Digitale 3D-meettoepassingen

M. de Bouw – Labohoofd « Renovatie & Erfgoed »
michael.de.bouw@bbri.be

wtcb.be
Onderzoekt • Ontwikkelt • Informeert

KU LEUVEN

AGENTSCHAP
INNOVEREN &
ONDERNEMEN

COOCK - Digitale 3D-meettoepassingen voor een geïndustrialiseerd bouwproces bij nieuwbouw en renovatie

Workshops clusters en gesprekken bedrijven

Gebruikersnoden gebundeld tot type-situaties: definiëren scope, probleempunten (startpunt) en visualiseren oplossingen en concrete toepassingen via demonstratiereeks (eindpunt):

WP1: Digitale opmetingen werf voor offertefase, en werfvoorbereiding

WP2: Digitale ondersteuning metingen voormontage, productievoorbereiding en uitzetten

WP3: Gefaciliteerde tolerantiecontroles na plaatsing elementen in situ

WP4: Digitale metingen voor de automatische herkenning/detectie van bouwelementen, bouwmaterialen en bouwpathologieën

Demonstratiereeks 1

Demonstratiereeks 2

Demonstratiereeks 3

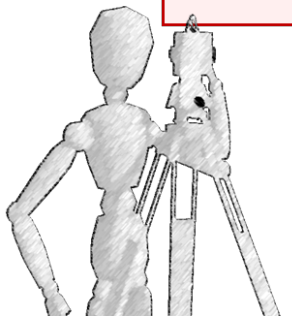
Technische workshops

Kennis-opbouwende deeltaken

Vertaalonderzoek

WP5: Bredere disseminatie-activiteiten, organisatie demonstratiereeksen en workshops, opvolgingssessies, … + creëren permanent vormingsaanbod

Kennisverspreidende acties



Opstarten bedrijfscases deel B (vanaf M18)

What? The diversity of measuring devices

Measuring technology

Point surveying devices

Laser scanners

Digital cameras

Depth cameras

....

Form

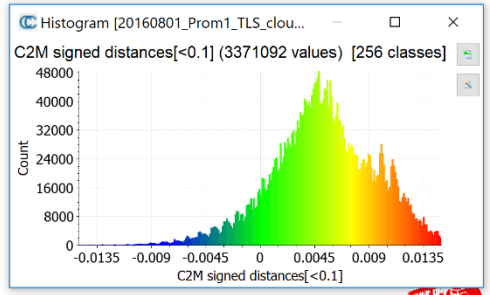
Specific handheld hardware

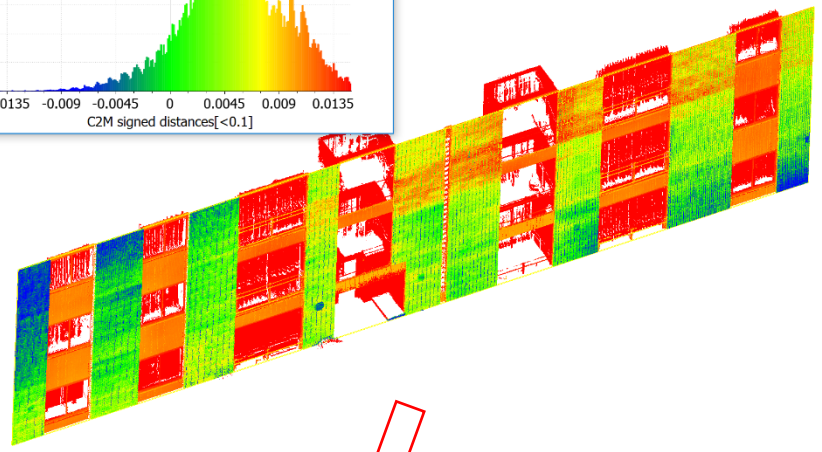
Specific tripod hardware

App on tablet

...

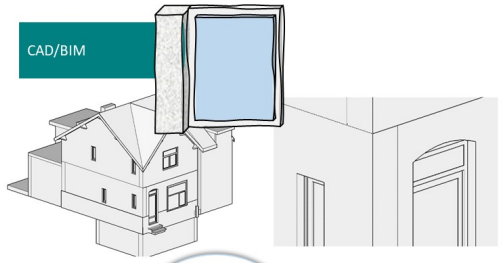
How to choose the adequate deliverable?

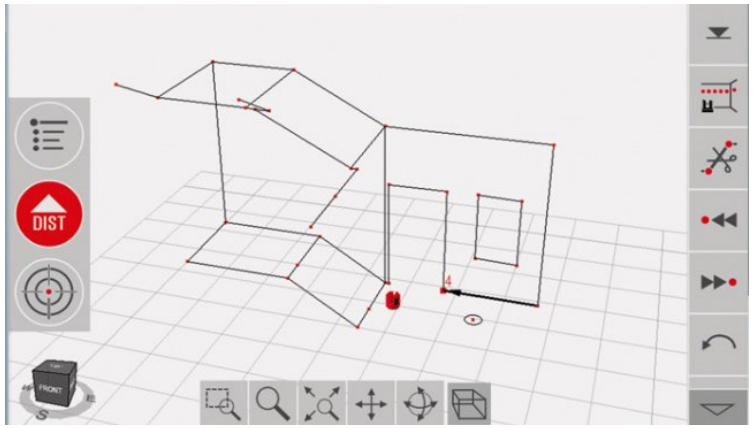




≠

- Delay to access data
- Accuracy of 3D Data
- Visual quality of 3D Data
- Completeness of 3D Data



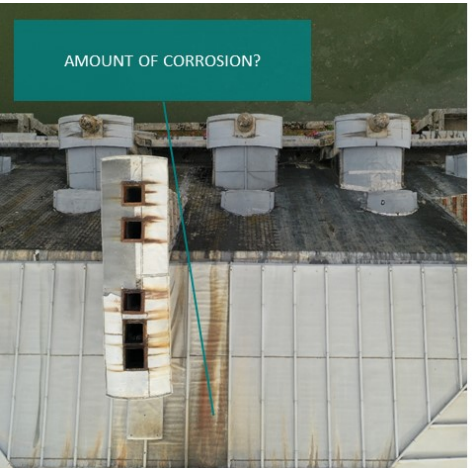


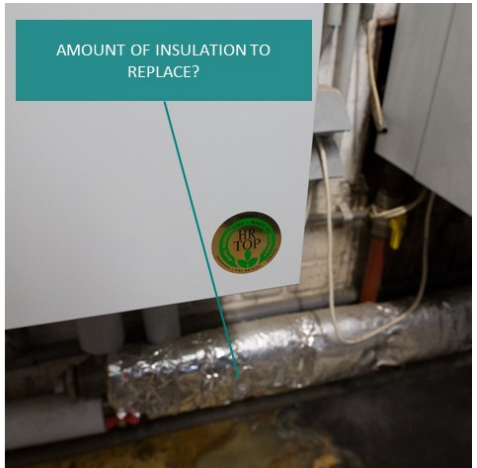
How to choose the adequate technology?

- Mobility
- Skills to produce useful data
- Total cost to get useful data
- Software and hardware adjustability

Applications for each project phase

- Price offer
- Construction site preparation
- Preassembly, production & transport
- Assembly & positioning assistance
- Tolerance control
- Inspection …





A NEW WORLD OF DATA FOR DAMAGE ASSESSMENT!

RGB…. & DEPTH!!

