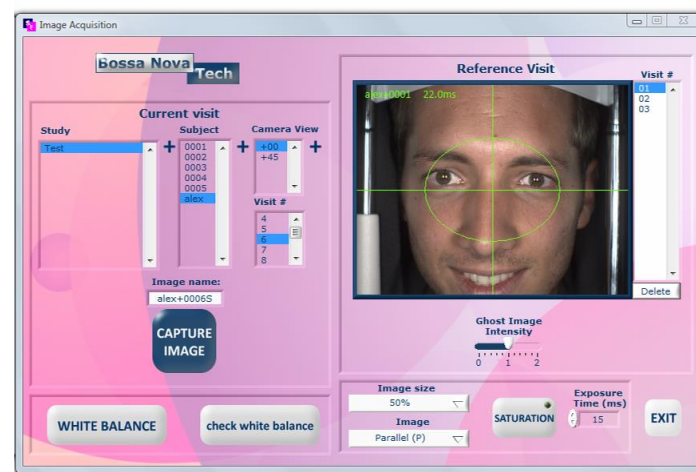


SAMBA FACE

Skin Gloss extraction

BOSSA NOVA VISION, California
Robert George - Sebastien Breugnot



**BOSSA NOVA
VISION**

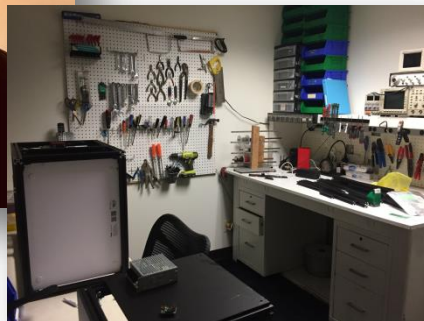
5777 W. Century Blvd
Suite 205 - LOS ANGELES
CA 90045 USA

Tel: +1 (424)-393-4011
Fax: +1 (310) 943-3280

www.bossanovavision.com
info@bossanovavision.com

BOSSA NOVA Vision, formerly BOSSA NOVA Technologies, is a LLC (Limited Liability Company) **founded in 2018**, located in **Los Angeles, USA**

Small business of 4 people specialized in optics, electronics, imaging and software development (3 PhDs, 1 Engineer)



Cross polarization-imaging is widely used as a non-destructive instrument to measure skin defects by removing the specular light reflected by the skin outer layer.

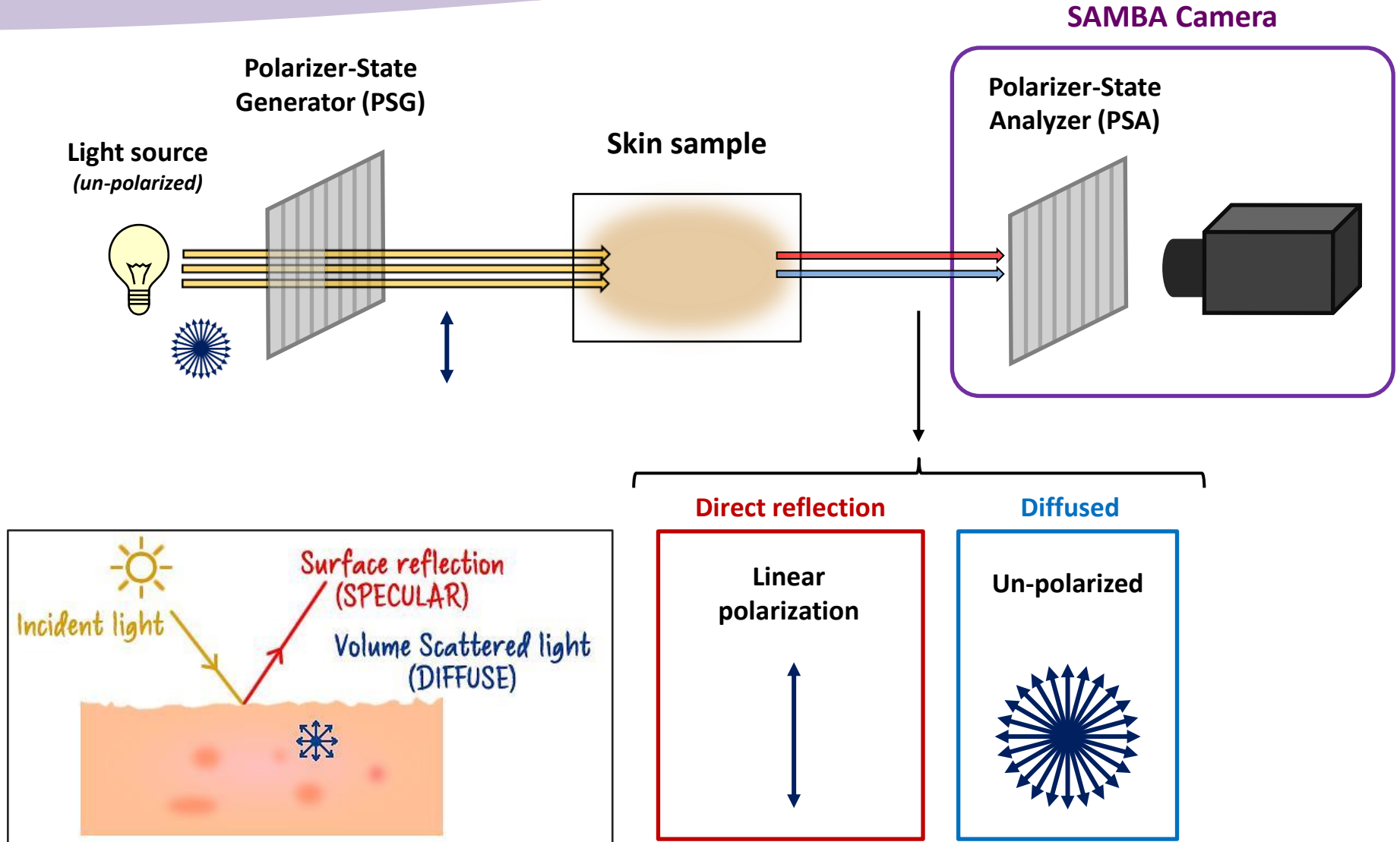
However, they only provide the diffusion image, and **no gloss/shine metric** can be extracted from those images.

