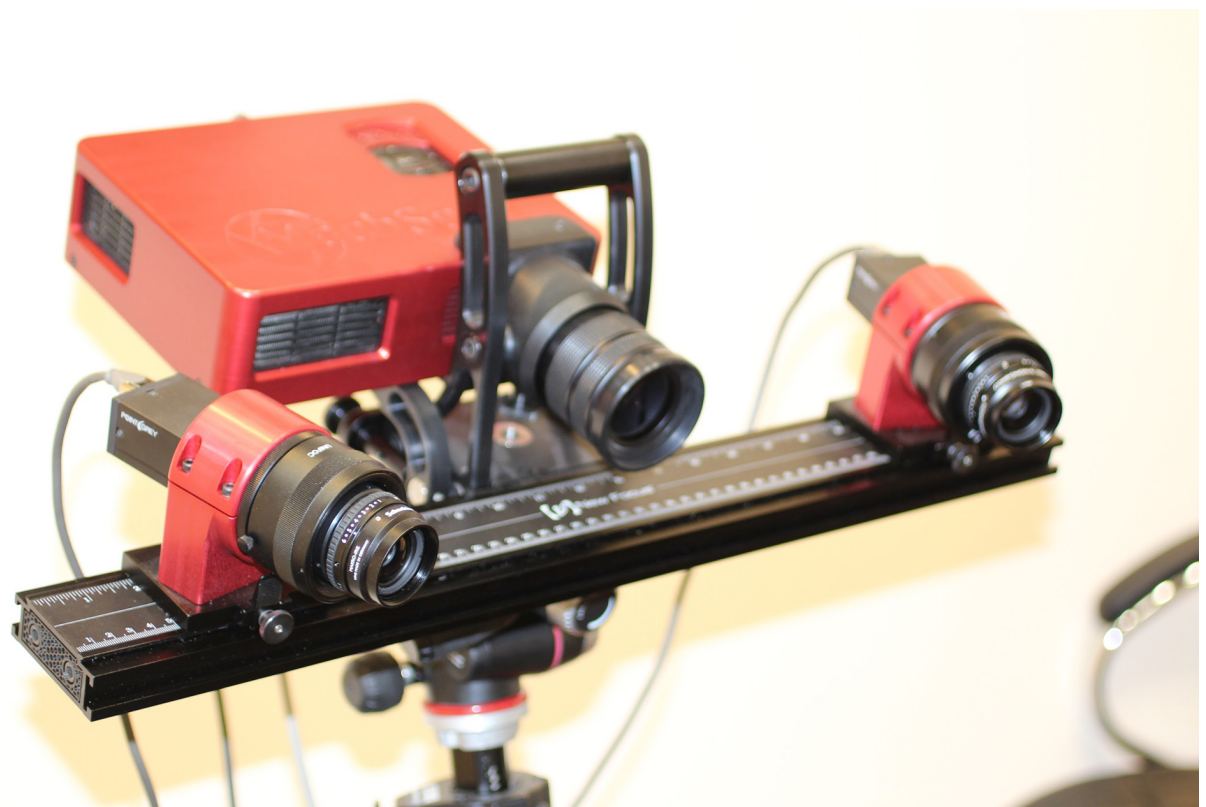# MS57 Training guide: Structure light scanning with Mechscan scanner using Flexscan (RBINS)

1. Start the scanner

- Connect all the cables and start the computer and the projector first

Mechscan Scanner

2. Calibration

- Depending on the object size, choose camera position.

- Open FlexScan 3.3, in the tab « scanner », choose « Remove » and delete the previous HDI calibration.

- Create a "new Mechscan".

- On the left part of the screen, select cameras.
  ! The first camera is the second on the list !

- Position the calibration board vertically and back-sided (white) and display the focus pattern (right part of the screen). Move the calibration plate until the black cross is approximately in the center of both cameras.

- Focus the projector so the focus pattern is sharp.

- Turn the calibration plate with the checkered pattern in front of the camera.
  Focus the cameras.

- Place the calibration plate vertically in front of camera 1 and start capturing the pattern according to the schema. Then do the same with the second camera.
  Repeat this process 3 times moving the calibration plates a few cm forward and a few cm backward.