Some ‘concrete’ examples

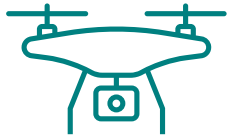
Condition analysis backed by modern 3D surveying

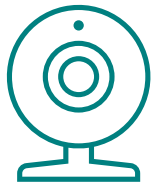
THE MAIN TOOLS USED @BBRI

Exterior

Interior & Exterior

Interior





Rgb pictures

IR pictures

Rgb pictures

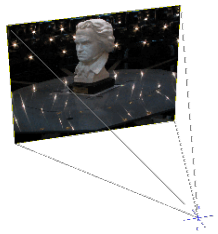
Point cloud

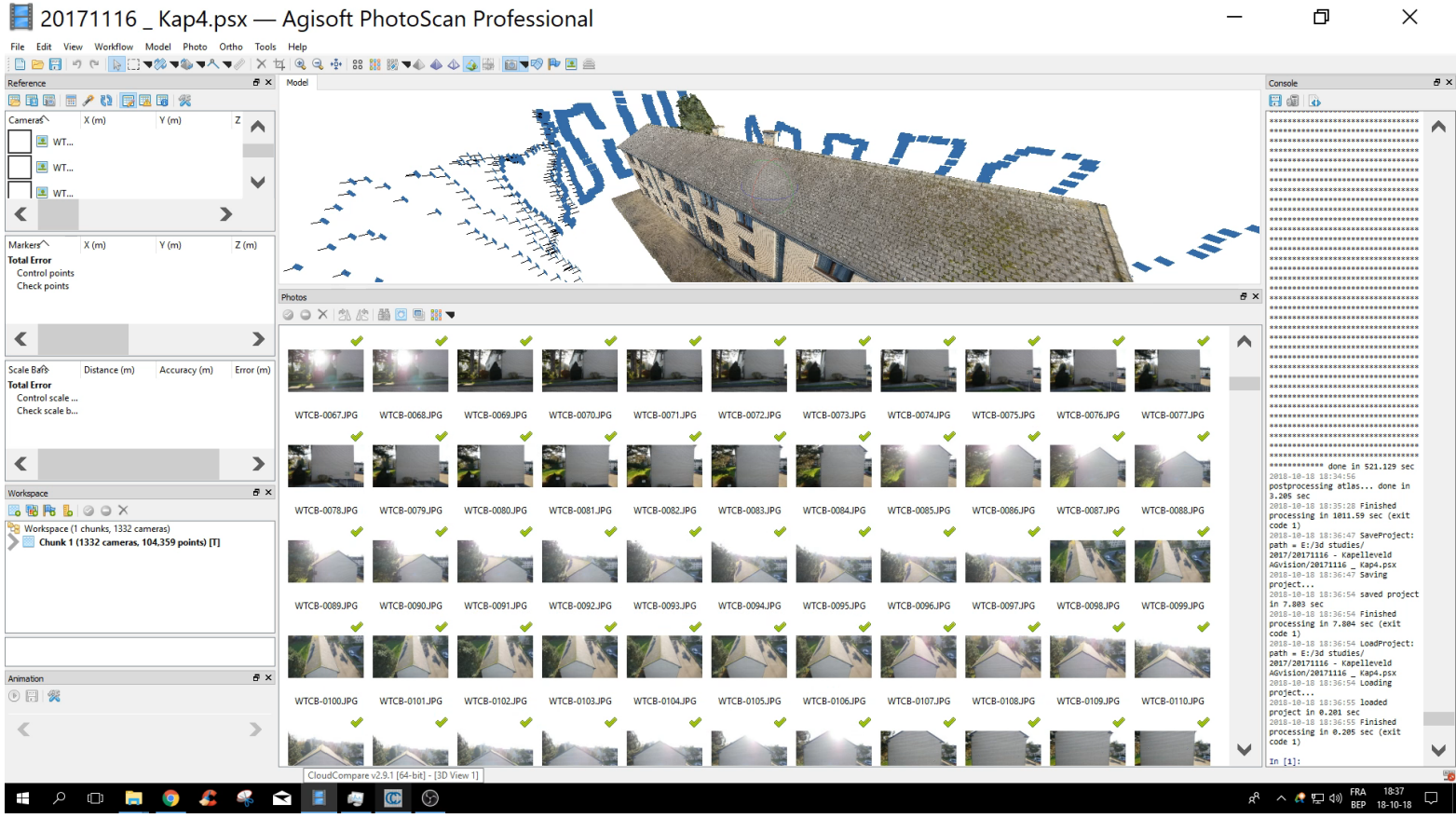
Panoramic pictures

Deliverables

Photogrammetry

- 3D reconstruction from images
  - Creation of detailed models based on photos only





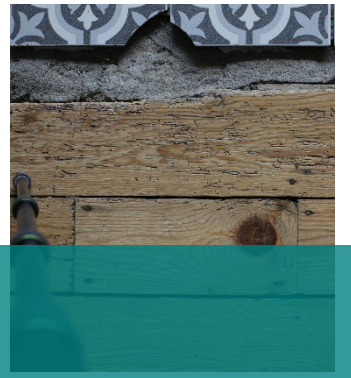
wtcb.be KU LEUVEN AGENTSCHAP INNOVEREN & ONDERNEMEN





