AGENDA

Introduction to VXelements

- GOscan!50 /Academia
- VXscan
- VXmodel

CADCAM PROTOTYPING

HARDWARE

CADCAM PROTOTYPING

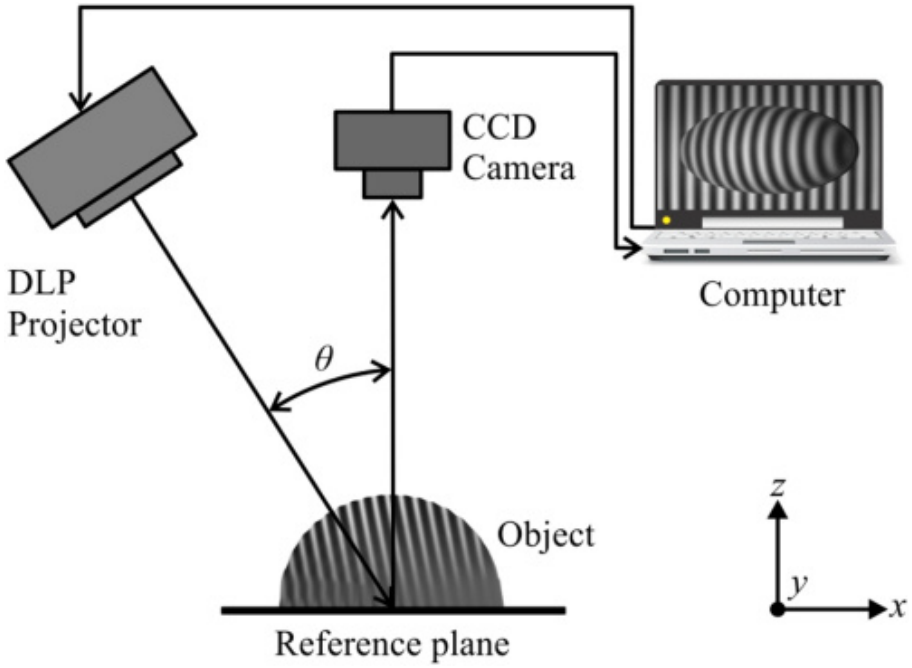
HARDWARE

CADCAM PROTOTYPING

TECHNOLOGY

A 3D scanner works with structured light using the principles of triangulation.

The sensor projects a precise shifting fringe pattern across the part's surface, and two cameras capture the surface geometry based on the pattern distortion, calculating 3D coordinate measurements.



CADCAM
PROTOTYPING

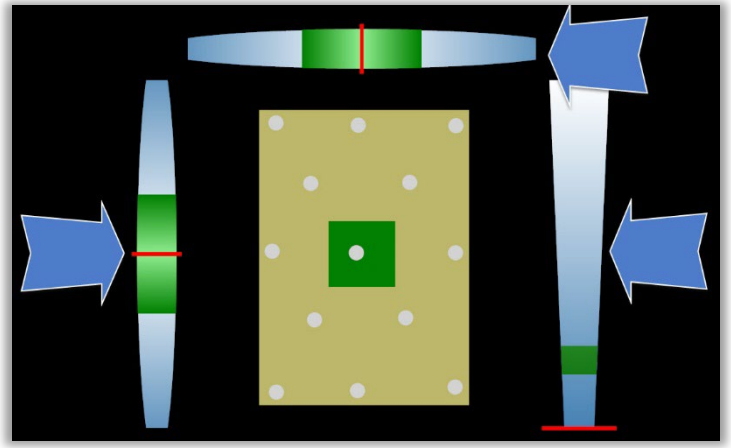
WORKFLOW

1. Part setup with target points
2. Connect GOscan!50 / Academia to the computer and launch VXelements
3. Calibrate the scanner
4. Set shutter time
5. Set resolution
6. Scan object
7. Clean up in VXscan (additional clean-up in VXmodel)
8. Merge scans and set alignment
9. VXelements output
10. Save/export for SolidWorks

CADCAM PROTOTYPING

CALIBRATION

Top indicator
Tilt wrist to the left or to the right



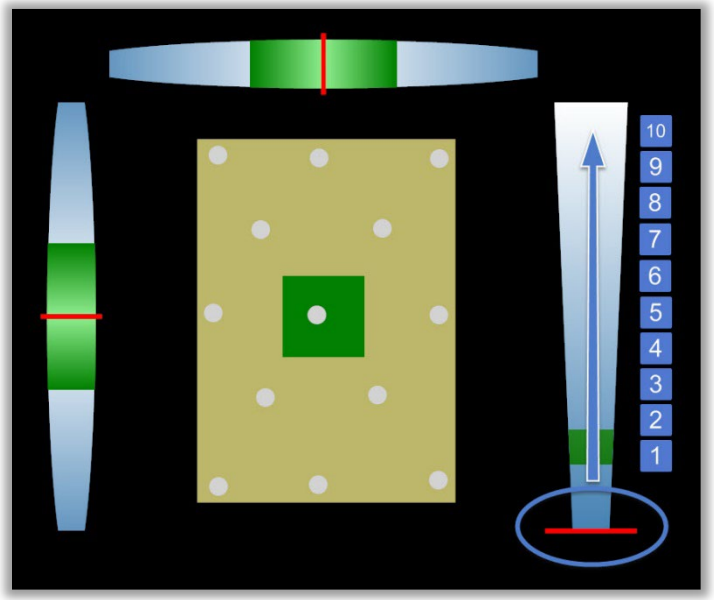
Left indicator
Tilt wrist up and down

Right indicator
Moving up and down

CADCAM PROTOTYPING

CALIBRATION

- Press the Trigger button to start
- The green areas represent the scanner target positions in the respective orientation
- The 10 positions are in the centre of the board but at different heights, starting close and going up