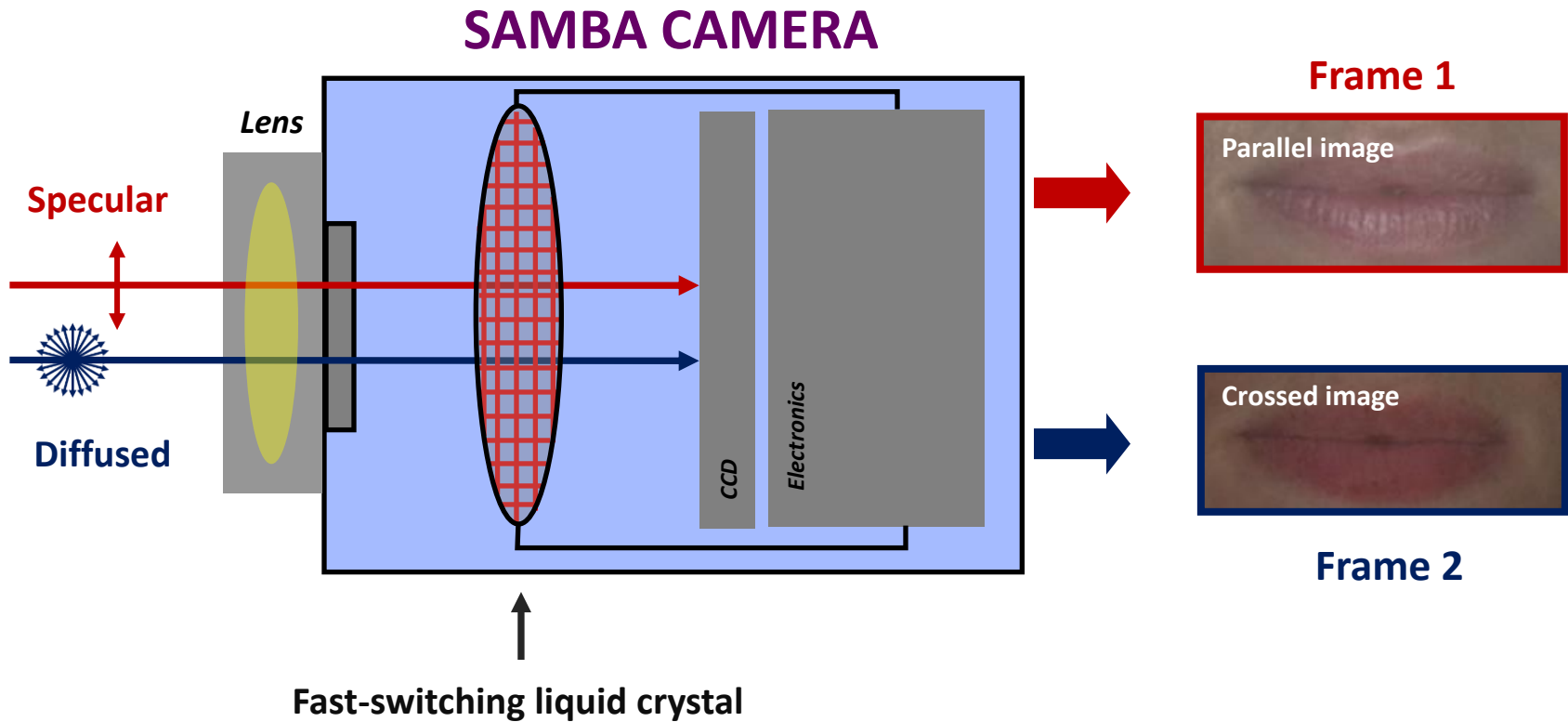
The **SAMBA Face** uses the full capability of our difference polarization digital camera to provide a high-resolution gloss image of a volunteer skin alongside the standard diffusion image.

Regular



Diffuse





Allow the filtering of Parallel and Crossed incident light

Parallel = 100% Specular + 50% Diffused

Crossed = 0% Specular + 50% Diffused



FRAME 1 :
Parallel Polarization

**100% Specular +
50% Diffused**

≈ Conventional Image



FRAME 2 :
Crossed Polarization

**0% Specular +
50% Diffused**

≈ Color Image



Gloss/Shine Image

=

Specular Image

Frame 1 - Frame 2

=

Parallel - Diffused

SAMBA Face System (2018 version)



SAMBA

Polarization-difference imaging

VISION

RGB 12-bits depth
1900 x 1900 px² resolution
166 x 116 mm² FOV
Interchangeable lens (C-mount)
Contrast Ratio > 200
5600K Daylight LED Ring

HOLDER

Adjustable chinrest
7 orientations

SOFTWARE

SAMBA Face Software

ACQUISITION

USB 3.0, nominal max. 5 Gbit/s
Specular and Diffusion Images
Ghost image for repositioning