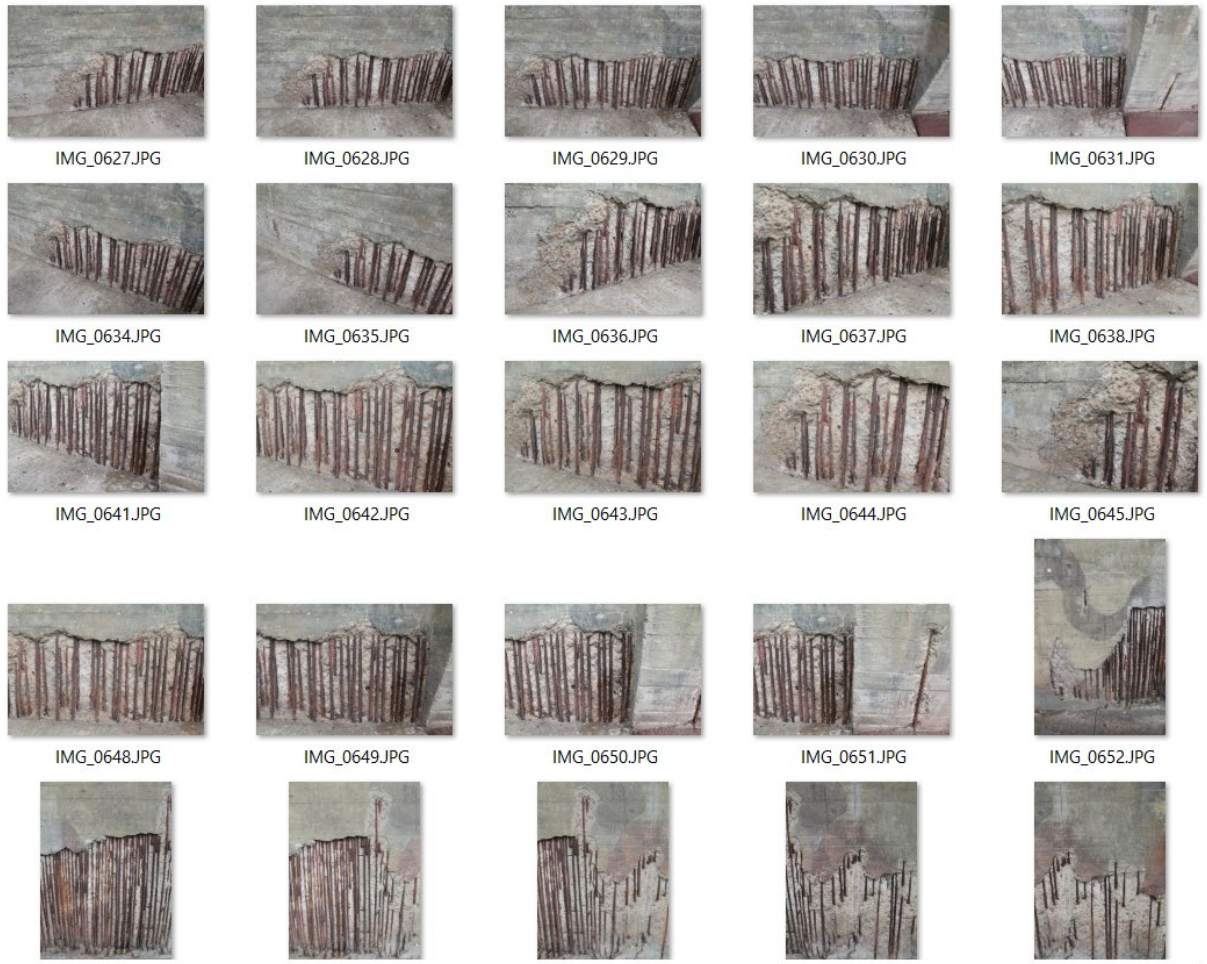





VARIOUS STUDY OBJECTS

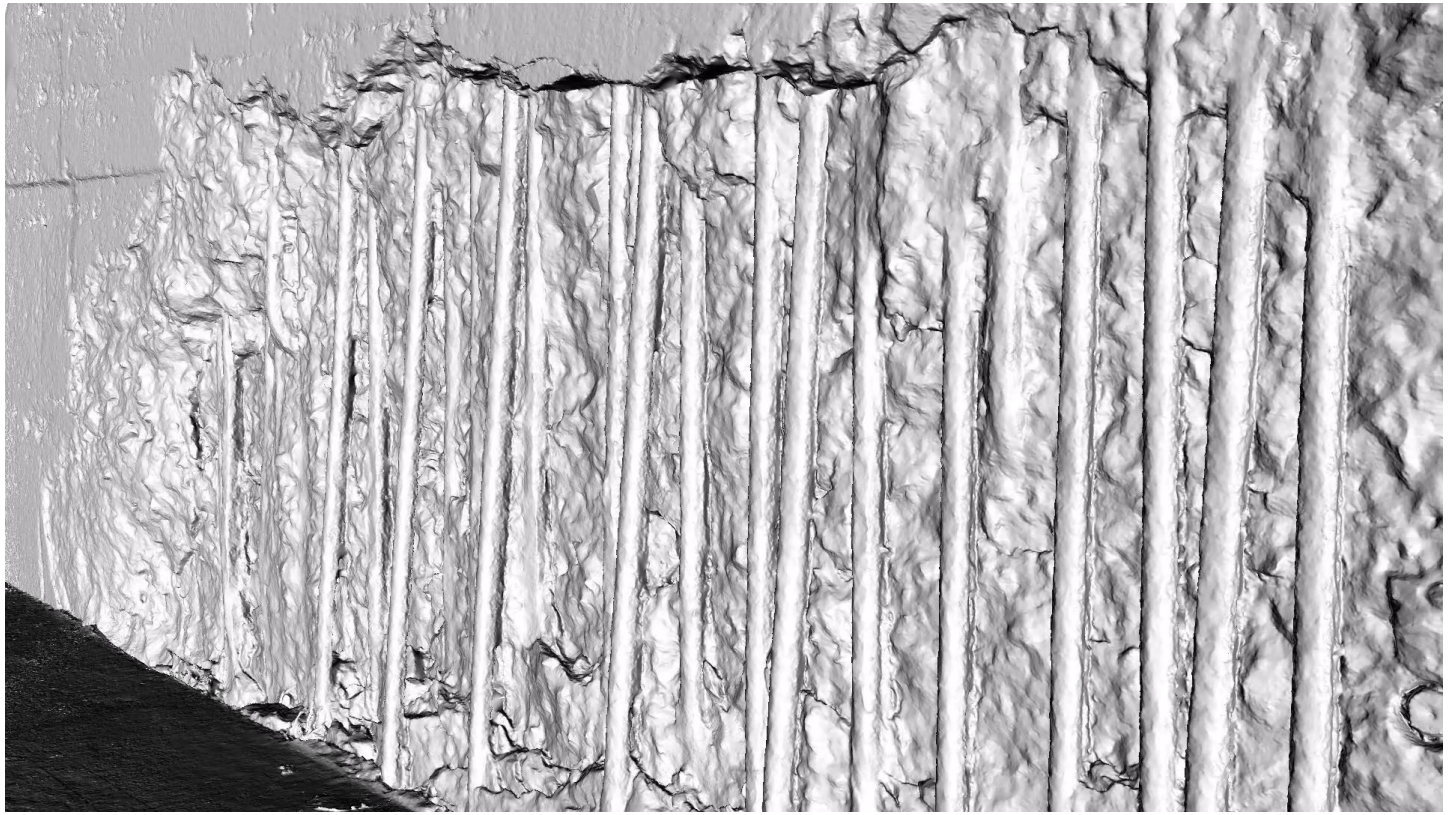
Example 1



50 PHOTOS, STANDARD DSLR

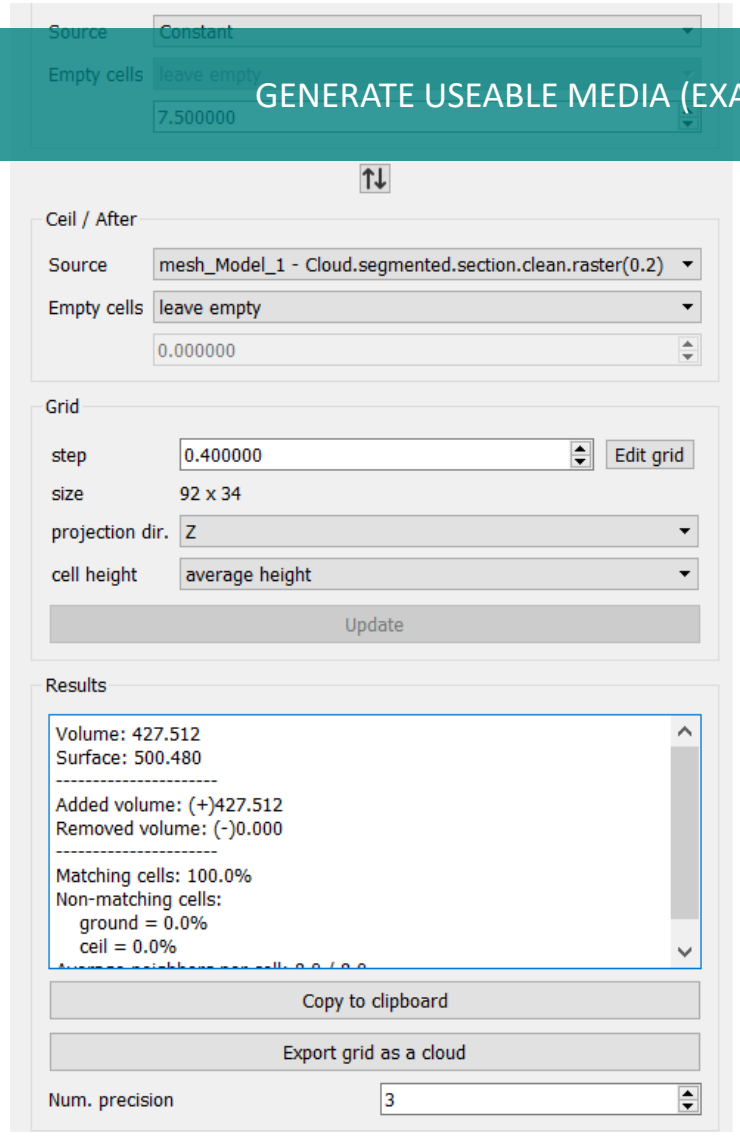
Example 1

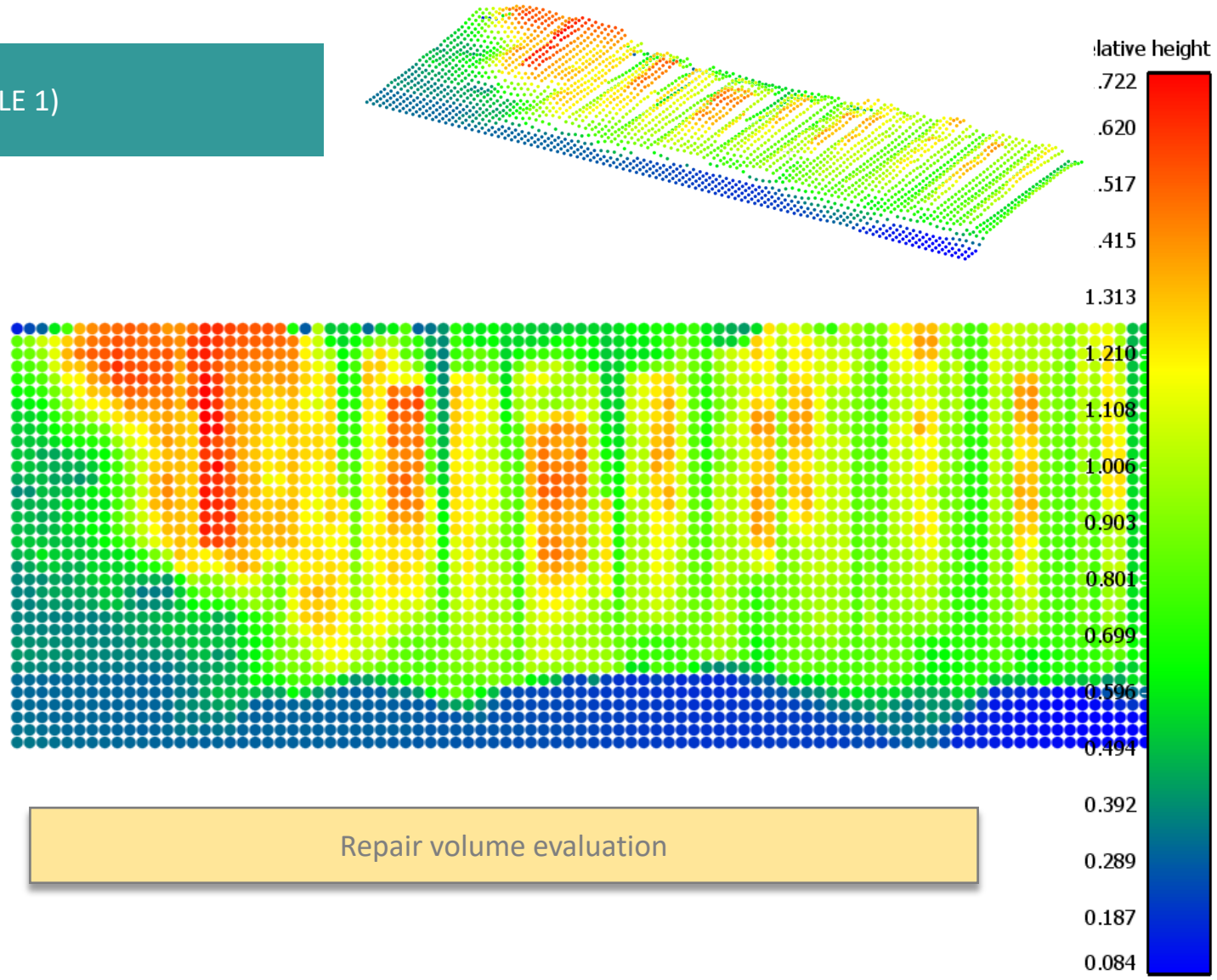
HIGH RESOLUTION 3D!



And then?

GENERATE USEABLE MEDIA (EXAMPLE 1)