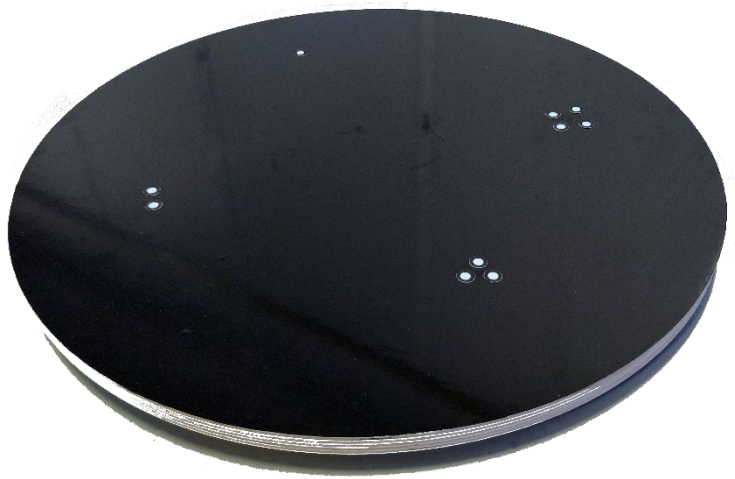


CADCAM PROTOTYPING

LAZY SUSAN

Placing the object on the “Lazy Susan” turntables enables easier scan sessions

- Group member 1 turns the table
- Group member 2 scans while moving scanner from side view to top view in a circular movement



CADCAM PROTOTYPING

PART SETUP

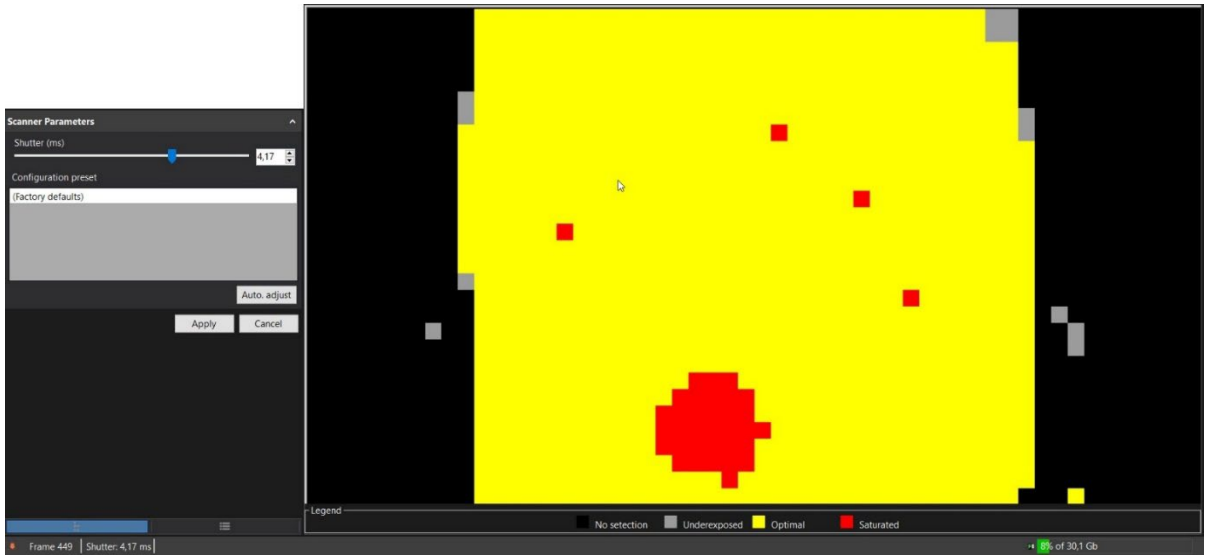
Add target points on the object

- These are detected from 25 - 70 cm
- Place them on planar surfaces
- Away from edges or details

CADCAM PROTOTYPING

SHUTTER TIME

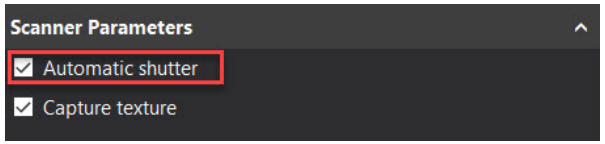
- Set the shutter time according to the object’s surface
- The darker the surface, the longer shutter time is needed
- Get as much yellow as possible from the object to scan at the good stand-off distance

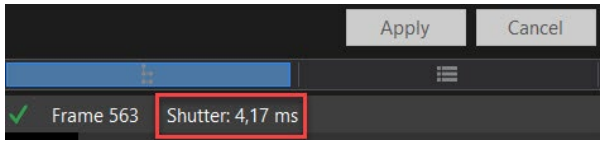


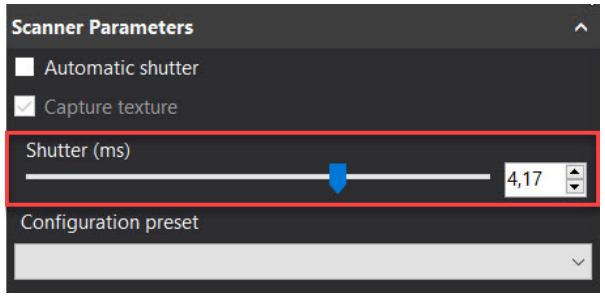
CADCAM PROTOTYPING

SHUTTER TIME

- If the *Automatic shutter* box is unchecked, Manual shutter time can be changed for a specific part of a contrasted textured object while scanning.
- It’s possible to set the value numerically, by moving the slider or by selecting a *Configuration Preset*
- 0,50 ms to 1,00 ms for white objects is adviced