DATA

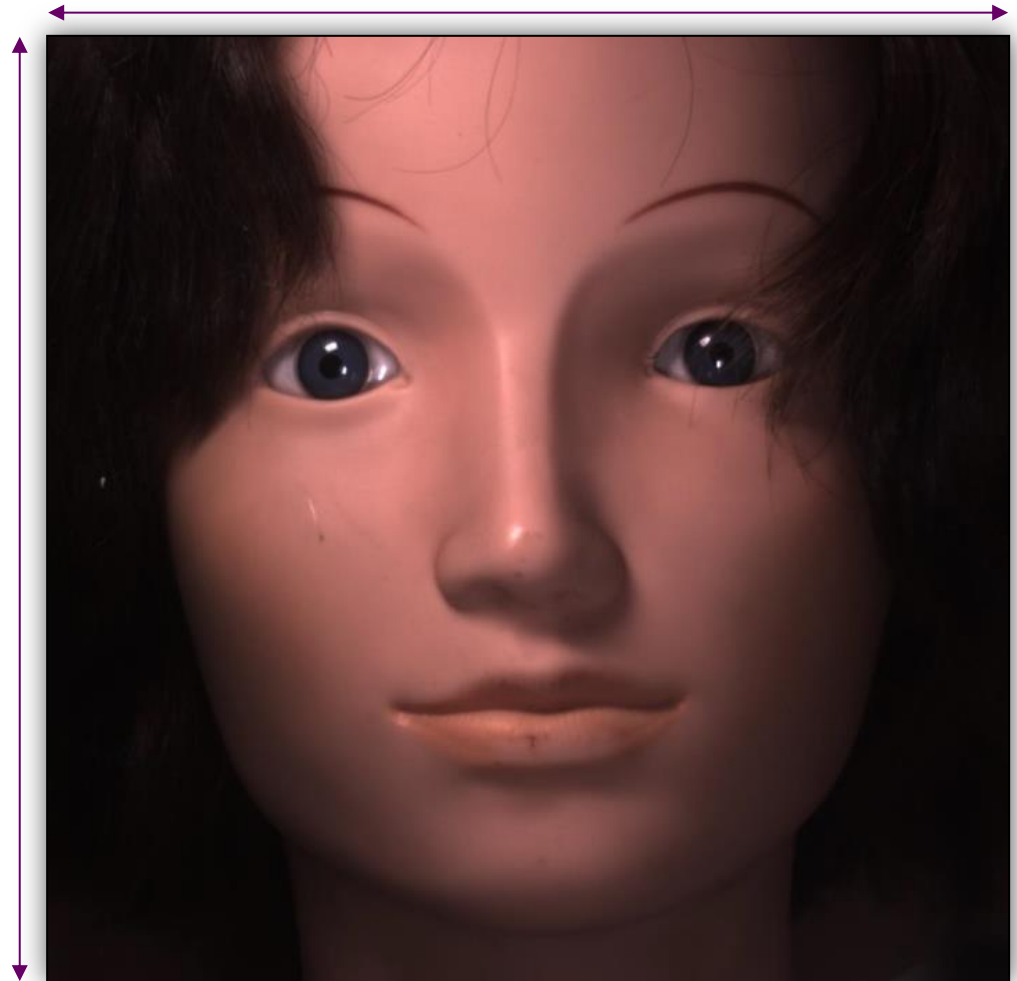
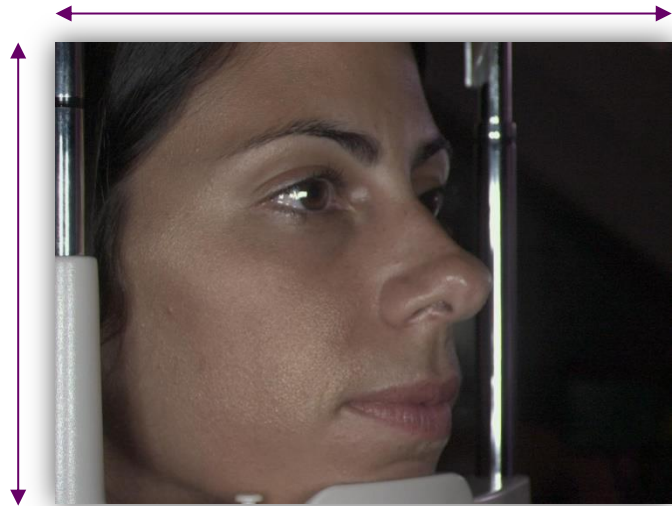
Gloss histogram
RGB 32 Bits Images
Processed Images
Excel Export

SYSTEM

Size : 30" x 16"x 22"
(76,2 cm x 40,6 cm x 56 cm)
110/200 VAC
50/60 Hz

Current SAMBA Face
1900 x 1900

In this presentation
1388 x 1038



Lenses

Focal length	18mm	35mm
Res/pix @500mm	61 μ m	31 μ m
Field of view @500mm	116mm x 116mm	60mm x 60mm
Minimum Optical Distance	240mm	210mm