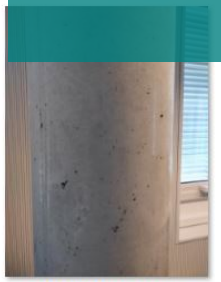




Repair volume evaluation

Example 2

SMARTPHONE PHOTOS


IMG_20190806_114347.jpg


IMG_20190806_114350.jpg


IMG_20190806_114351.jpg


IMG_20190806_114353.jpg


IMG_20190806_114359.jpg


IMG_20190806_114401.jpg


IMG_20190806_114403.jpg


IMG_20190806_114406.jpg


IMG_20190806_114415.jpg


IMG_20190806_114418.jpg

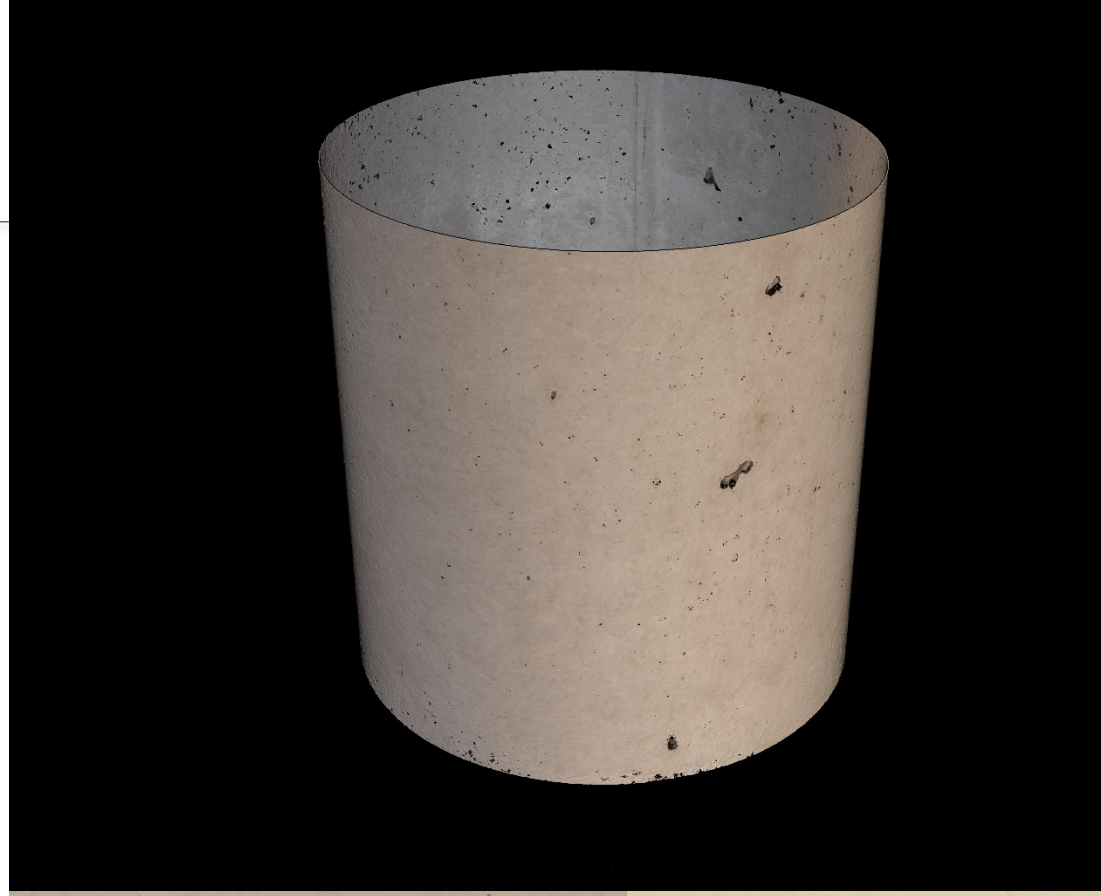

IMG_20190806_114420.jpg


IMG_20190806_114422.jpg

wtcb.be

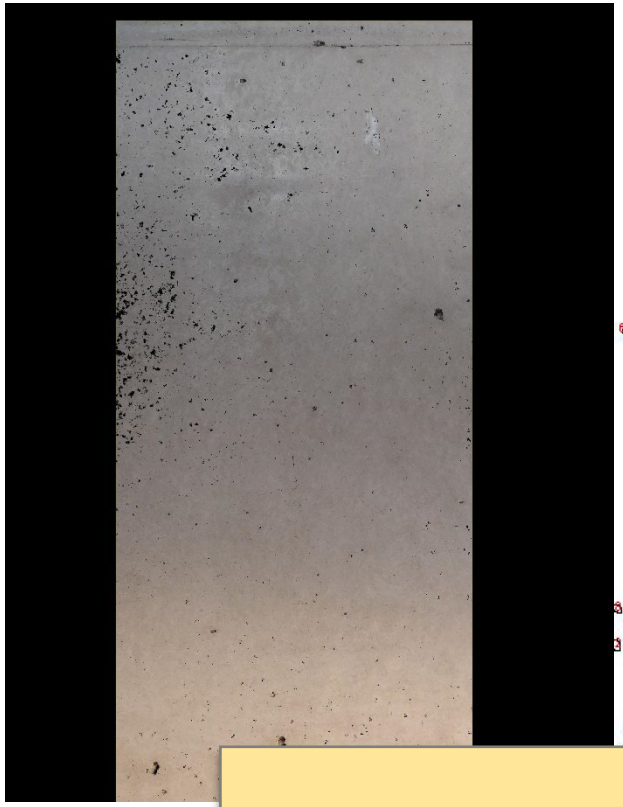
KU LEUVEN

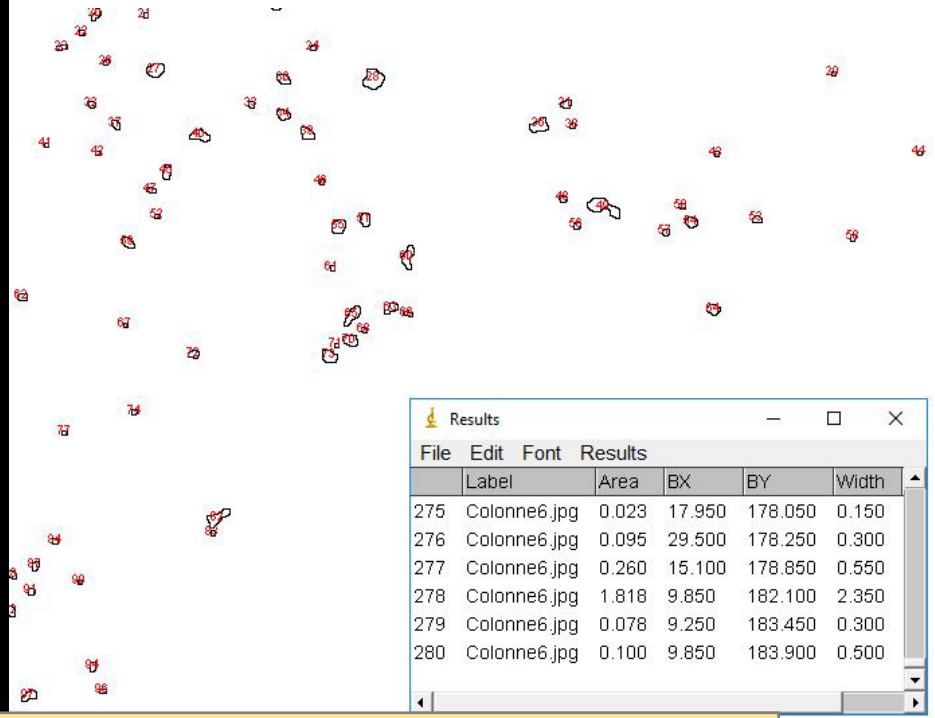
