ARISTOTLE UNIVERSITY OF THESSALONIKI, GREECE

3D Reconstruction Using Agisoft Metashape

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Aristotle University of Thessaloniki, School of Spatial Planning and Development, Greece

NARRATE

Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples

Workshop on Documentation of Ecclesiastical Heritage

December 9-11, 2024

Istanbul, Turkey

CIPA Heritage Documentation

Introduction

NARRATE

Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples

Presentation Structure

- Data Sets
- Image based processing workflow
- Instructions for Building
- Instructions for Small Object
- Results
- Conclusions

Data sets

Small object

Building façade

Data sets

Small object

- 26 images
- Liturgical object
- Equipment: Sony Alpha a7ii Mirrorless Camera
- Measuring tape
- Agisoft Targets

Building façade

- 30 images
- Didymoteichon Castle in Thrace, Greece
- Equipment: UAV DJI Mavic 3 Enterprise
- UAV(Unmanned aerial vehicle) with RTK (Real-time kinematic positioning)

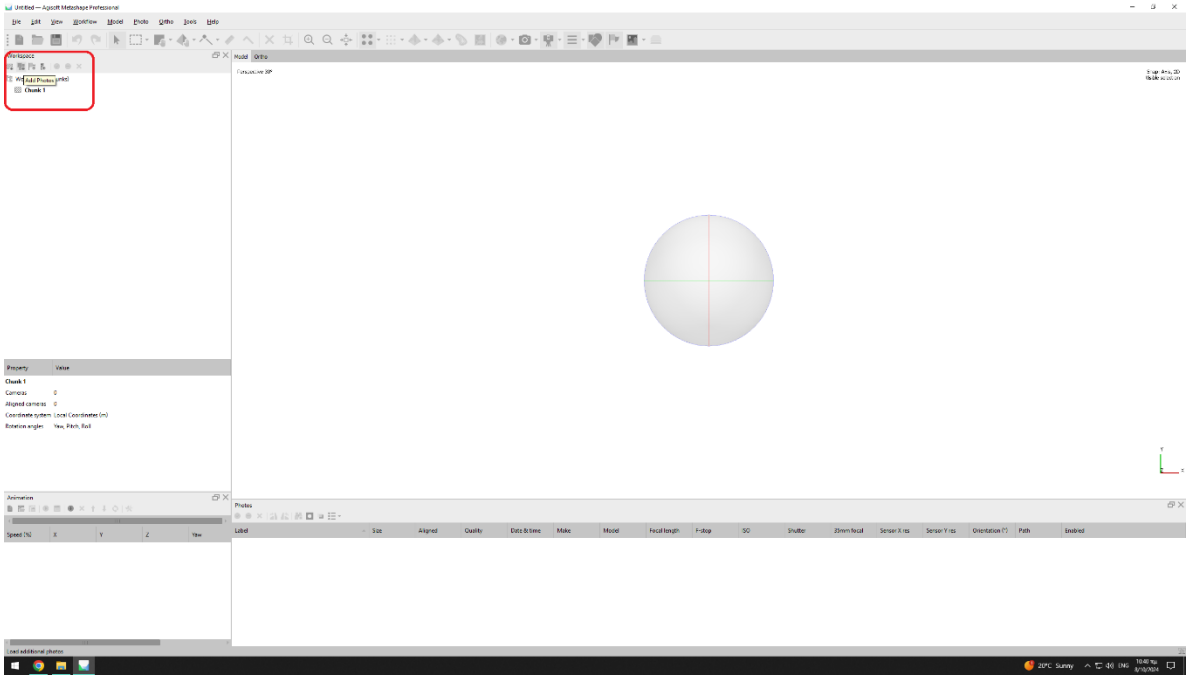
General Workflow

1. Import Images
2. Aligment
3. Tie points
4. Refinement
5. Point Cloud
6. 3D-Model
7. Orthomosaic

Step by step
Building façade

New Project

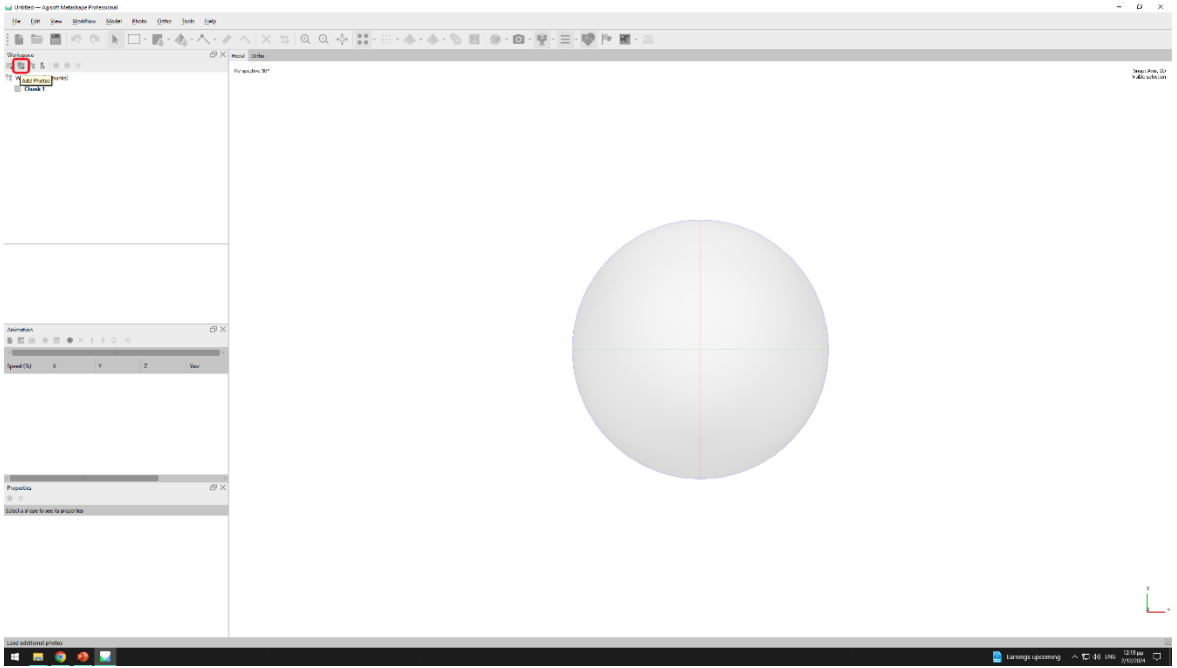
Open the Agisoft Metashape software and create a new project.