Other lenses available on demand

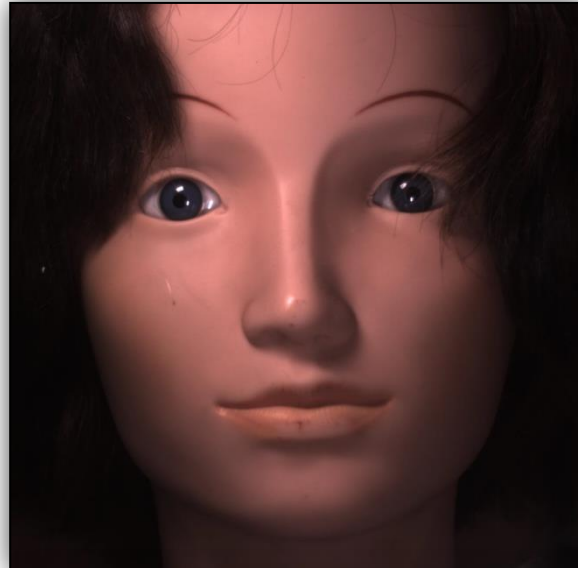
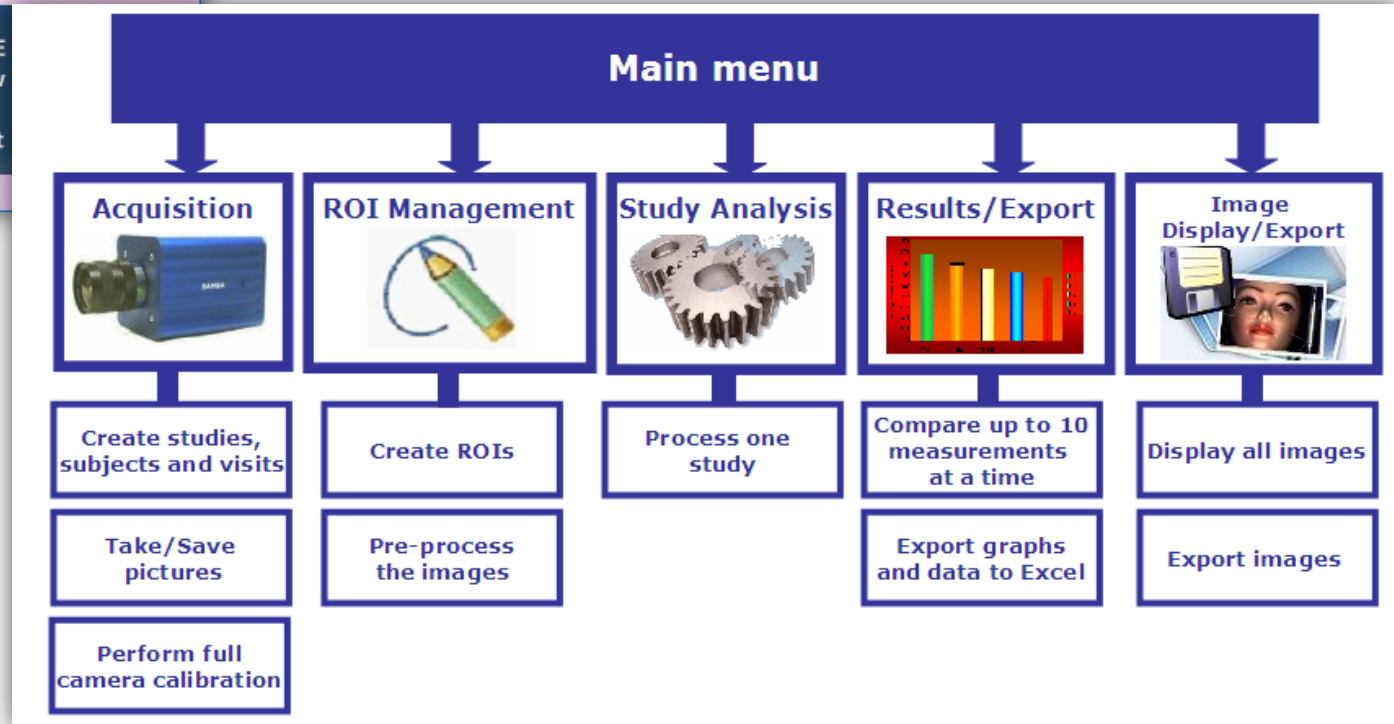
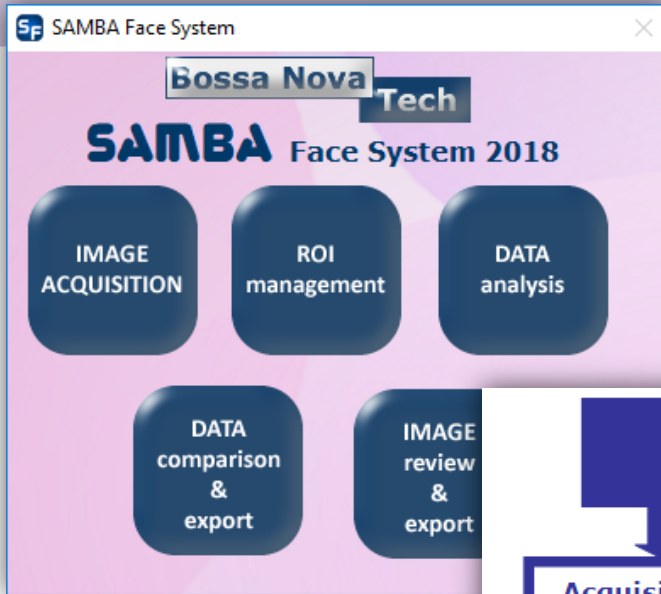
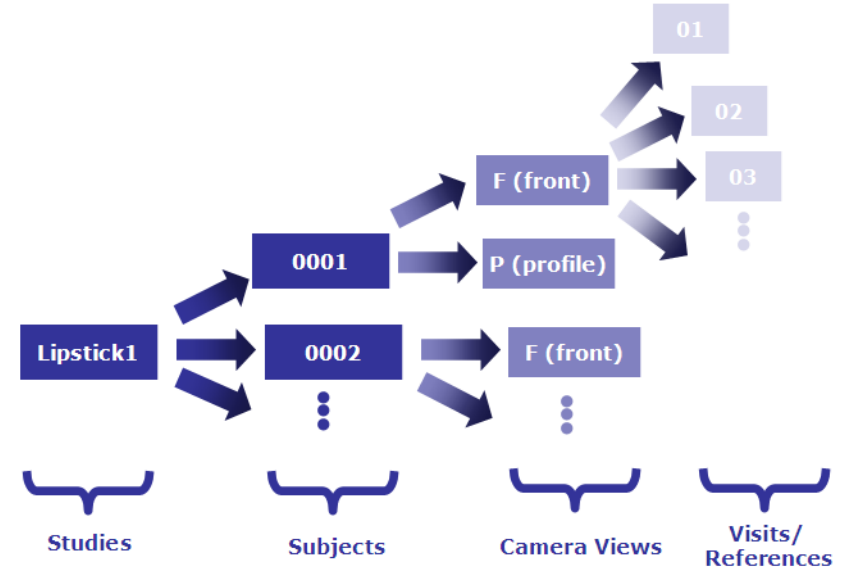
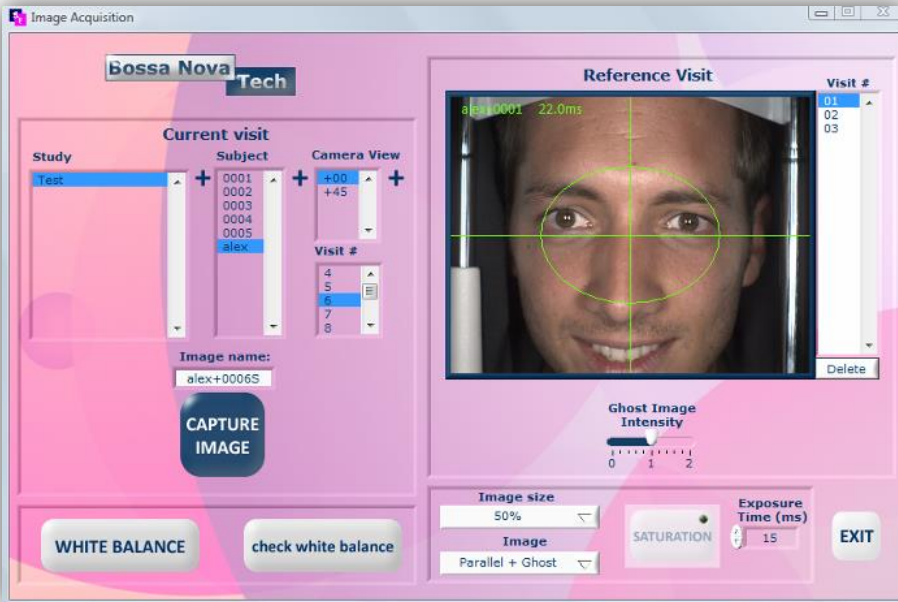