AGENTSCHAP INNOVEREN & ONDERNEMEN



And then?

GENERATE USEABLE MEDIA (EXAMPLE 2)





Results

File Edit Font Results

	Label	Area	BX	BY	Width
275	Colonne6.jpg	0.023	17.950	178.050	0.150
276	Colonne6.jpg	0.095	29.500	178.250	0.300
277	Colonne6.jpg	0.260	15.100	178.850	0.550
278	Colonne6.jpg	1.818	9.850	182.100	2.350
279	Colonne6.jpg	0.078	9.250	183.450	0.300
280	Colonne6.jpg	0.100	9.850	183.900	0.500

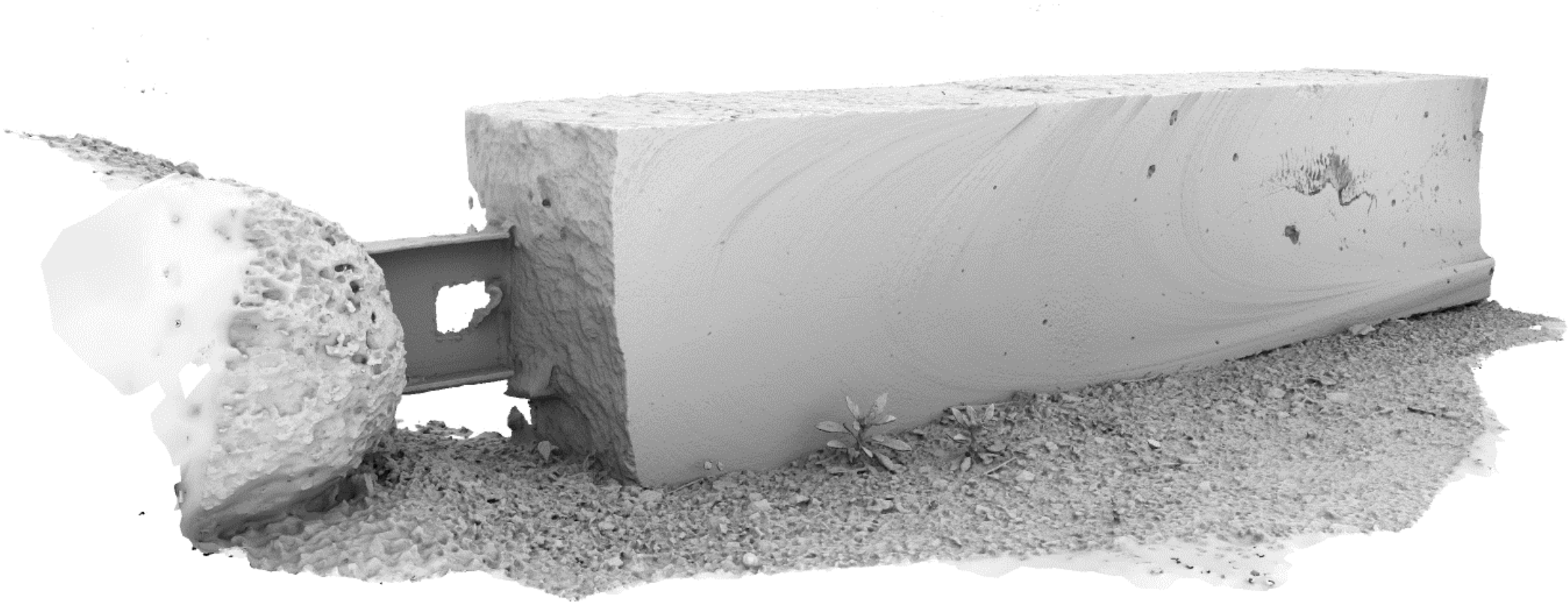
Bubbling evaluation

Example 3

A VIDEO

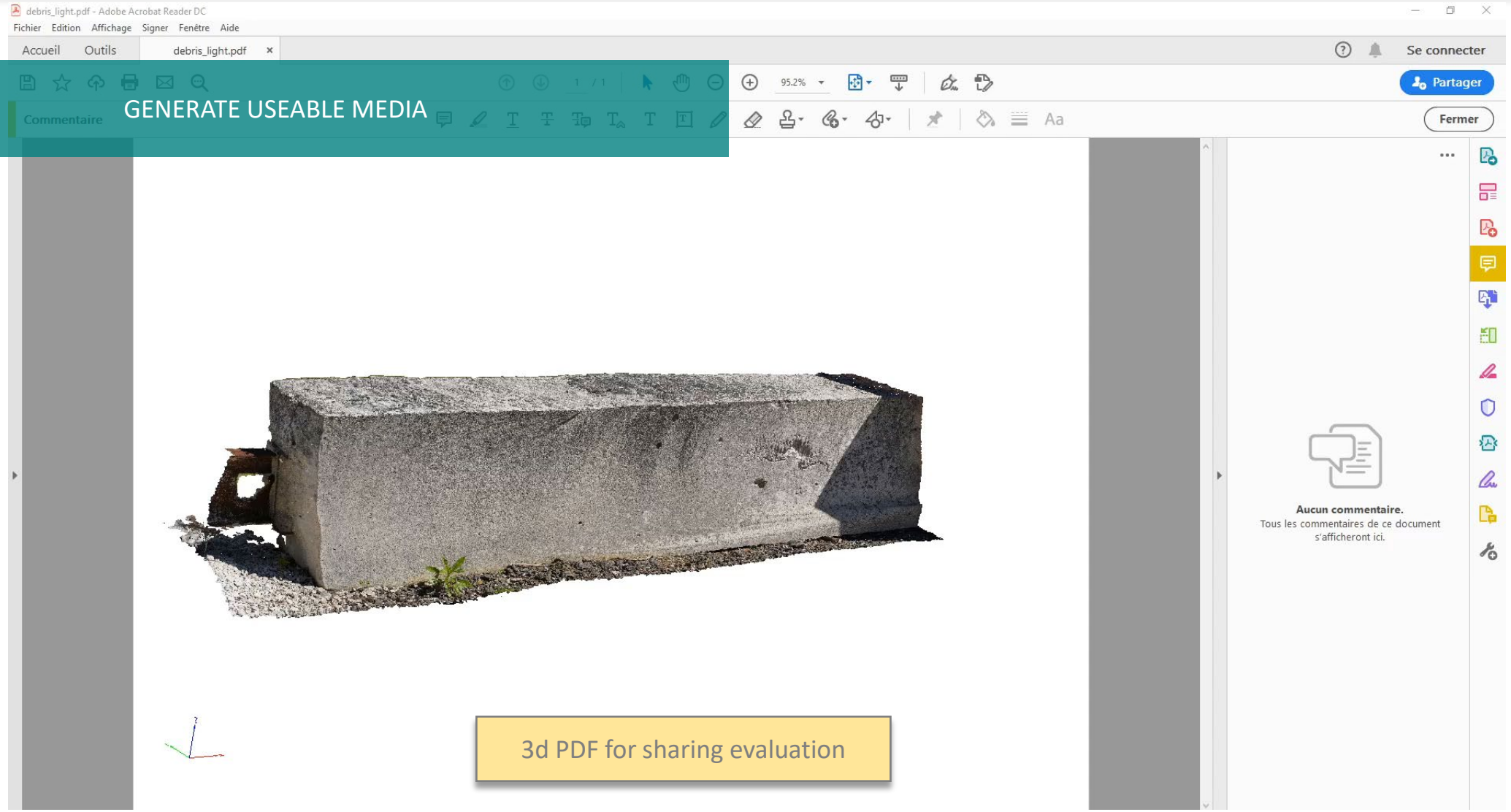
Example 3

A VIDEO



And then?