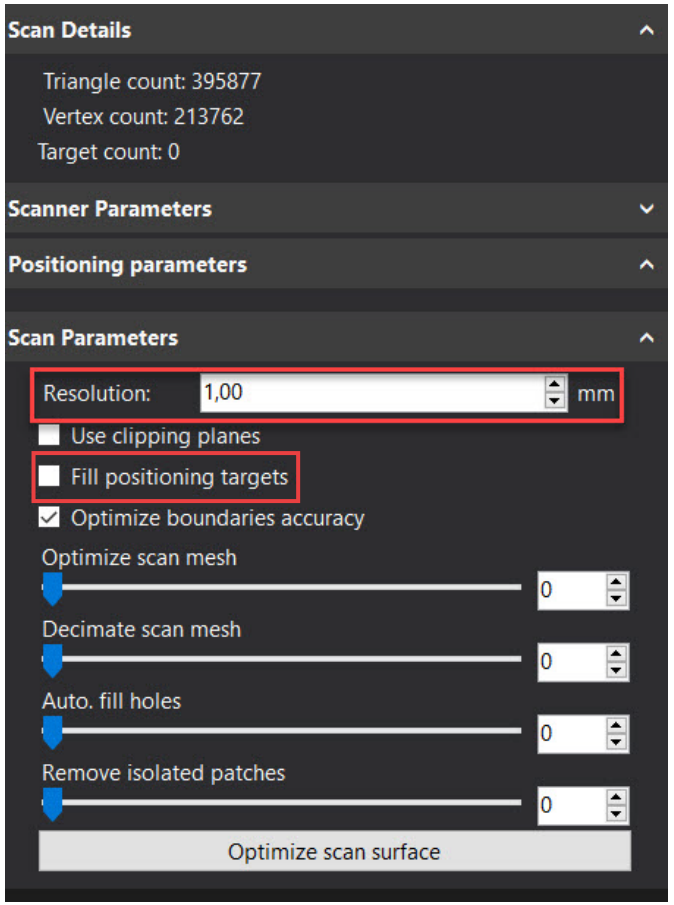




CADCAM PROTOTYPING

RESOLUTION

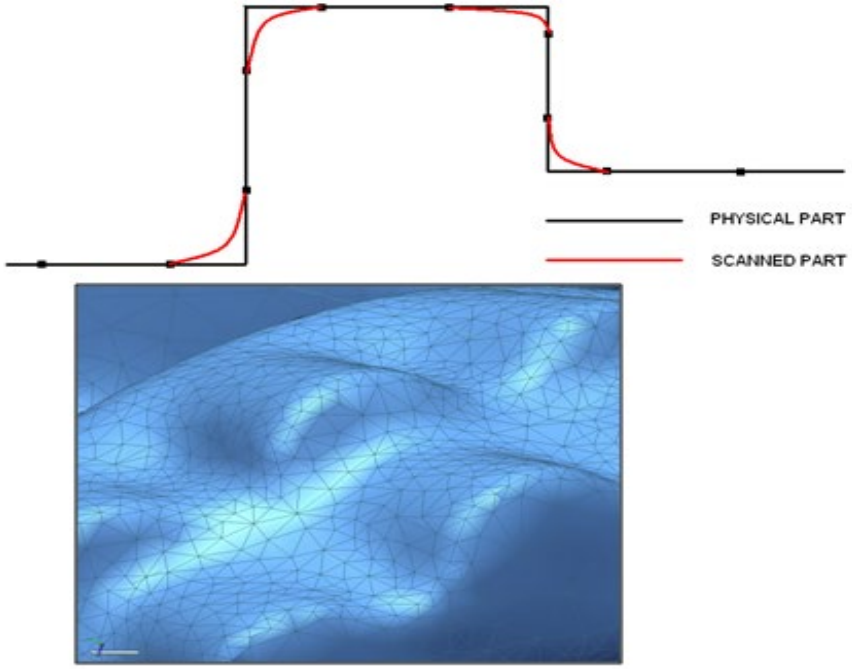
- The resolution sets the level of details
- For the *GO!scan 50* and the *Academia* scanners the standard resolution is 2,0 mm and a high resolution is 0,5 mm
- Check the box *Fill positioning targets* to let the program patch these areas automatically
- Checking on *Capture texture* will result in slower computation as well as larger files. Since the Plastilina surface is smooth and without texture, there's no need for checking on the box.

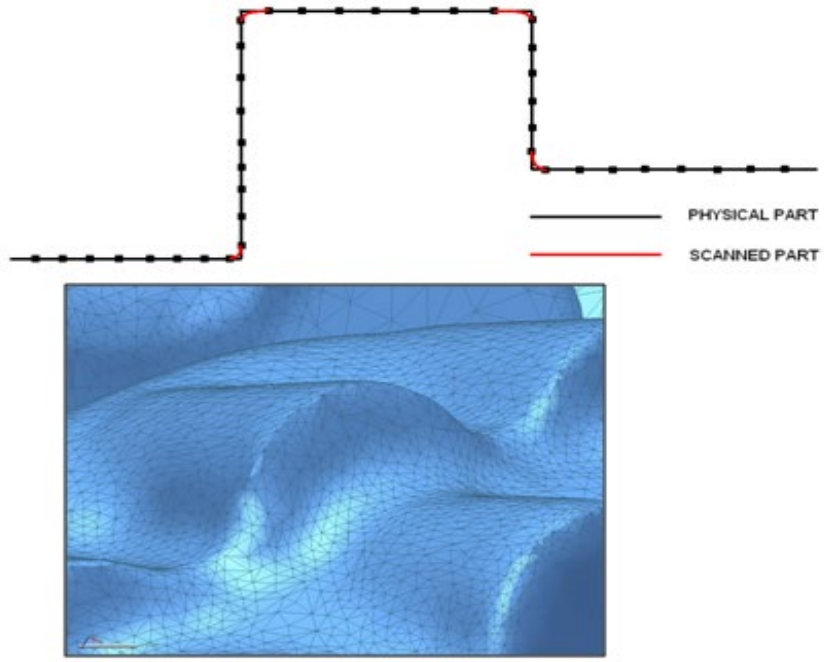


CADCAM PROTOTYPING

RESOLUTION

The accuracy is about 100 microns (0,1 mm)