Image taken with 18 mm lens
Numerical zoom only

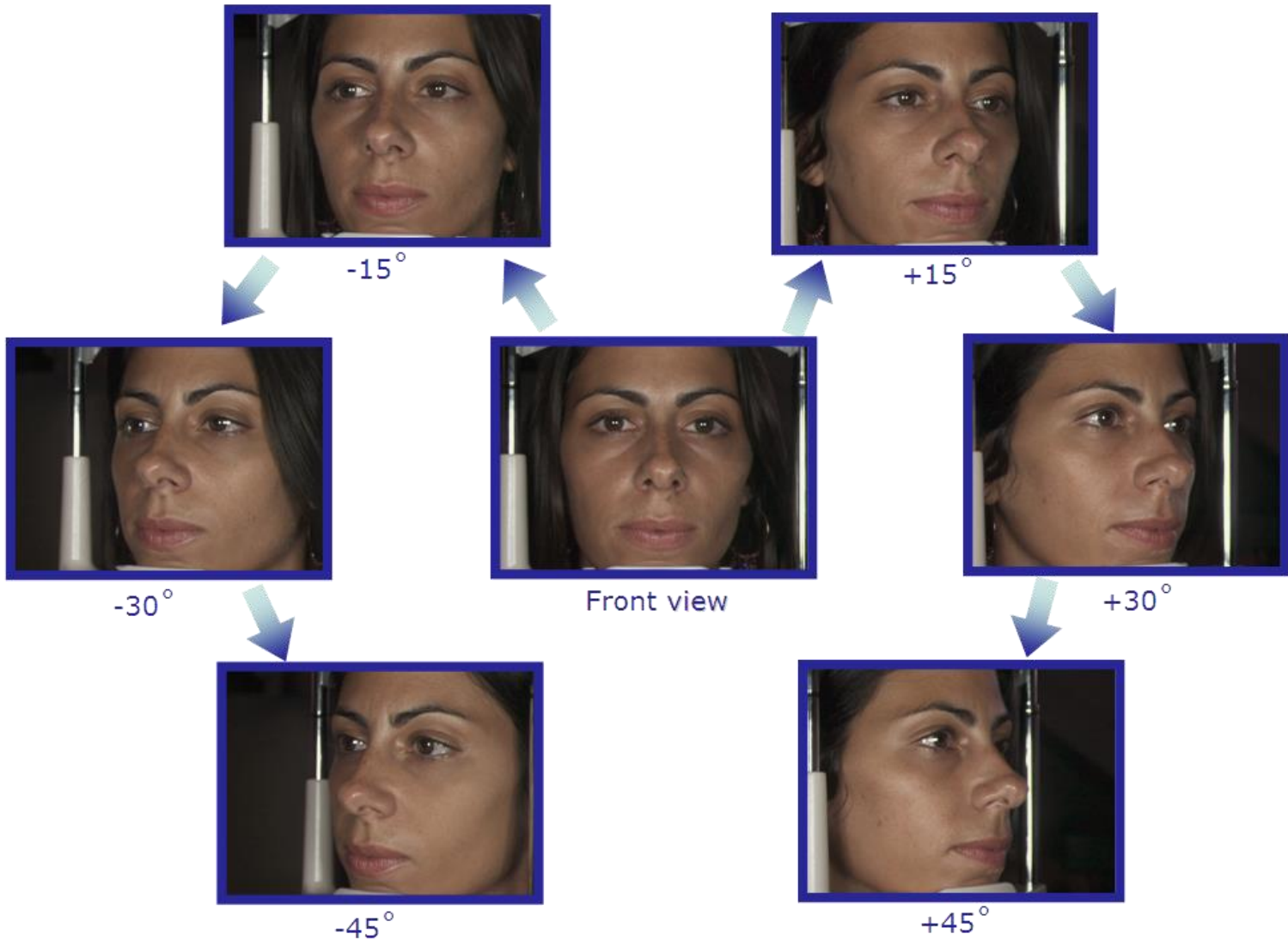




Software keeps track of many studies, panelists and visits

Green target overlay + Ghost image feature to help reposition panelist between visits

Camera views

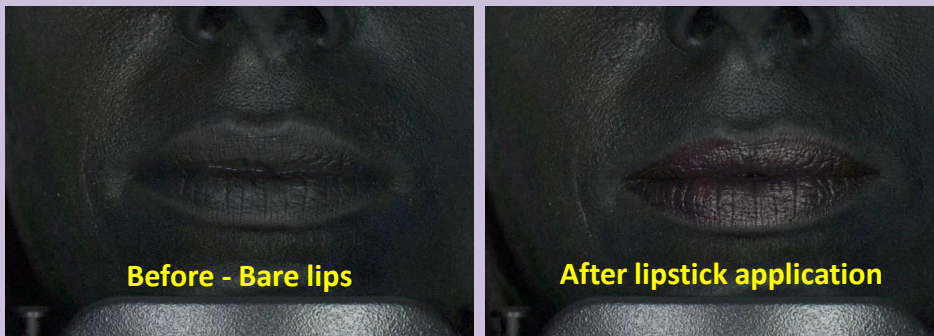


User selects a ROI from a library to chose the area where the analysis will be done