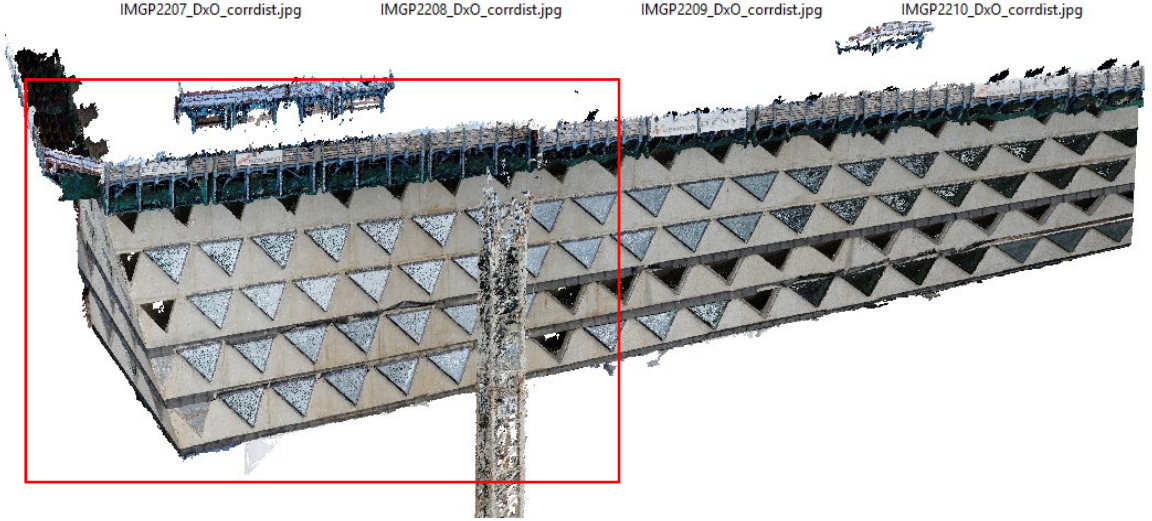
GENERATE USEABLE MEDIA



3d PDF for sharing evaluation

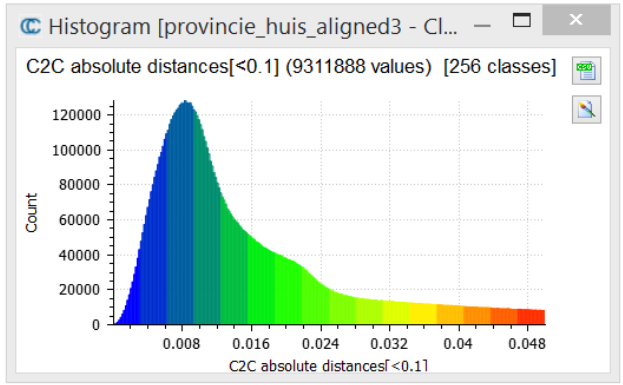
Example 4

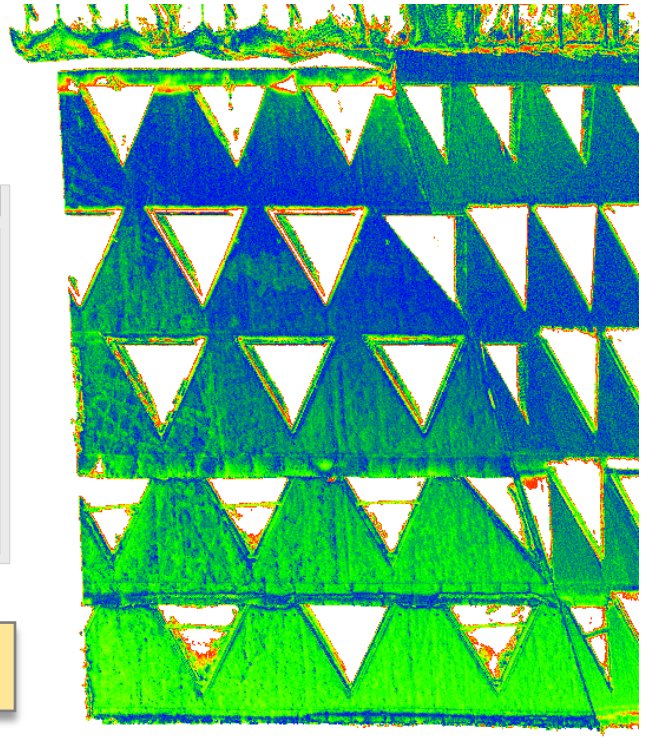
LASER + PHOTOGRAMMETRY



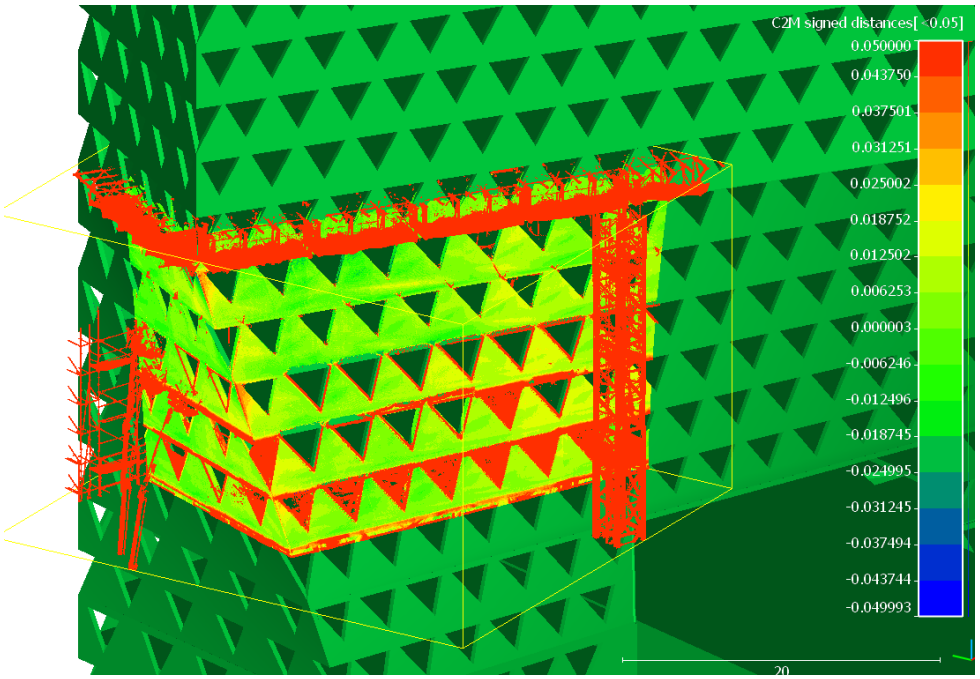
And then?