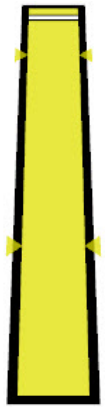




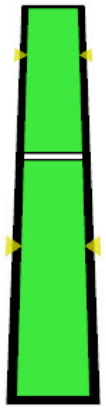
CADCAM PROTOTYPING

SCAN OBJECT

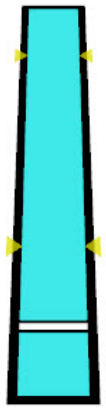
- Keep a steady distance of appx. 40 cm to the object



Scanner is too close



Scanner distance is correct



Scanner is too far

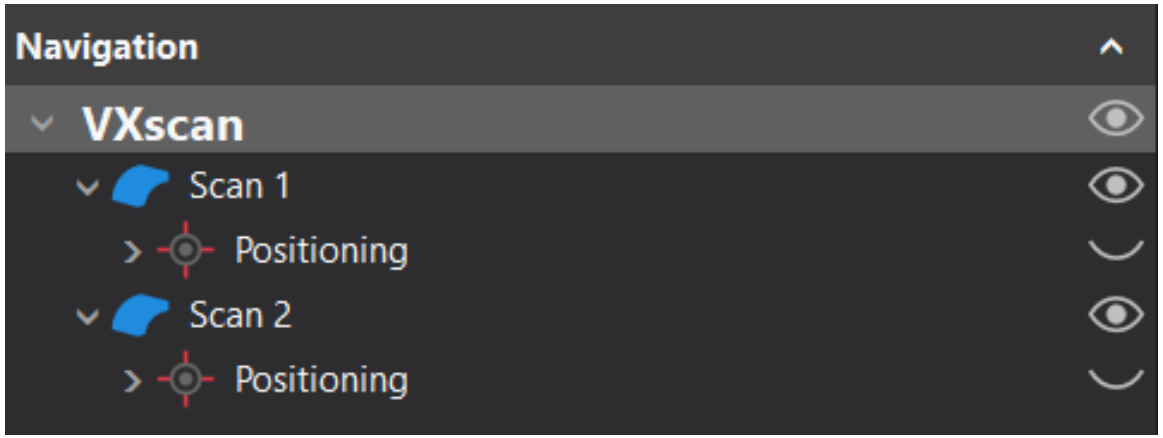
CADCAM PROTOTYPING

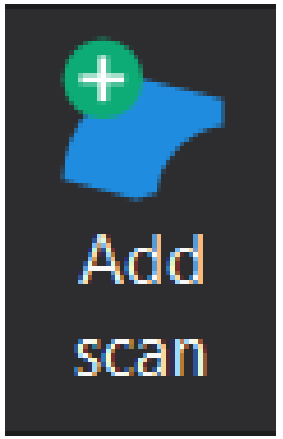
VXscan

STEP 1

When the scanner is calibrated, and you have placed target points on the object:

- Scan the object (Scan1)
- *Add scan*, turn the object and scan the bottom (Scan2)





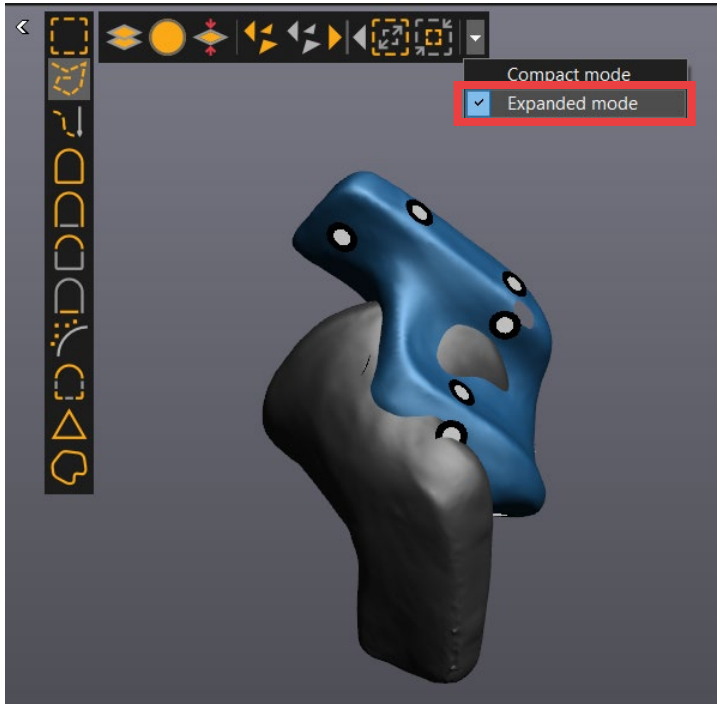
CADCAM PROTOTYPING

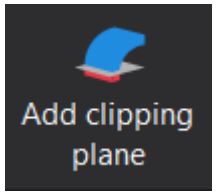
VXscan

STEP 2

Make an initial clean-up of the two scans

- Enable the *Expanded mode* for additional features
- Cleaning scan 1, turn off the visibility of scan2 temporarily by clicking the eye
- Add a *Clipping plane* for removal of the Lazy Susan scan mesh