Multiple ROIs can be applied to a same image

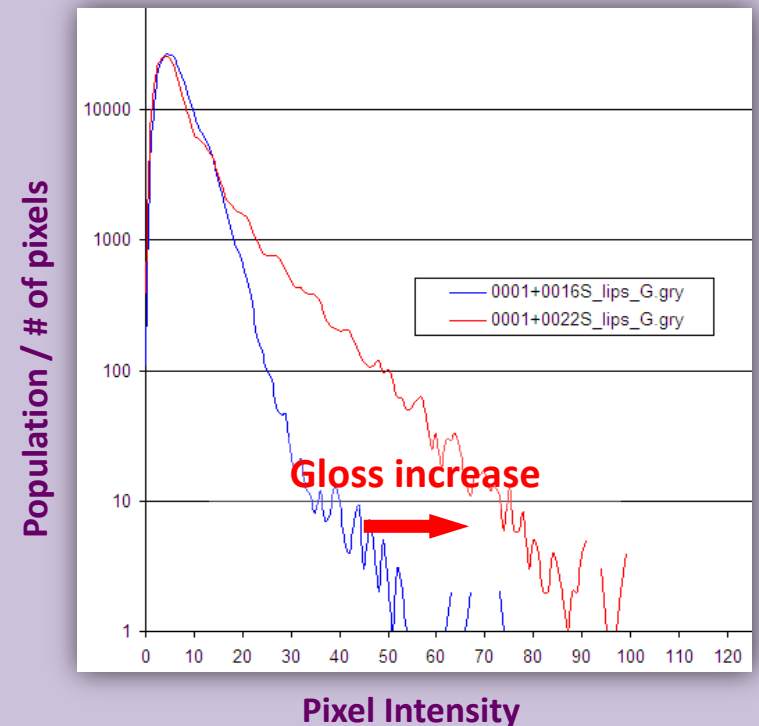


Lipstick application - Gloss Images



Gloss data is extracted in the ROI

Gloss histogram: pixel count (y-axis) for each gloss intensity (x-axis)



Rinse-off products on forearms

Objective :

Comparing the removal efficiency of two rinse-off products

- Rinse-off A
- Rinse-off B

Protocol :

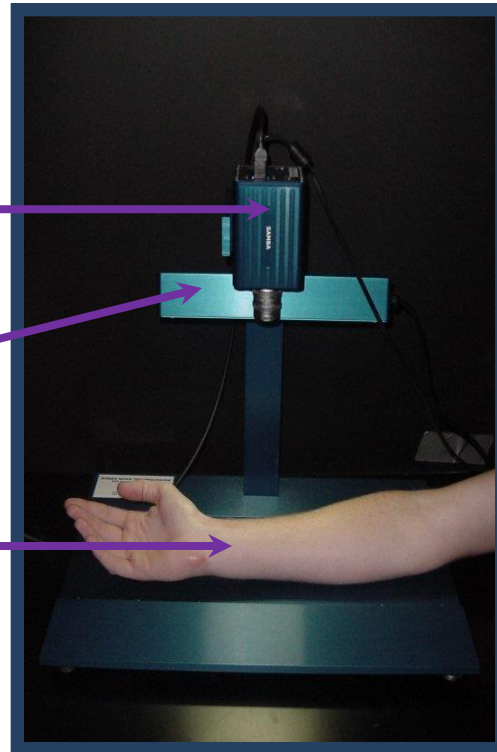
1. Measure gloss on bare arm
2. Apply a skin product (side-effect = increasing gloss)
3. Apply rinse-off A and B
4. Measure gloss on arm after rinse-off A and B

Setup

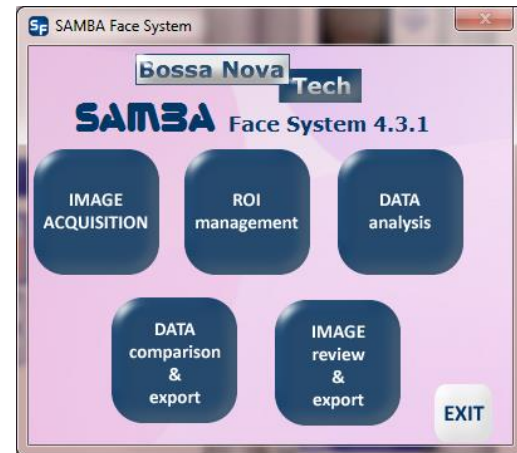
Color SAMBA camera
acquiring two states of
polarization at video rate

Polarized illumination

Arm



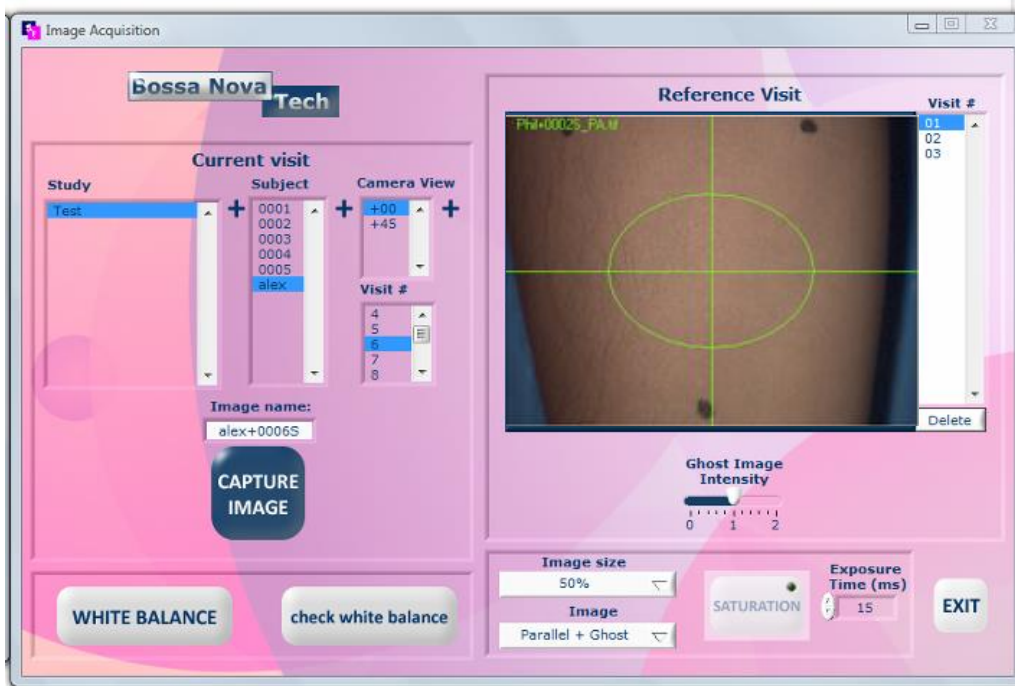
Hardware [custom version]



Software

Visual Appearance Study Software (camera calibration, export to excel, ability to handle many studies, panelists and visits...)