QUALITY CONTROL & FOLLOW-UP

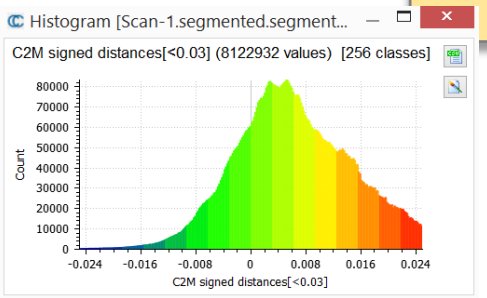




Cloud-to-Cloud



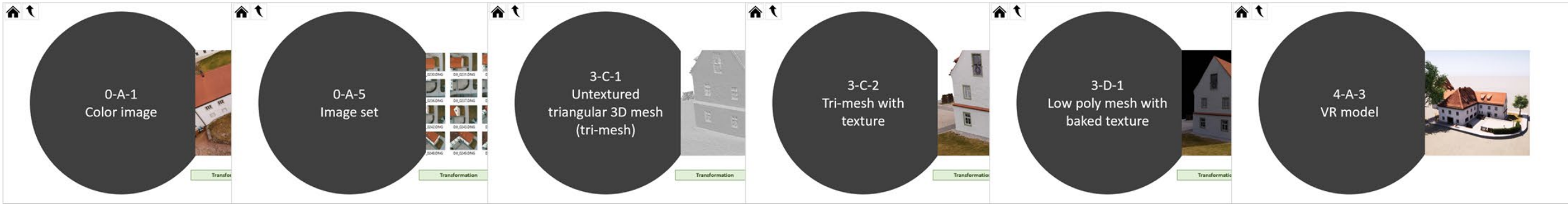
Cloud-to-BIM



Perspectives

For the future

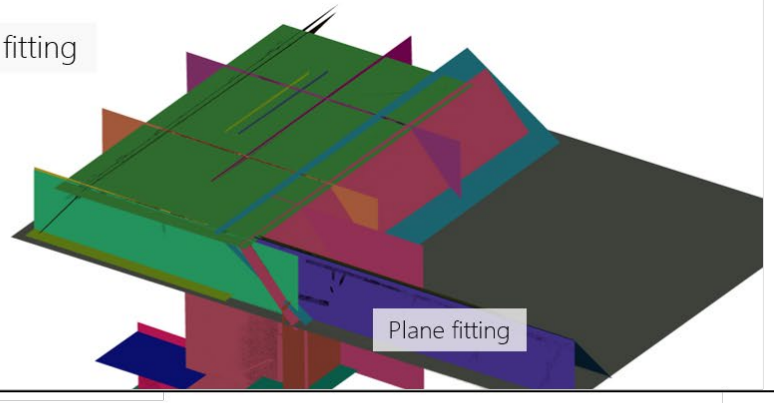
THE FUTURE? QUALITY FRAMEWORKS



THE FUTURE? SEMANTIC DATA!

1. Automated shape fitting

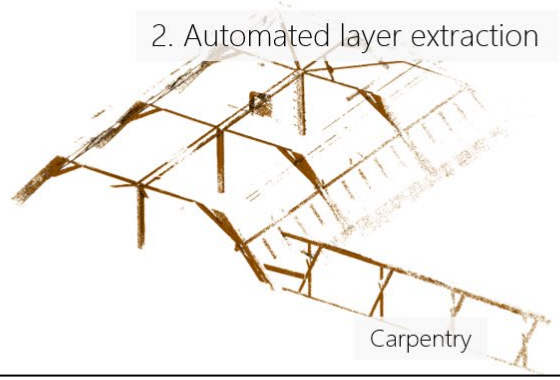
Point cloud



Plane fitting

2. Automated layer extraction

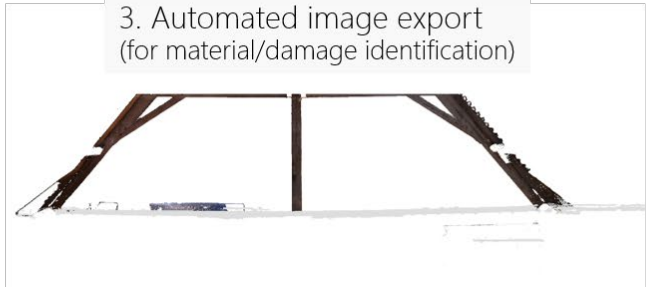
Floors



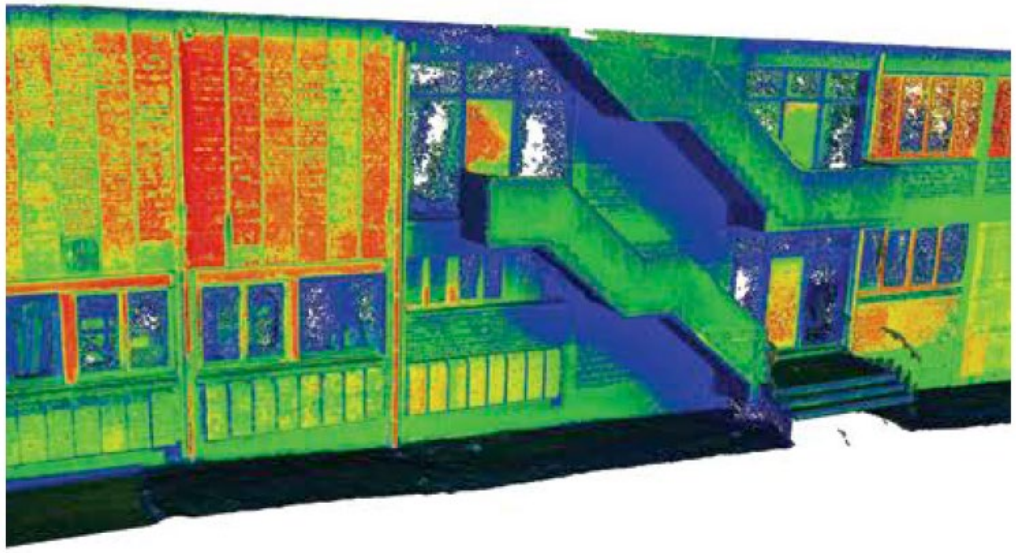
Carpentry

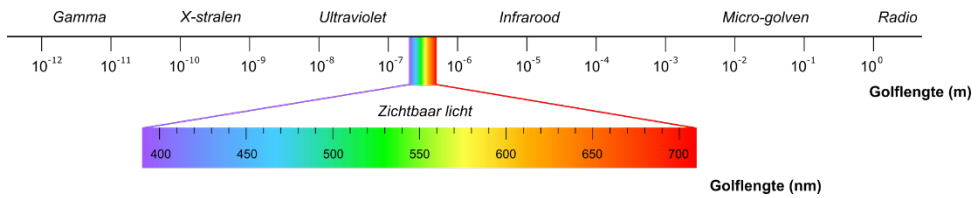
Roof interior finish

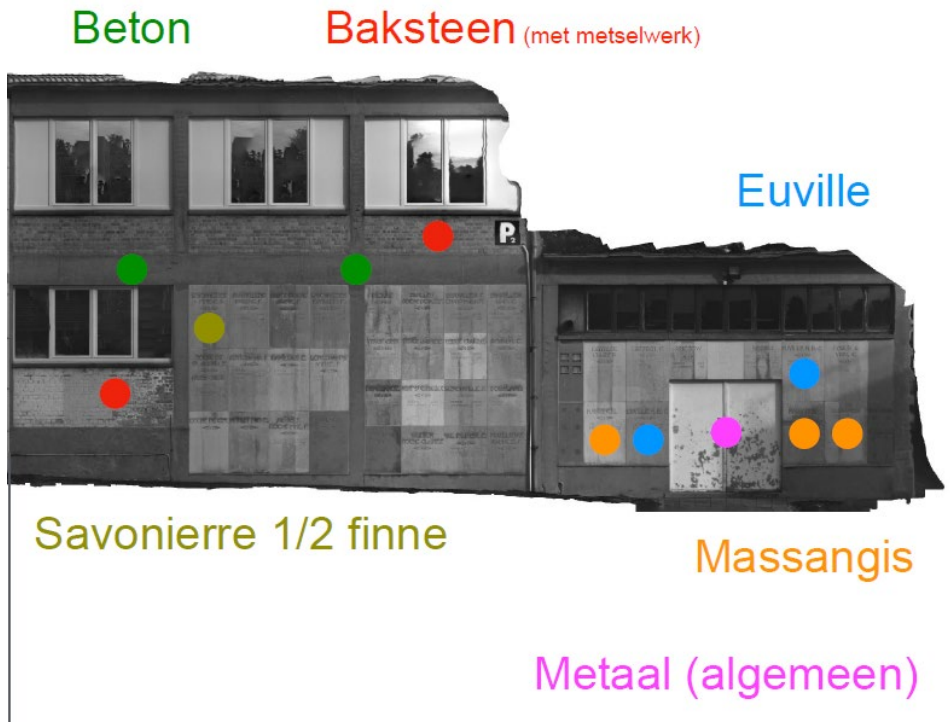
3. Automated image export
(for material/damage identification)