Add photos into the project

1. From the Workspace panel -> Add Photos

find the photos from the folder where you have saved them.



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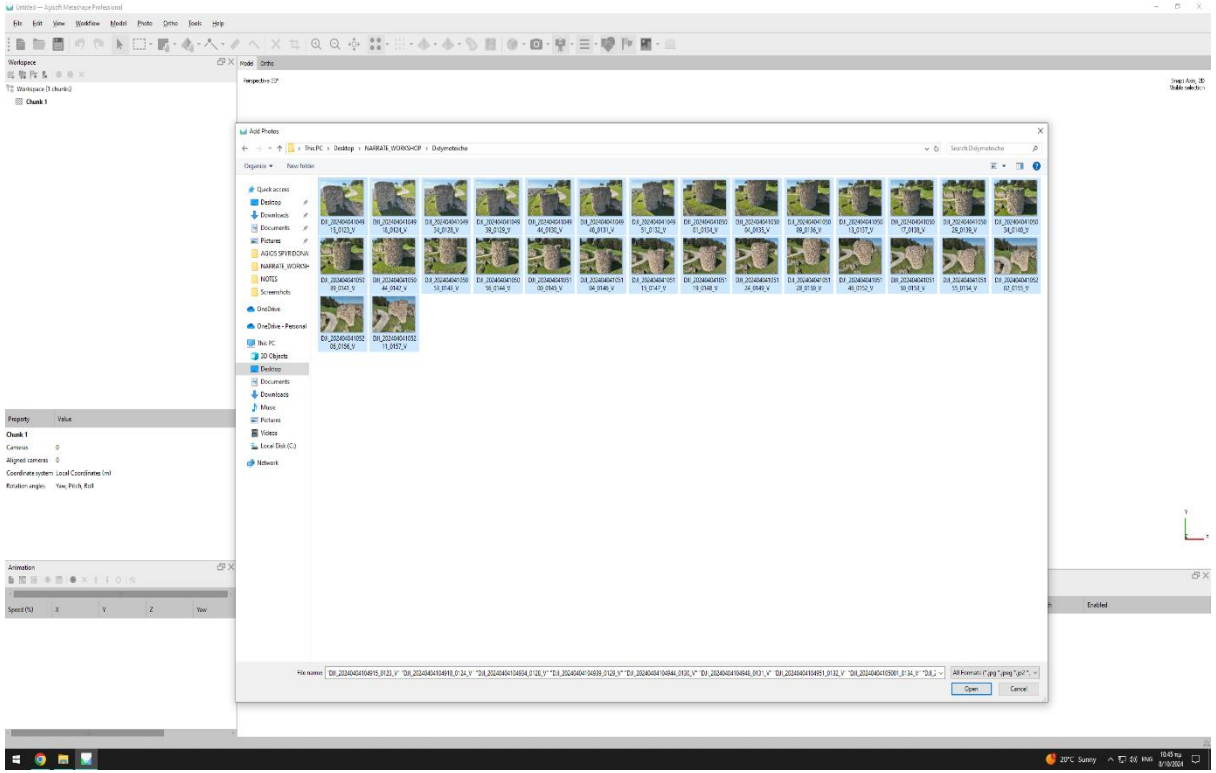
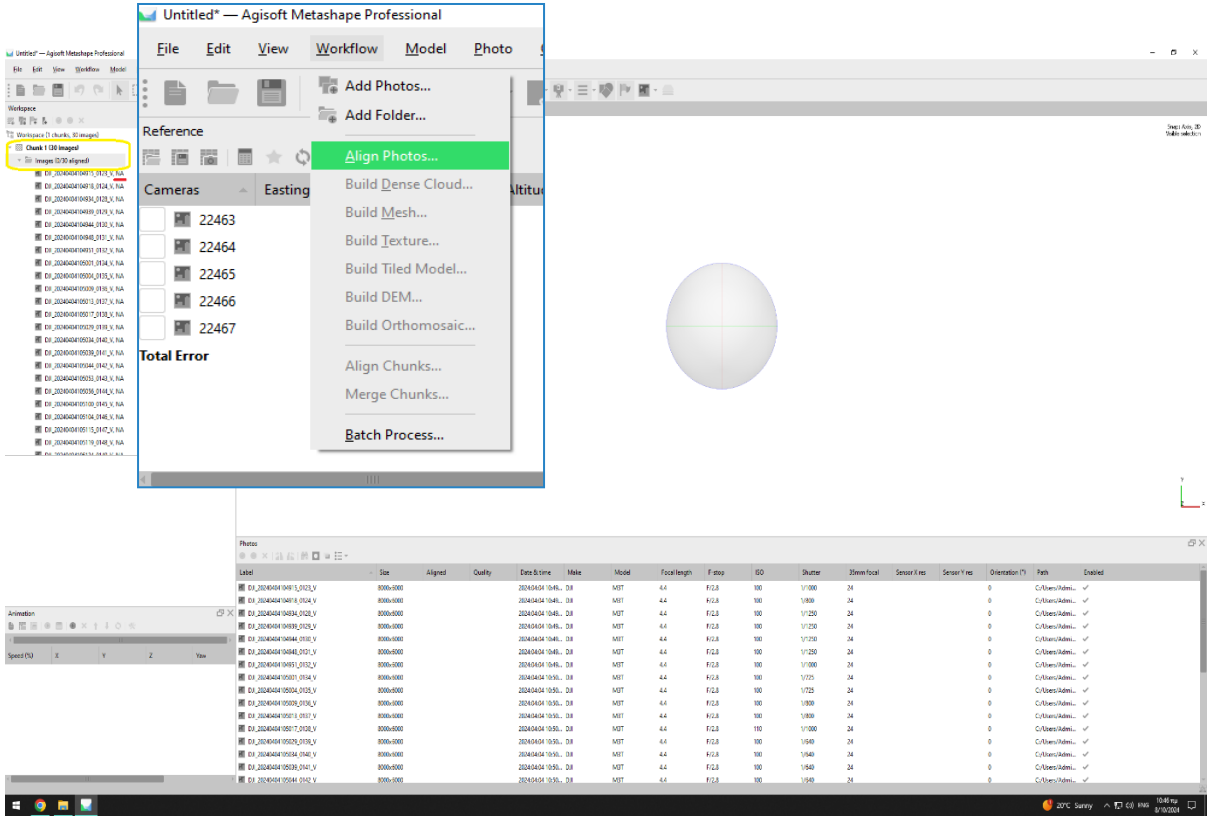
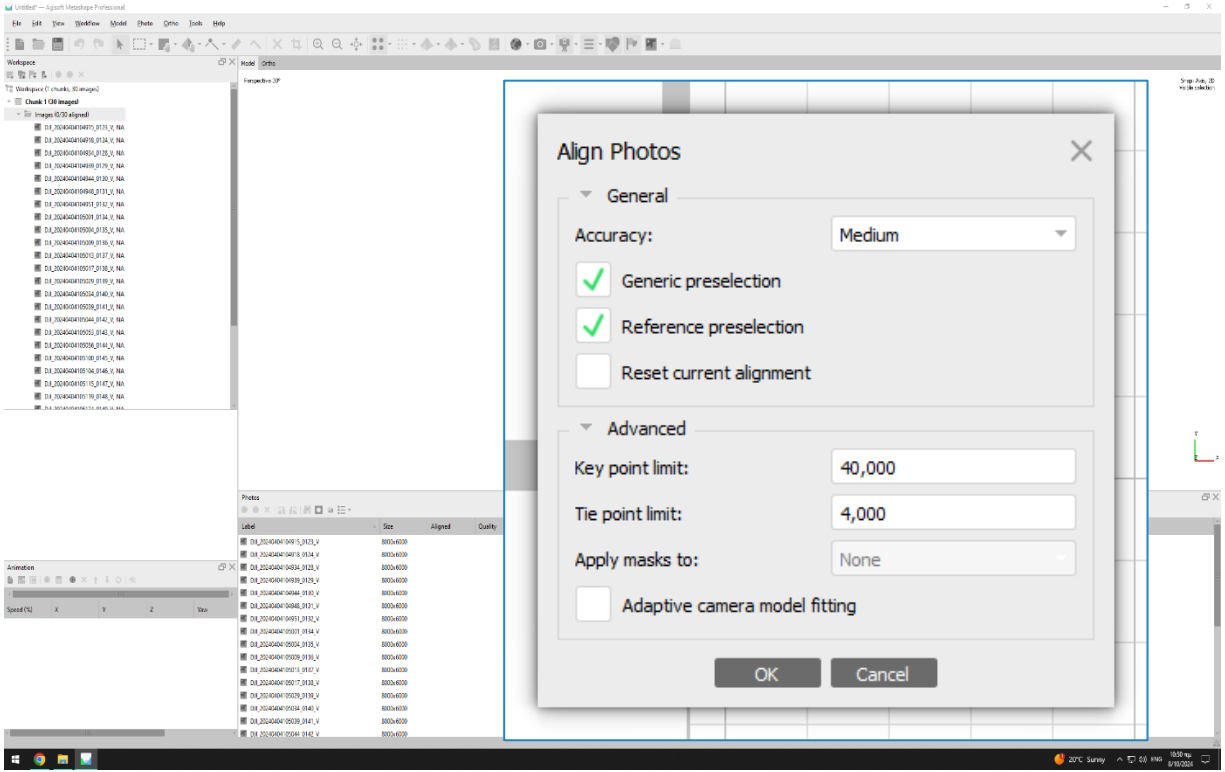


