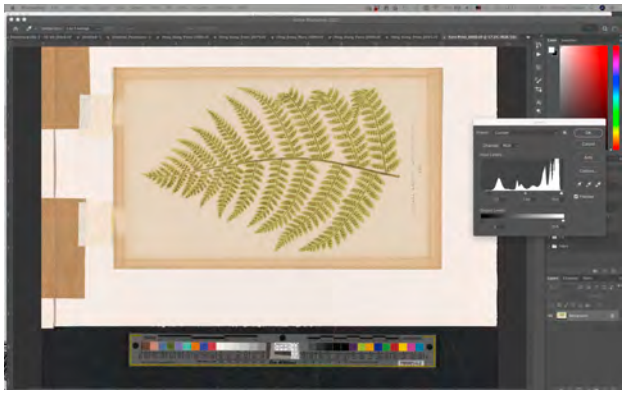


Image on copy table

# What sets Broncolor apart for cultural heritage preservation work?

**Precision Exposures and color accuracy:** ***(****Every Bron capture has identical exposure and color)*

**Series of items printed on the same paper need to match perfectly.**

Examples:

Books

Series (prints, post cards, etc.)

**Images that are a composite of multiple images:**

Examples:

XY stitching tiles for large art 600 PPI 4 star images

360 spins aassembly

Panoramas

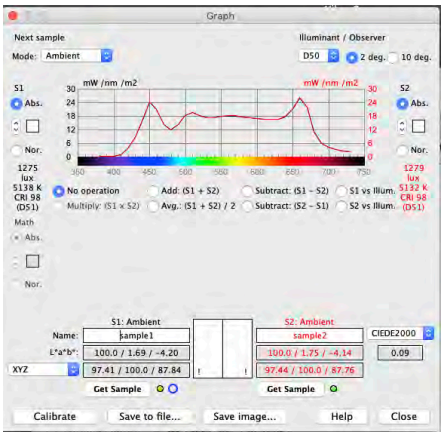
Photogrammetry

Multi-shot camera files

**Babelcolor CT&A test using i1Pro2 Spectrophotometer:**

Testing of Broncolor Lights (LED and strobes) routinely exceeds quality needed for FADGI 4 star ratings.

Testing of 2 F160 LED Lamps Compared




i1Pro2 Spectrophotometer

**Cross polarization with single light source and illuminance Uniformity procedure:**

Painting - cross polarized with single light source is possible with the power of a Scoro. This shows the three dimensional character of thick brush strokes and eliminates specular highlights.

# What sets Broncolor apart for cultural heritage preservation work?

**Raising texture**

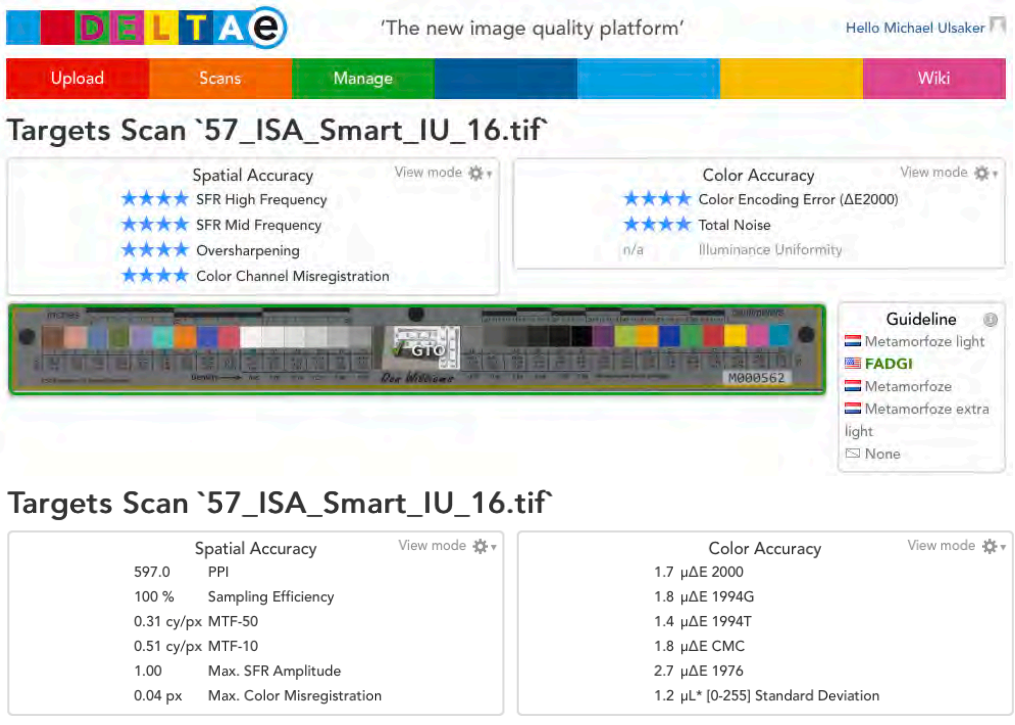
Conservators sometimes need images showing the textural qualities of the artworks surface. The Broncolor Picolite with Fresnel adapter does a great job:

Detail of watercolor shot with Picolite Fresnel at low angle.