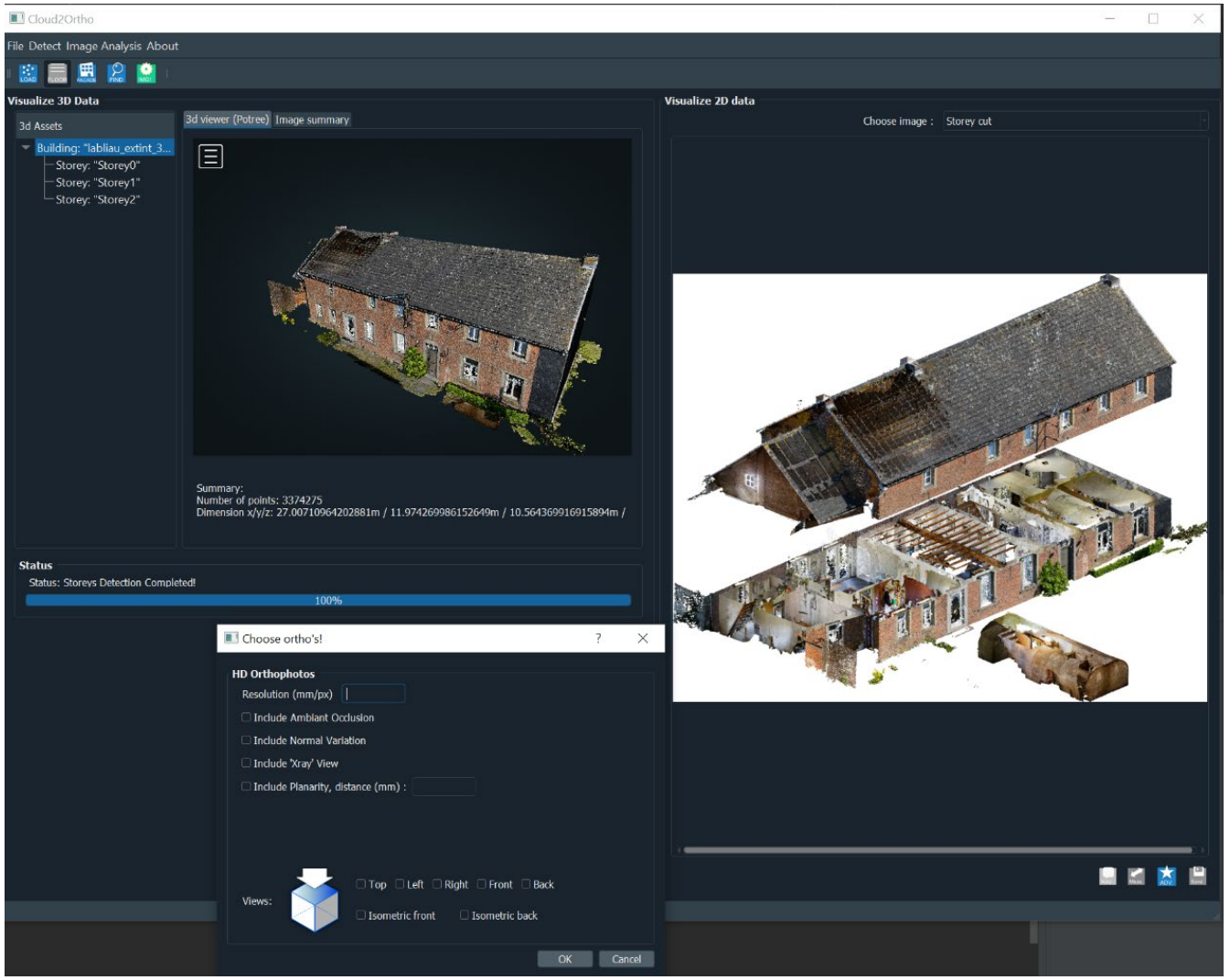
THE FUTURE? MATERIAL / PATHOLOGY IDENTIFICATION & INFORMATION !



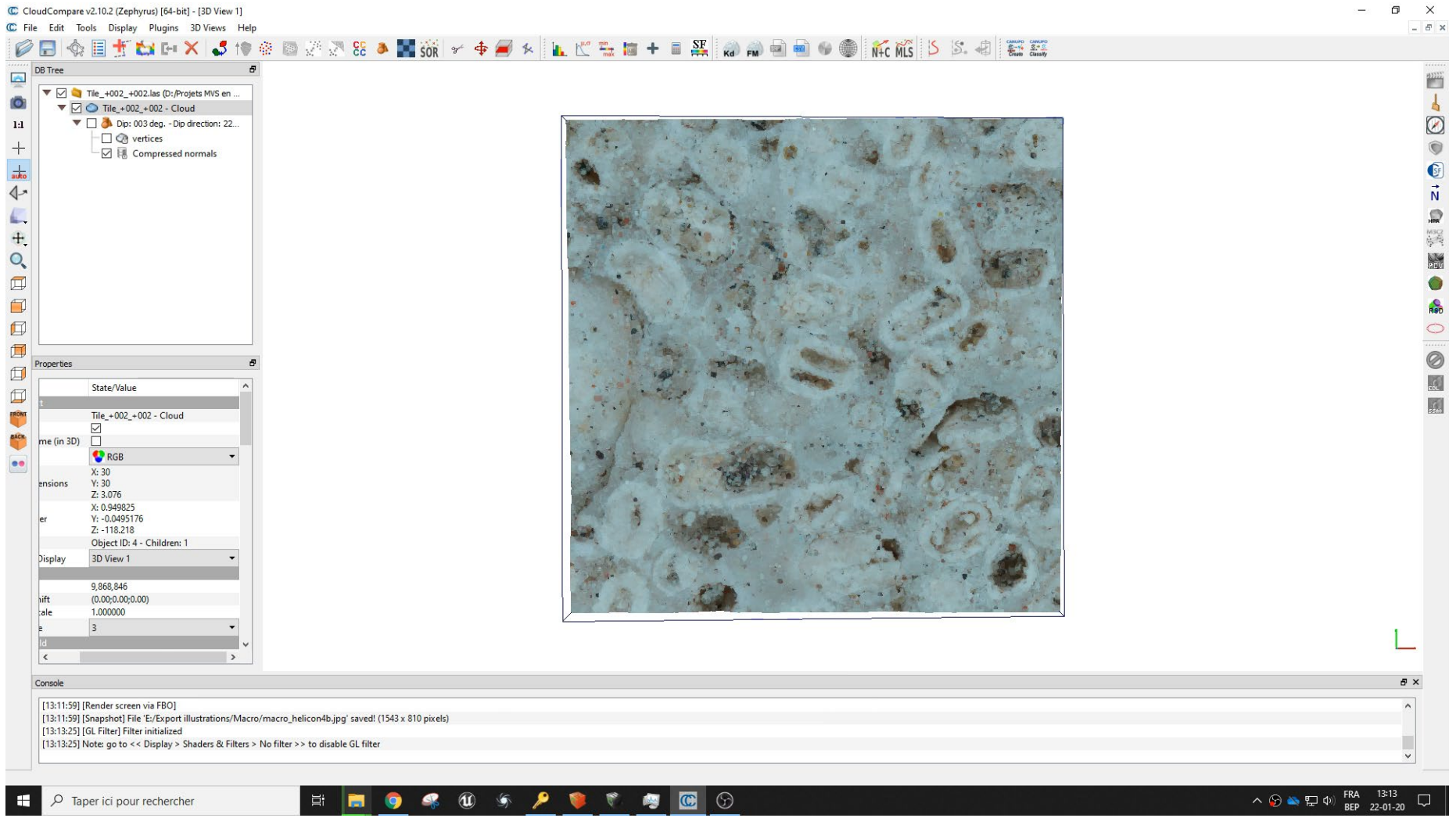




THE FUTURE? AUTOMATED ANALYSIS AND REPORTING TOOL



EXPLORE NEW HORIZONS…



Bedankt!

M. de Bouw – Labohoofd
« Renovatie & Erfgoed »
michael.de.bouw@bbri.be

wtcb.be
Onderzoekt • Ontwikkelt • Informeert

KU LEUVEN

AGENTSCHAP
INNOVEREN &
ONDERNEMEN