Alignment

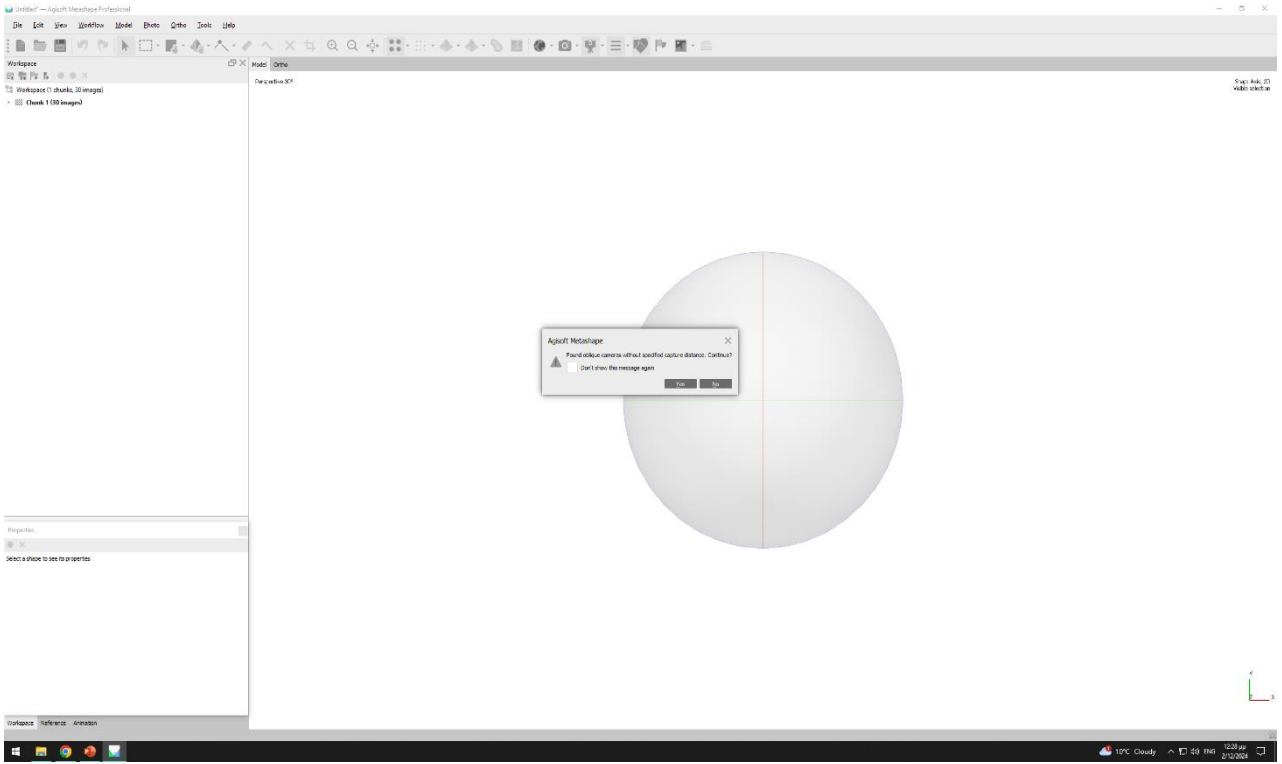
2. Workflow -> Align Photos



Alignment parameters



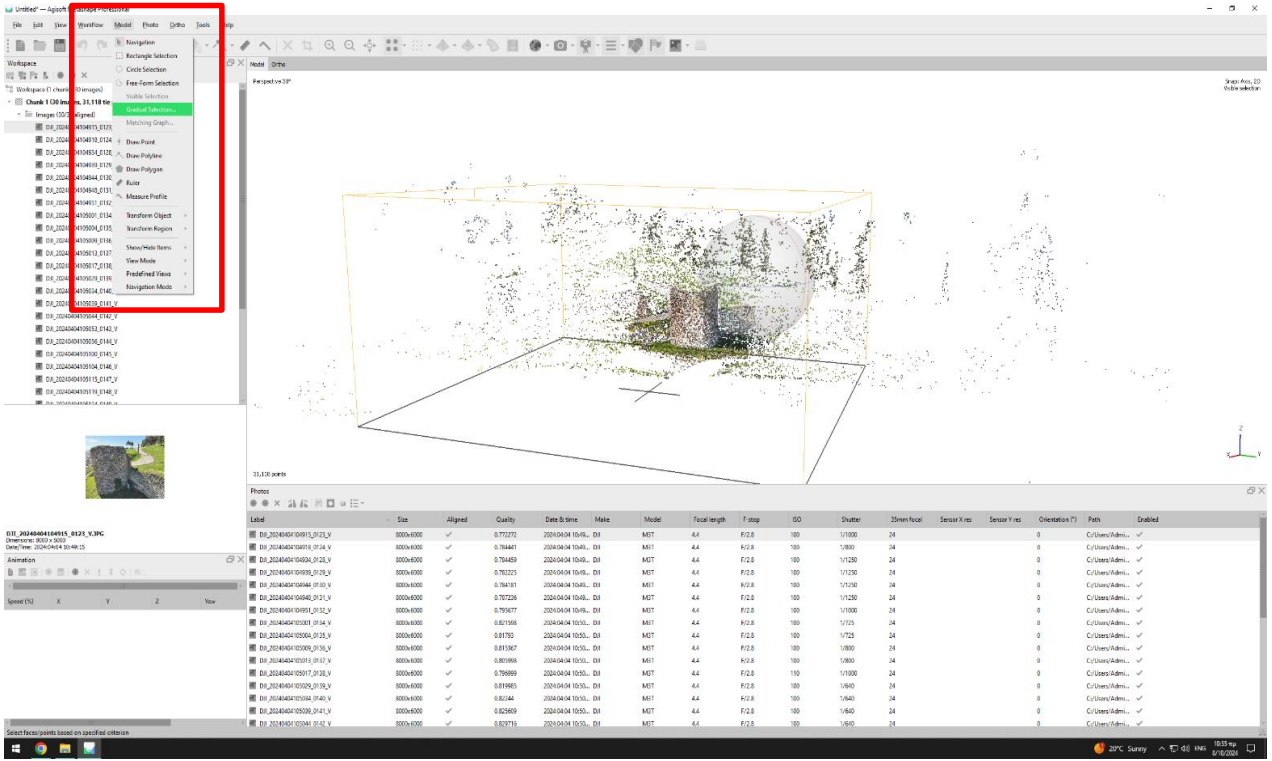
Oblique images



Tie points cleaning