- Press calibrate. Your calibration coverage should be higher than 65 % otherwise start again.
  ! Recalibrate whenever you change field of view, transport the scanner or whenever there are big changes in temperature.
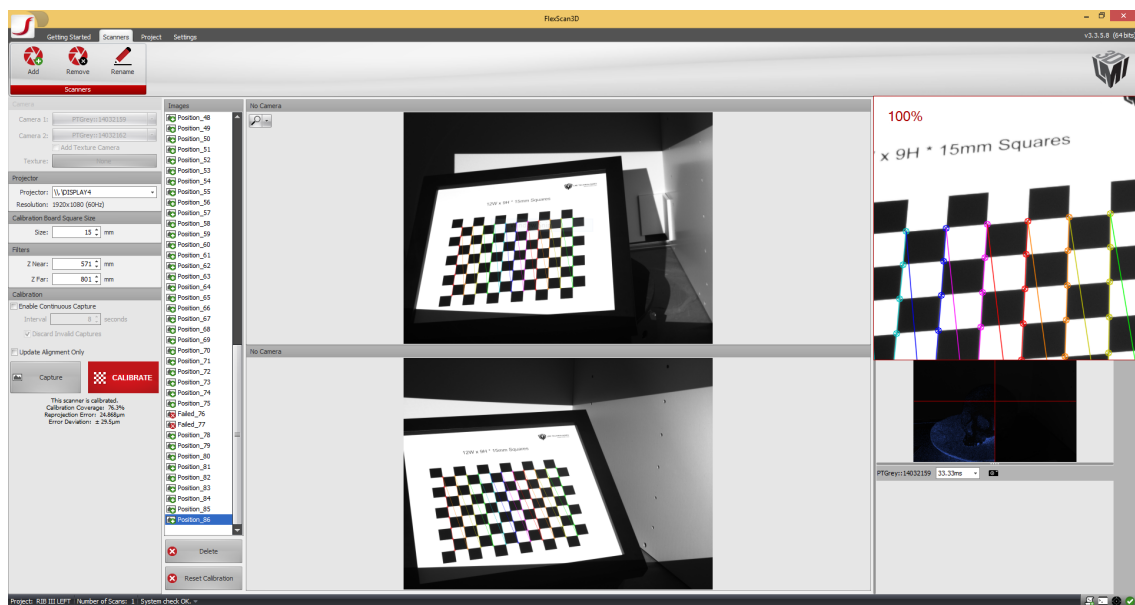

Figure X: Calibration in Flexscan software

3. Scanning

- Place the object in the center of the turntable.

- Display the focus pattern and check the black cross is in the center of the camera red cross.

- Take out the object. Place the calibration plate flat on the turntable (Fig. X), calibrate the turntable (press « Recalibrate » under the scan menu).

Figure X: Calibration plate lying flat on the turntable in order to calibrate the turntable.

- Put back your object, check color texture if required, choose the numbers of scans wished (advice number of scans : 8). Uncheck « automatic combine » and press scan.

- Unlock the scans and clean if necessary. To clean, select the unwanted part maintaining the Ctrl button pressed and delete.

- Once cleaned, select the scans and press combine. Once combined, hide the model by clicking off the check-box next to the thumbnail.

- Turn your object on another side and press scan again.

- Clean and combine.

- Display the previous rotation by clicking on the check-box next to the thumbnail. With Alt button press, align roughly the two combined scans together and press align.