Image acquisition



Acquisition menu



Visit 02: bare skin

Visit 03: after application and rinse-off of product A on bare skin

Visit 04,05 & 06: after application and rinse-off of product B on bare skin

The software helps the panelist reposition him/herself thanks to a 'ghost image' that can be superimposed to the live image

Gloss image calculation

For each visit : 1 Parallel and 1 Crossed image acquired



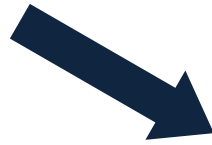
Parallel image

(= Specular light + 50% diffused light)



Crossed image

(= 50% diffused light)



- =



Gloss image computed
= specular light only

Visual assessment

Gloss increase with Product A

Gloss increase with Product B



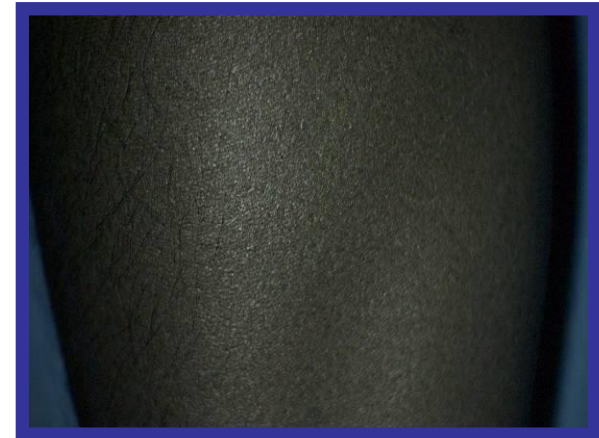
Product A



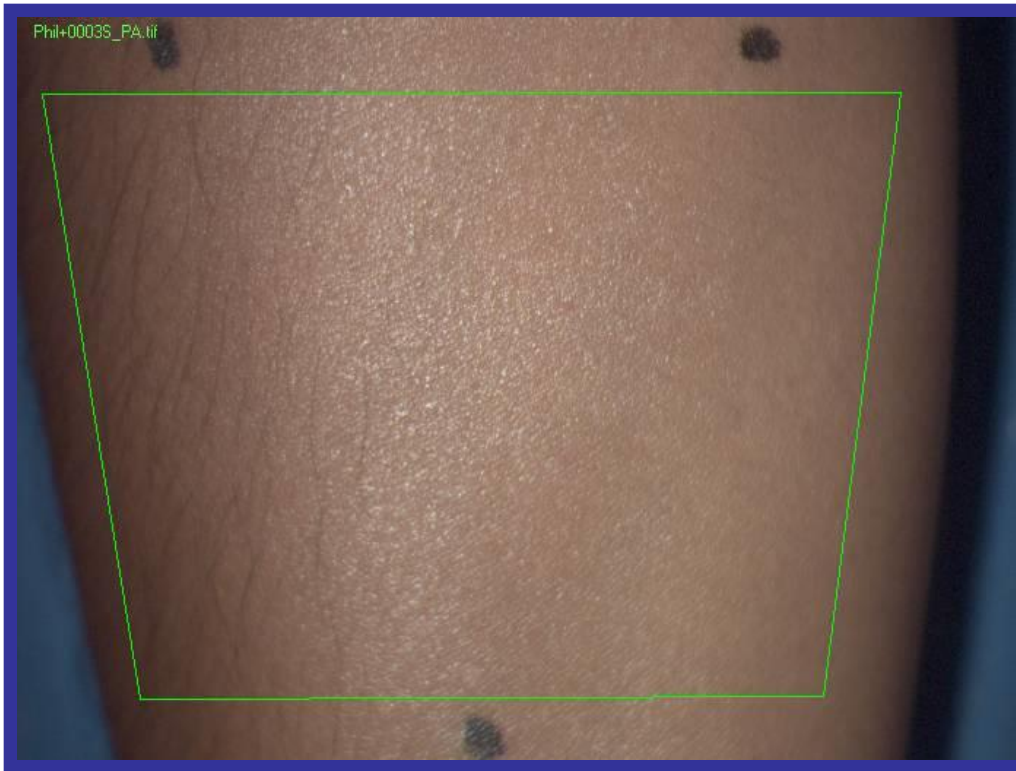
Bare skin



Bare skin

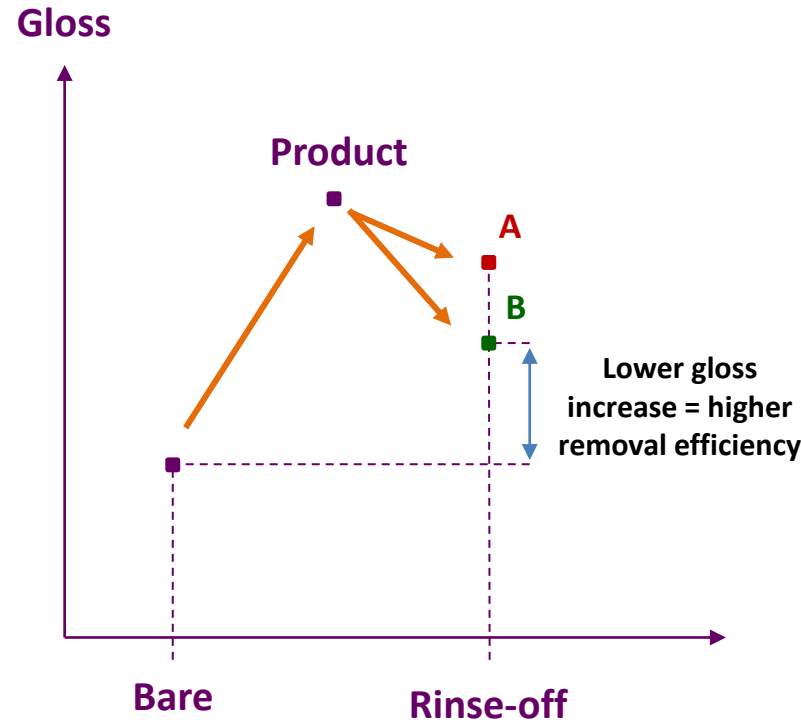
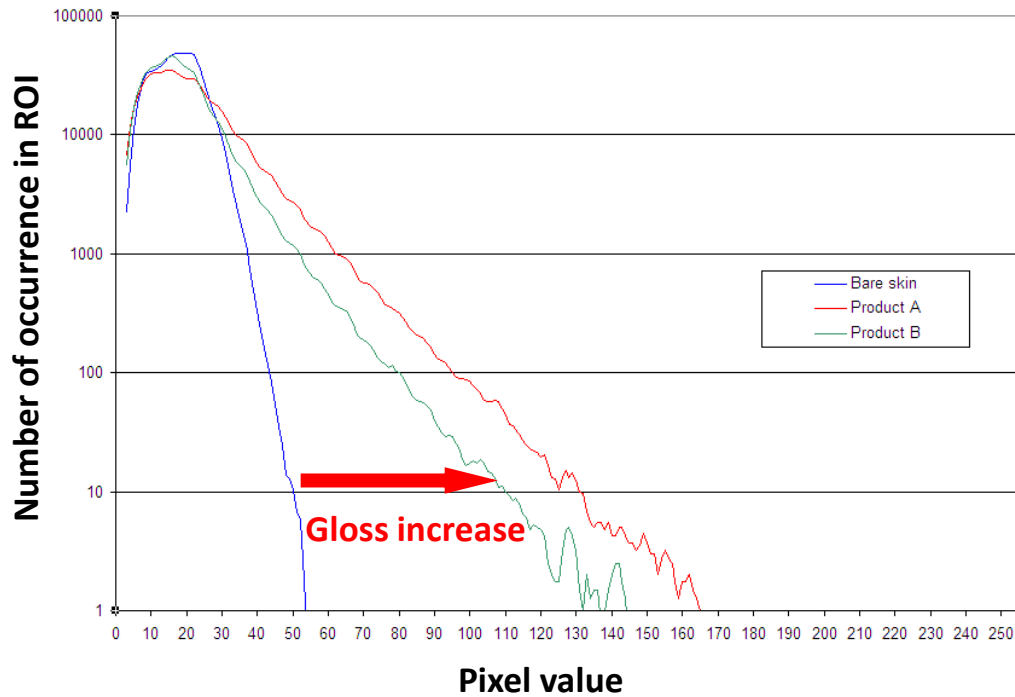


Choice of the ROI



The same ROI is applied to all visits