3. Model -> Gradual Selection

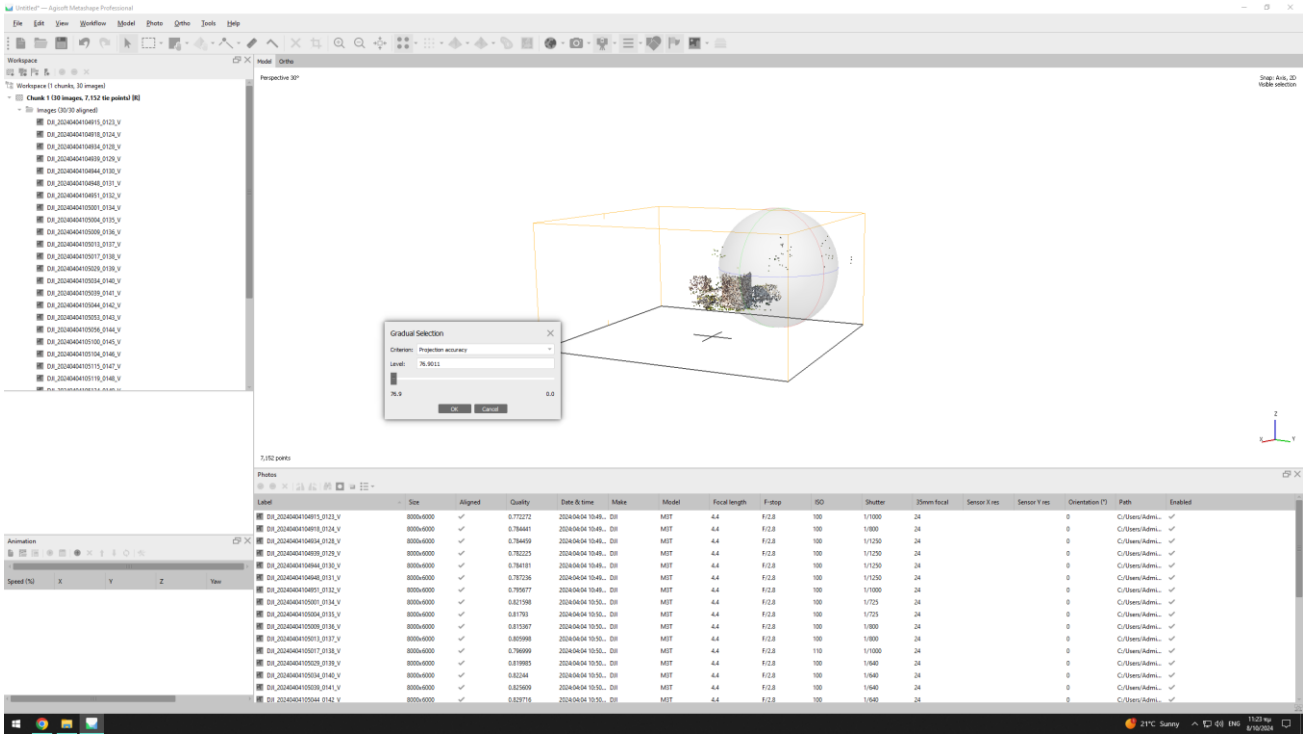
- Exclude 10% of your points



Noise filtering 1/3

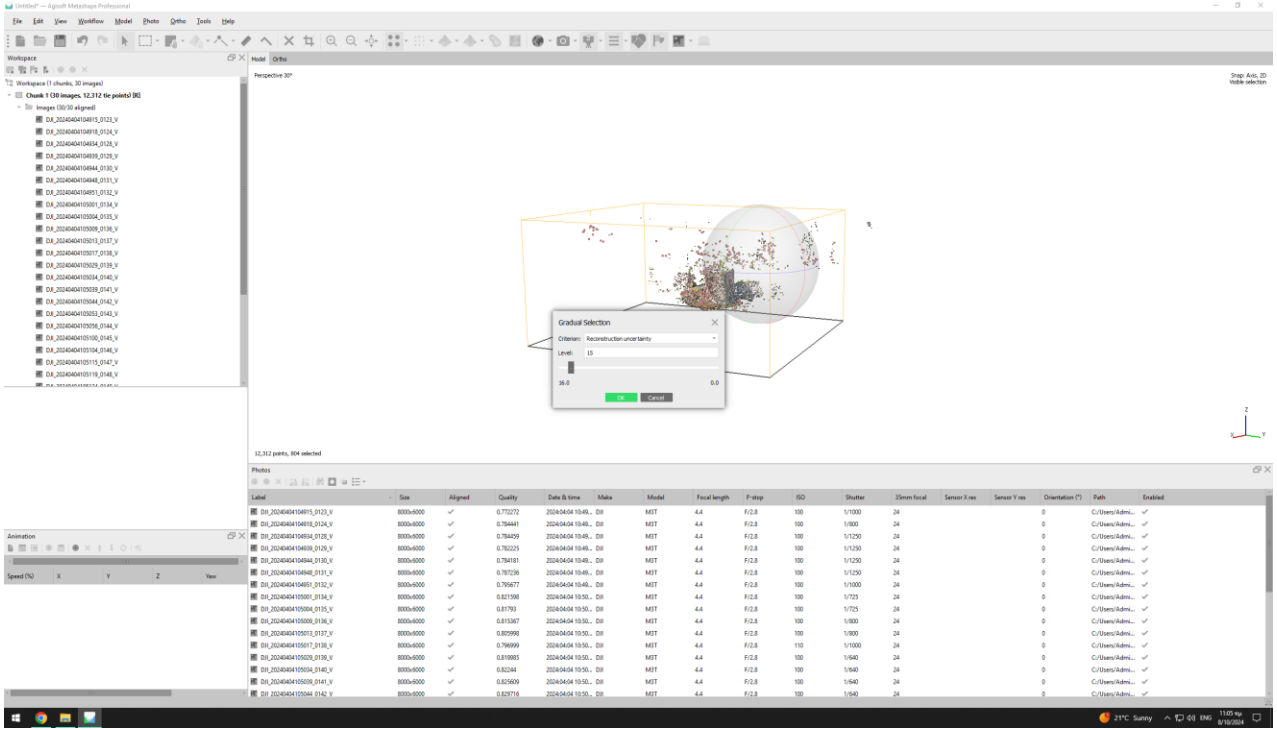