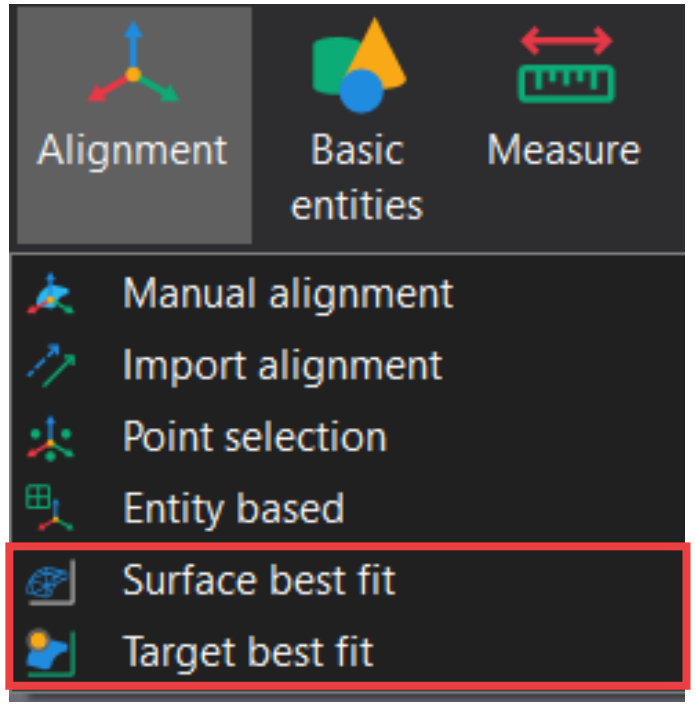
CADCAM PROTOTYPING

VXscan

STEP 3

Align Scan1 and Scan2. Use either:

- (A) *Surface Best fit* (aligns with the target points from each session/scan), or use
- (B) *Target Best fit* (using pre-alignment set by user)



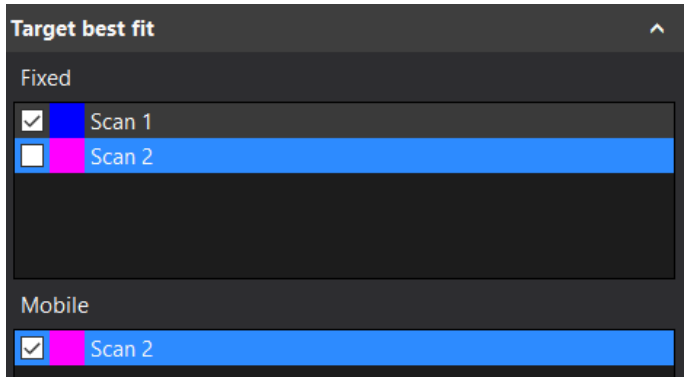
CADCAM PROTOTYPING

VXscan

STEP 4 (A)

Align Scan1 and Scan2

- Choose which scan to be *Fixed*, and which to be *Mobile*
- Choose *Manual* under *Parameters,* and set Max distance to 1,00 mm



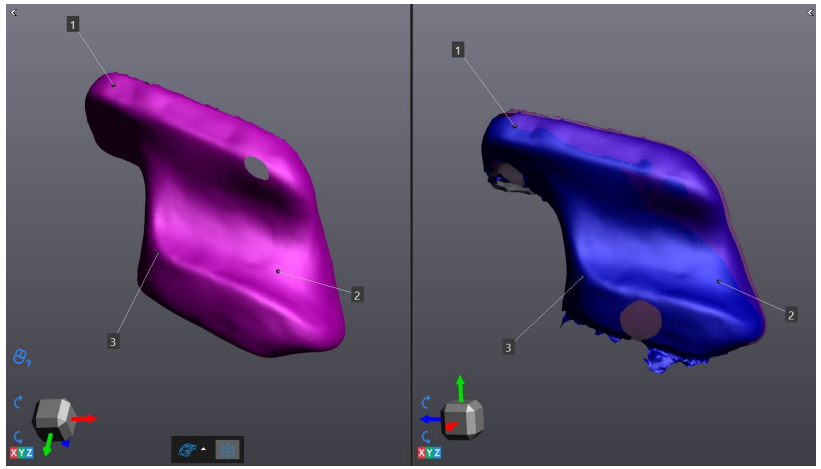
CADCAM PROTOTYPING

VXscan

STEP 4 (A)

Align Scan1 and Scan2

- Align the models, and select 3 points on each model with scan overlaps
- Click *Best fit,* and *OK*



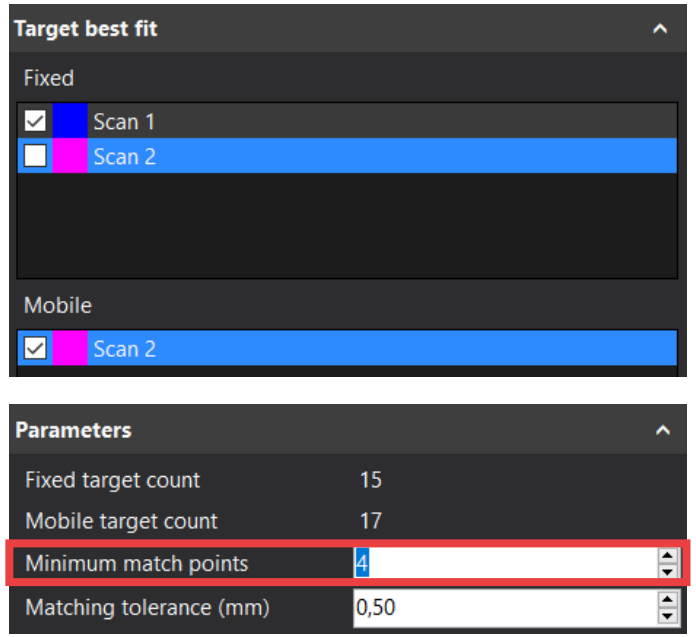
CADCAM PROTOTYPING

VXscan

STEP 4 (B)

Align Scan1 and Scan2

- Choose which scan to *Fixed*, and which to be *Mobile*
- If using target points, reduce *Minimum match point* under *Parameters*
- Click *Preview, Accept* and *OK*