Same detail shot with Broncolor F160 LEDs to simulate “Gallery Lighting”

**4 Star FADGI Ratings:**

With a Pro level digital camera and lens, Broncolor lighting reliably produces 4 star FADGI results.

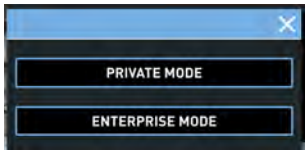


# What sets Broncolor apart for cultural heritage preservation work?

**BronControl Software:**

Controlling the lights with the lamp head's controls is not always convenient. Sometimes they are in a high position or otherwise hard to access. The BronControl software makes it easy to tuen them on and off and change power etcetera from your computer. It is ideal to use the "Enterprise Mode" which allows connection to the heads through your WIFI router.


Choose Enterprise Mode.




Clicking on standby turns lights on and off.


Adjust power.


**Portability: & Versatility Multi-Purpose Usage - Location and Studio:**

Copy stand lights can be used in studio, galleries or any other location. They can also be used with strobes. since they are the same color temperature.

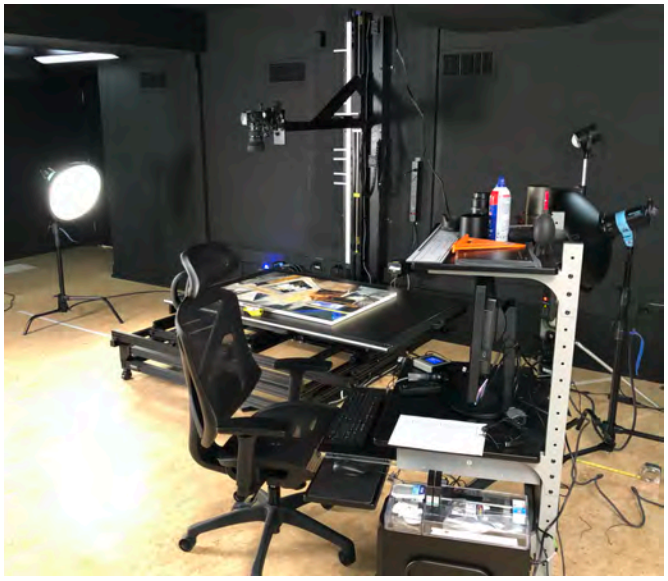
**Copy stand lighting solutions**

Copy stand setup in conservation studio using Broncolor Strip Lites. The adjustable table lowers to 14" off the floor and is rolled under the white table (on the left) so they can shoot larger paintings up to 5x6 feet using the same strip lites. Although, these lights are only 2 feet wide, the light is so even, it is possible to cover much larger surfaces.

# What sets Broncolor apart for cultural heritage preservation work?

**Copy stand lighting solutions**

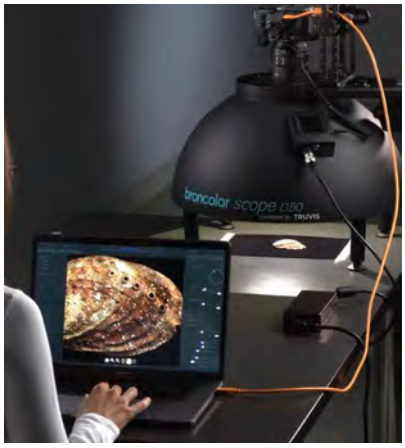
Soft Light Reflectors and an motorized programmable XY Table. This copy stand solution uses 2 Unilites with Softlight reflectors covered by polarizing filters and powered by a Scoro E 3200 power pack.

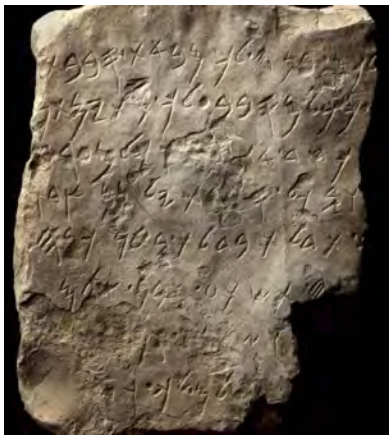


**Innovation for Cultural Heritage Photography:**

Broncolor has created several lighting devices that are designed specifically for museums, showing their commitment to listen to their needs.

**Scope D50** - Makes Reflectance Transformation Imaging (RTI) easy
Based on a digital surface model that can be viewed in any web environment, the Broncolor scope D50 authentically reproduces the shape, color and texture of an object.
Link - https://broncolor.swiss/products/scope-d50?variant=6147



# What sets Broncolor apart for cultural heritage preservation work?

**UV Attachment:**

The UV attachment eliminates practically the entire visible light of the flash. Only the UV part remains. This enables unlimited applications in technical (reproduction, material analyse, forensic photography etc.) and also in creative photography, wherever dyes are being used.


There are many reasons why Broncolor has become a “must have” tool for my cultural heritage preservation work. This document is an overview of my lighting experience with museums and libraries, which is constantly growing.