3. Model -> Gradual Selection

Projection Accuracy: 10-30



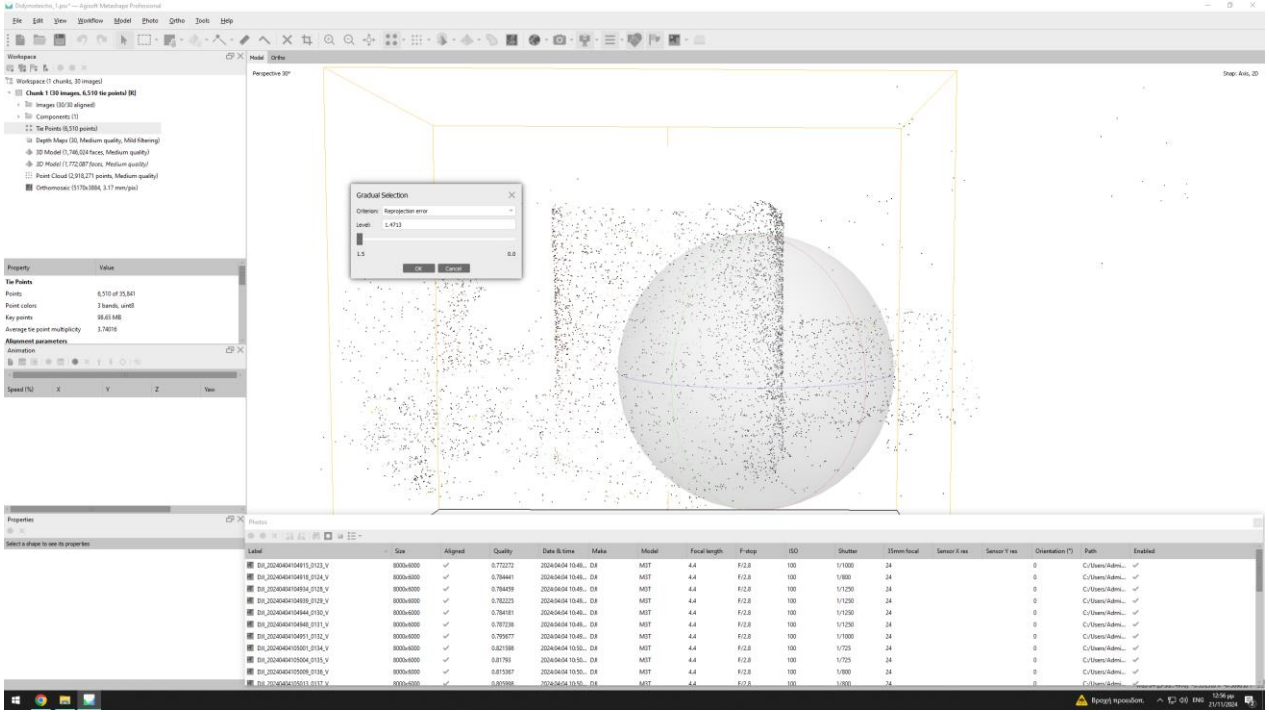
Noise filtering 2/3

Reconstruction Uncertainty ~ 10



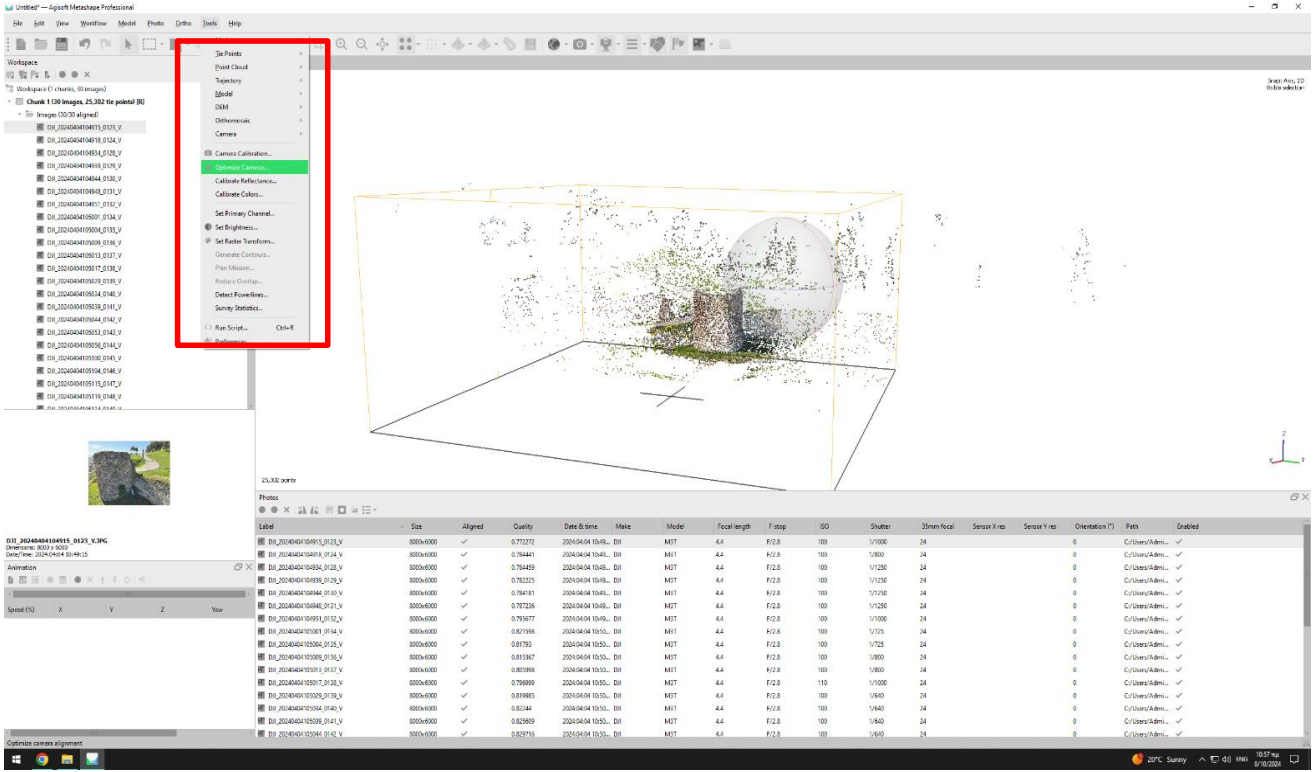