- Combine

- Repeat these operations until having a full model.
  When your full model is combined, press finalize.
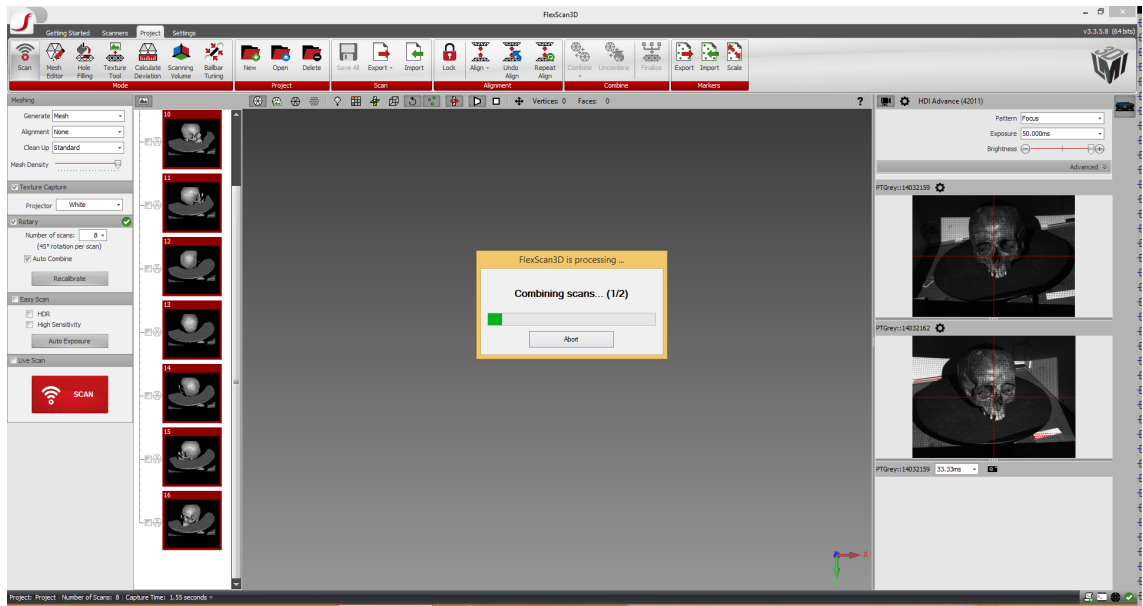
- Rename the model and export.

Figure X: Scanning in Flexscan.

4. Tips
- Scan in a room with constant lighting, preferably dark: change in luminosity can create unwanted artefacts. Environmental conditions (light, temperature, etc.) should be the same as for calibration.

- Avoid having too much scans. More scans than necessary only add noise and render the project heavier.

- For objects with high colour contrast you can activate HDR mode. The HDR mode can be selected in the preferences. This mode is more time consuming.

- If you are scanning something more fluid, you can use Flexible mode.

- The Easy Scan mode analyses the correct exposure for the user.

- <u>Shortcuts</u>
  - Alt+LMB = rotate selected scan
  - Alt+CMB = Translate selected scan
  - Ctrl+LMB = select parts of the scan

5. Troubleshootings

- Cameras are not working properly

  - Case 1 - Restart computer and unplug/replug the cameras
    - Close the software and try to disconnect the power of the cameras, and plug it back in. Restart the software. (You may want to try that several times in a row).
    - Restart the computer
    - If after re-plugging the issue didn't go away, please try case 2.

  - Case 2 - Reset all the camera settings.
    - Open FlyCap2 > Configure Selected > Advanced Camera Settings > Memory Channel drop down list > select Default, and click on the restore button. From the drop down, then select memory channel 1 > Save. Memory channel 2 > Save.
    - Close this settings Windows. Open FlexScan3D to see if you are still seeing the split issue. Also, it might be good to verify if from FlyCap by opening FlyCap2 > select the camera, and click on "OK". This will generate a live video from FlyCap. If it's not showing up, please go into settings > Trigger / Strobe tab > check the "Enable /Disable Trigger" check box. Check to see if your video is still split in half. If you are seeing a black screen but see the the frame rate and the Timestamp running on the left hand side, then please change the aperture on the lens to make it brighter.
    - If you don't see the video splitting in half, then please continue with step 4. Otherwise please go back to case 2.
    - Go to camera settings > set the "Gain" to 0, "Shutter" to 16.66. Uncheck all the checked boxes.
    - Go to Advanced camera settings > save these settings to memory channel 1 and 2.

- I have combined misaligned scans, can I undo this?
    - « Undo » button or Ctrl+Z doesn't work, but you can uncombine and recombine.
    ! When uncombining, you are not going back to the previous step but all the scans are uncombined !
    Tip : Recombine by chunks of the number of scans of your rotation.

6. Credits
- Author: Aurore Mathys
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- Version: 1.0
- CC: CC BY