Results: histograms on the ROI



Name	Max	Integral	Pixel value for y=10
Bare Skin	50478	898661	50
Product A	36652	898661	130
Product B	48356	898661	109

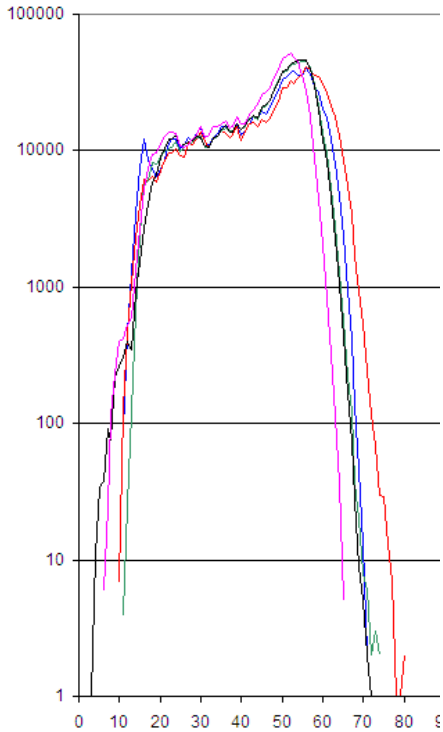


Gloss increase

Product B > Product A

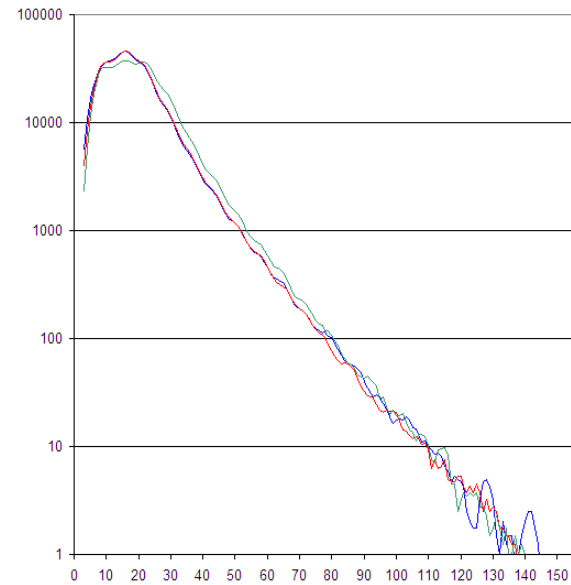
Repeatability

Crossed histograms for all visits



Crossed signal (skin color) remain the same all along the visits

Gloss histograms for visits 4,5 and 6
(product B)



Name	Max	Integral	Pixel value for $\gamma=10$
Visit 4	48356	898661	109
Visit 5	48443	898661	109
Visit 6	38780	898661	113

Repeatability of $\approx 4\%$

SAMBA FACE

Conclusions

- **SAMBA Face** is a robust and adaptable system for Skin gloss measurement
- **SAMBA Face** can deliver Standard, Diffused and Gloss processed images
- User-friendly campaign management, analysis and export interface

Thank you !

For further questions
feel free to contact us

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