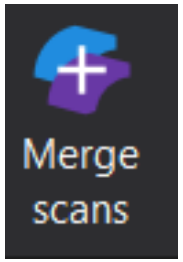
CADCAM PROTOTYPING

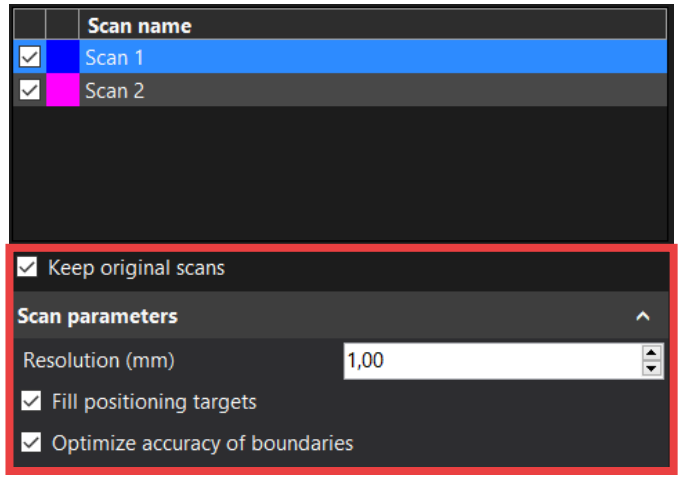
VXscan

STEP 5

Merge Scan1 and Scan2

- Right-click to set *rotation center* on fixed and mobile object
- Click *Merge scans*
- Enable *Keep original scans*
- Enable *Fill positioning targets*
- Test enabling *Optimize accuracy…*
- Click *Accept*





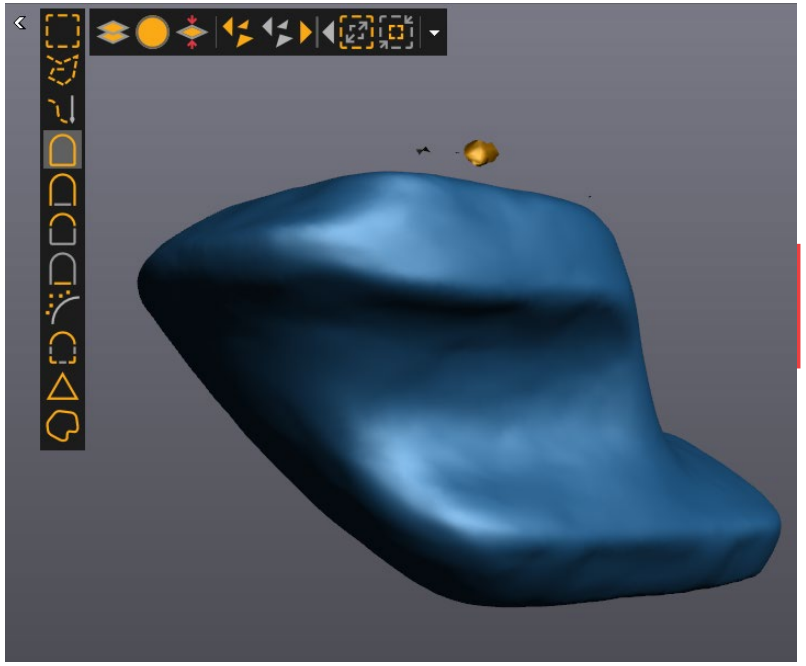
CADCAM PROTOTYPING

VXscan

STEP 6

Clean for noise

- Hide *Scan1*, *Scan2* and target points
- Hold *CTRL* when using selection tools
- Press *Delete*



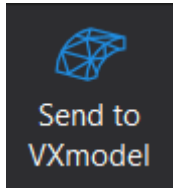
CADCAM PROTOTYPING

VXmodel

STEP 7

Send to VXmodel

- Make sure to select the *MergedScan* for sending to Vxmodel
- VXmodel (and VXinspect) only works on KEA's network!



CADCAM PROTOTYPING

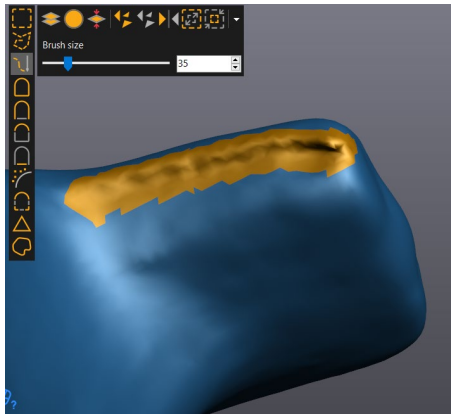
VXmodel

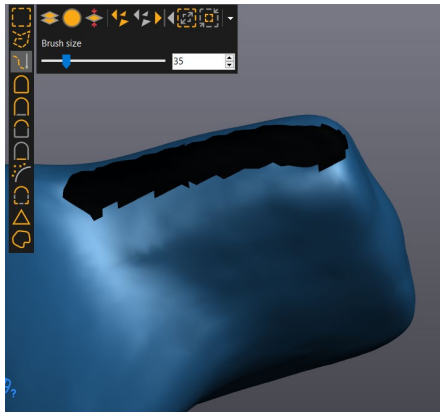
STEP 8

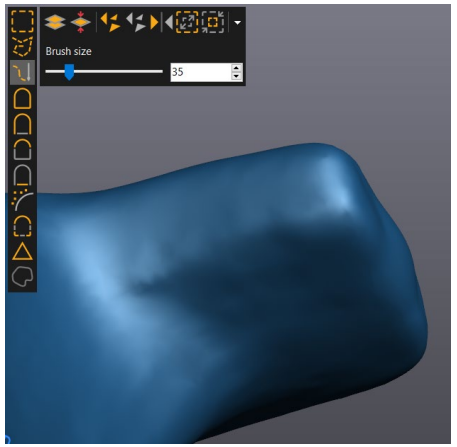
Optimize scan

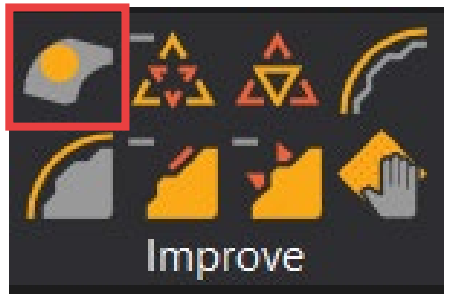
- *Fill holes*
- Create bridges
- Smoothen surface