Noise filtering 3/3

Reprojection error
<1



Optimizing cameras

4. Tools -> Optimize cameras



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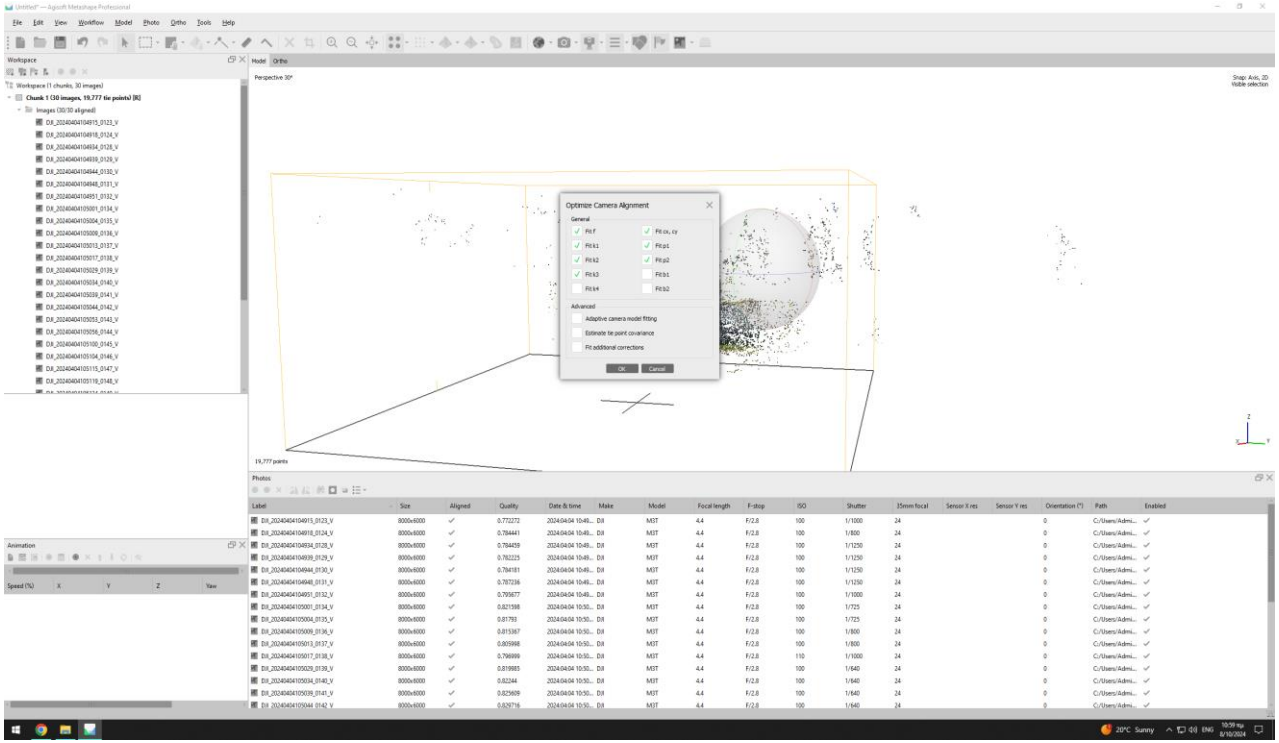