Watch the VXmodel video









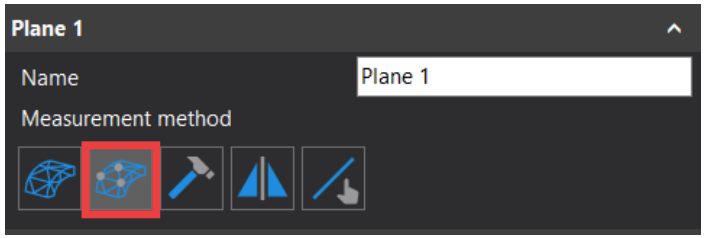
CADCAM PROTOTYPING

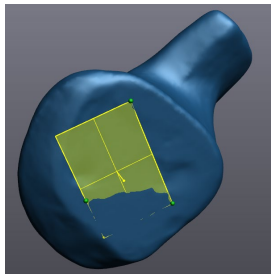
VXmodel

STEP 9

Create entities

- Make a plane on the bottom surface
- Use *Vertex Selection* (press CTRL)
- Click 3 times on the surface
- Add additional entities if possible





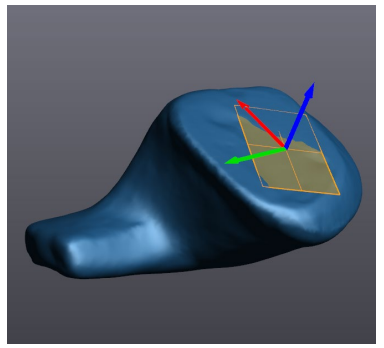
CADCAM PROTOTYPING

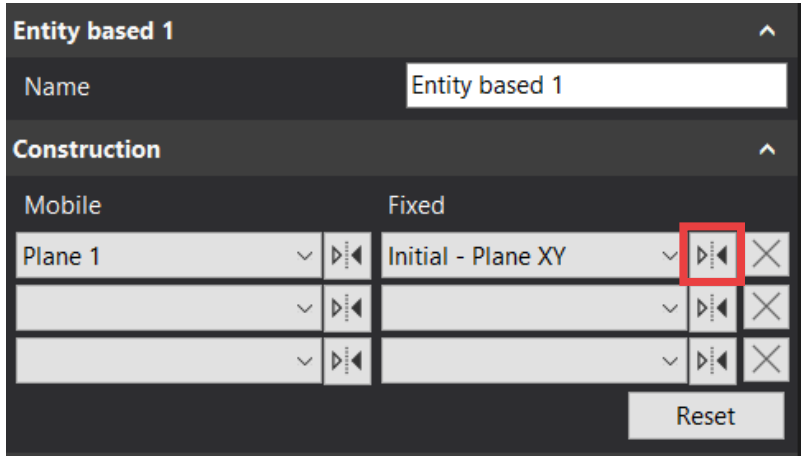
VXmodel

STEP 10

Align with X Y Z

- Use the Entity based alignment
- Plane 1 is Mobile, and XY plane is Fixed
- *Flip* the model for Z axis alignment if necessary
- Create other alignments if you have additional entities





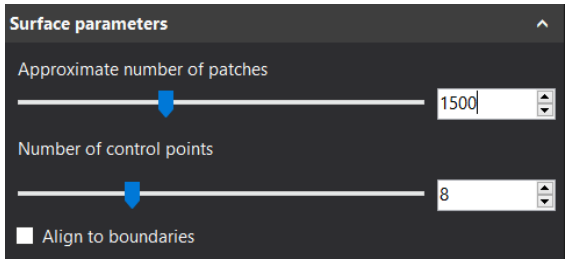
CADCAM PROTOTYPING

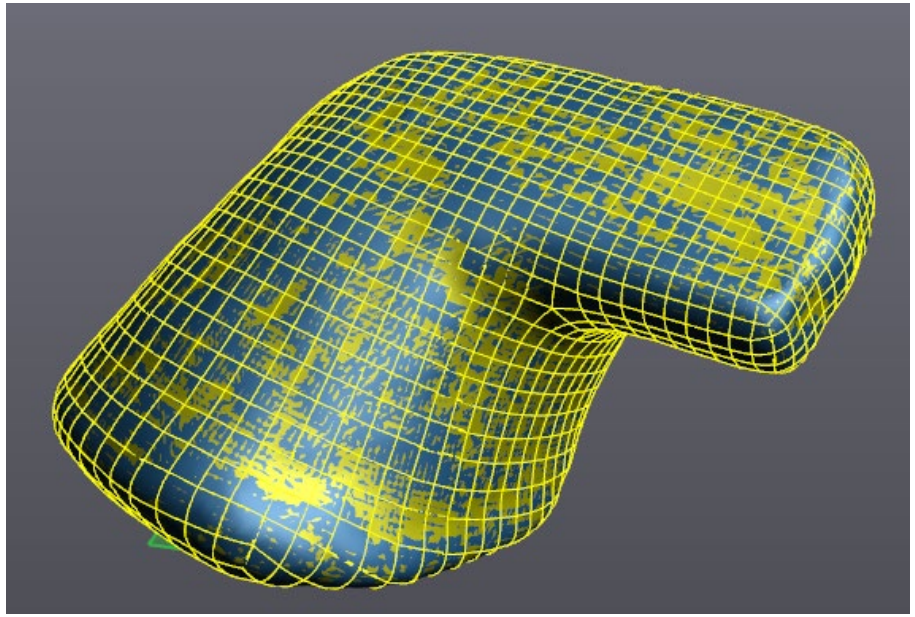
VXmodel

STEP 11

Create an Auto Surface

- Adjust mesh to 1500 / 8





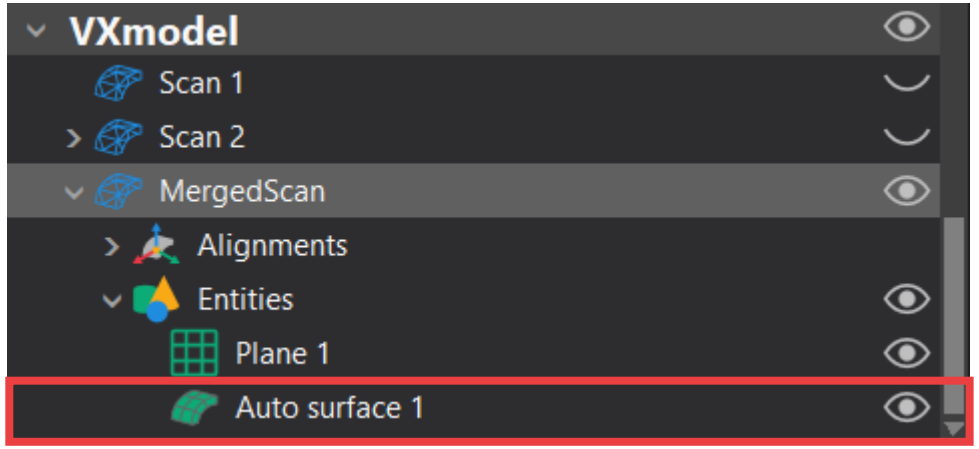
CADCAM PROTOTYPING

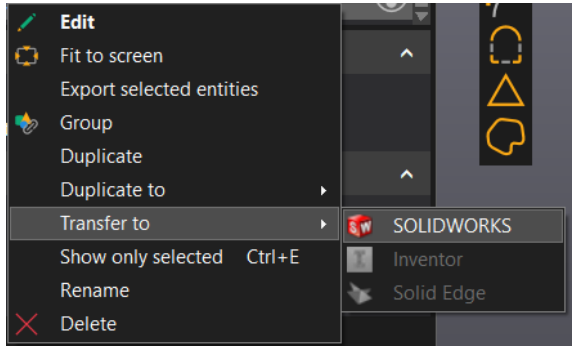
VXmodel

STEP 12

Transfer to SolidWorks

- Twirl open the MergedScan menu
- Locate the Auto Surface
- Right click, and *Transfer to* > SW



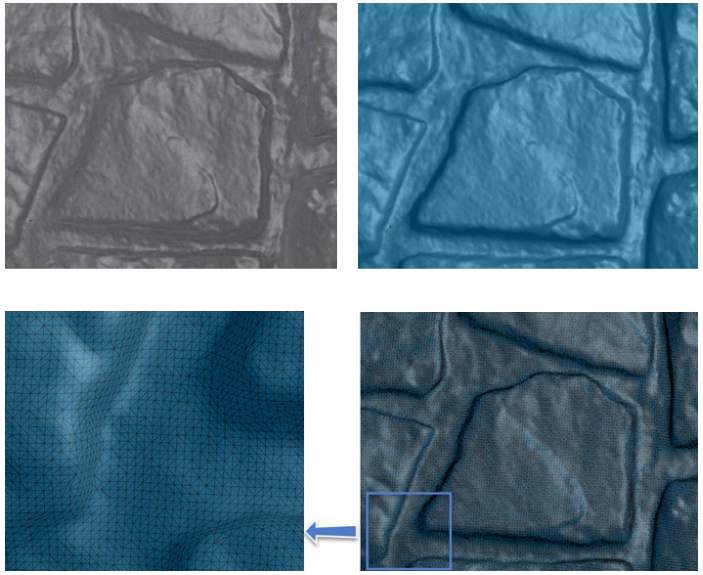


CADCAM PROTOTYPING

VX ELEMENTS OUTPUT

VXelement's output is an optimized mesh, and the user can save out the file as a:

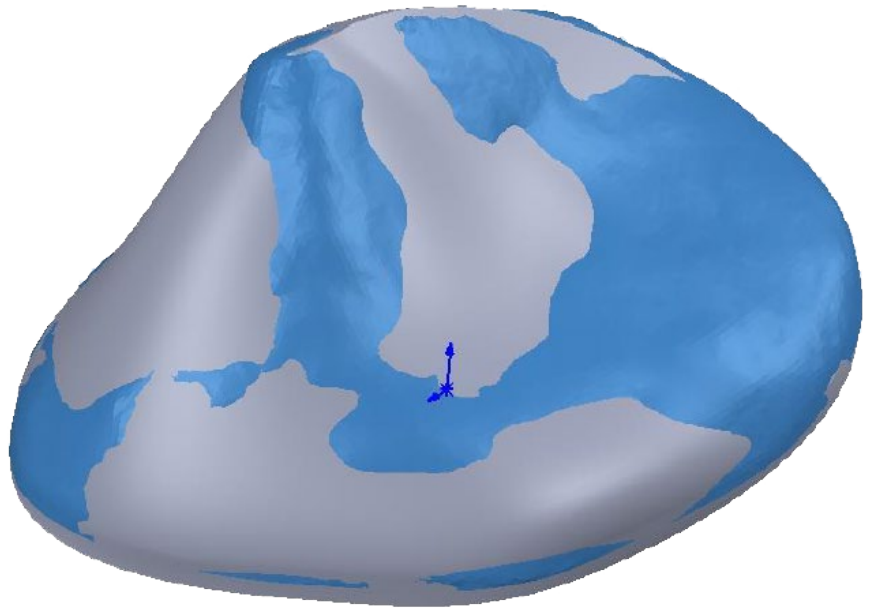
- VXelements session which contains all data (.csf)
- Mesh file of the geometry only (.stl)
- Mesh file of the geometry & texture information related (.obj)



CADCAM PROTOTYPING

EXPORT FOR SOLIDWORKS

The overall goal is to create a surface in SW that aligns with your scan



CADCAM PROTOTYPING