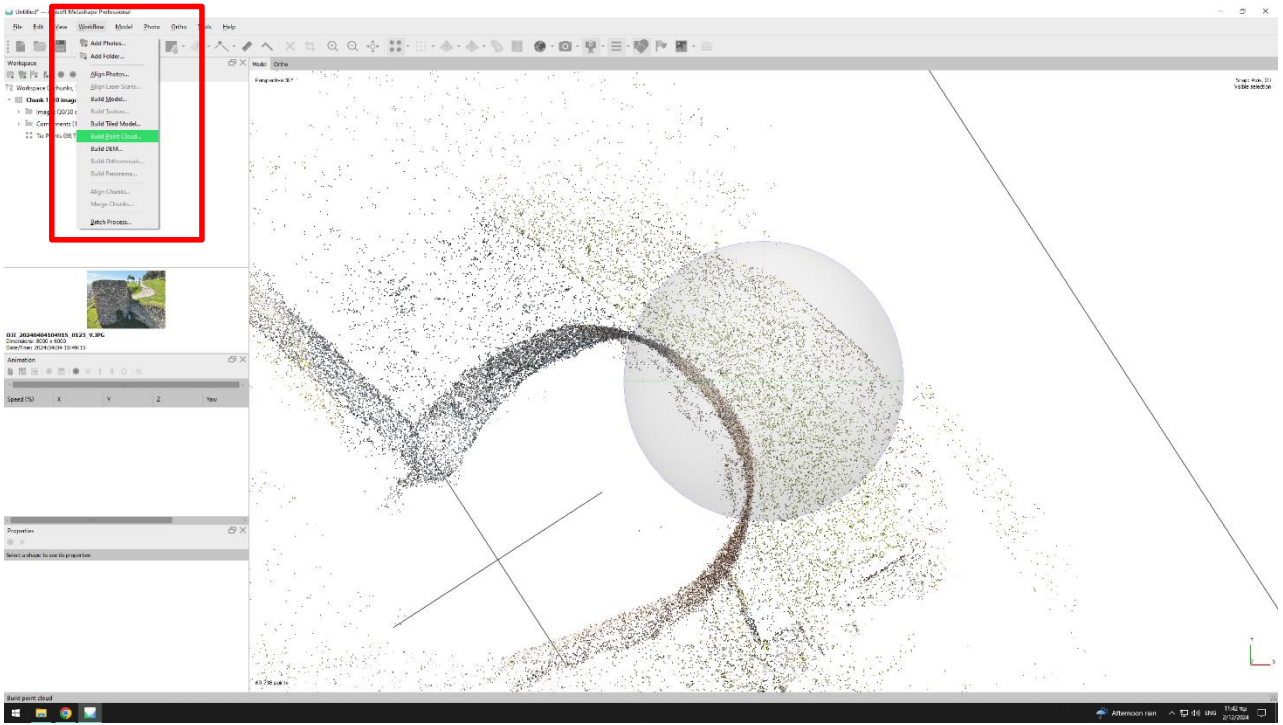


(Dense) Point Cloud creation

5. Workflow -> Build Point Cloud



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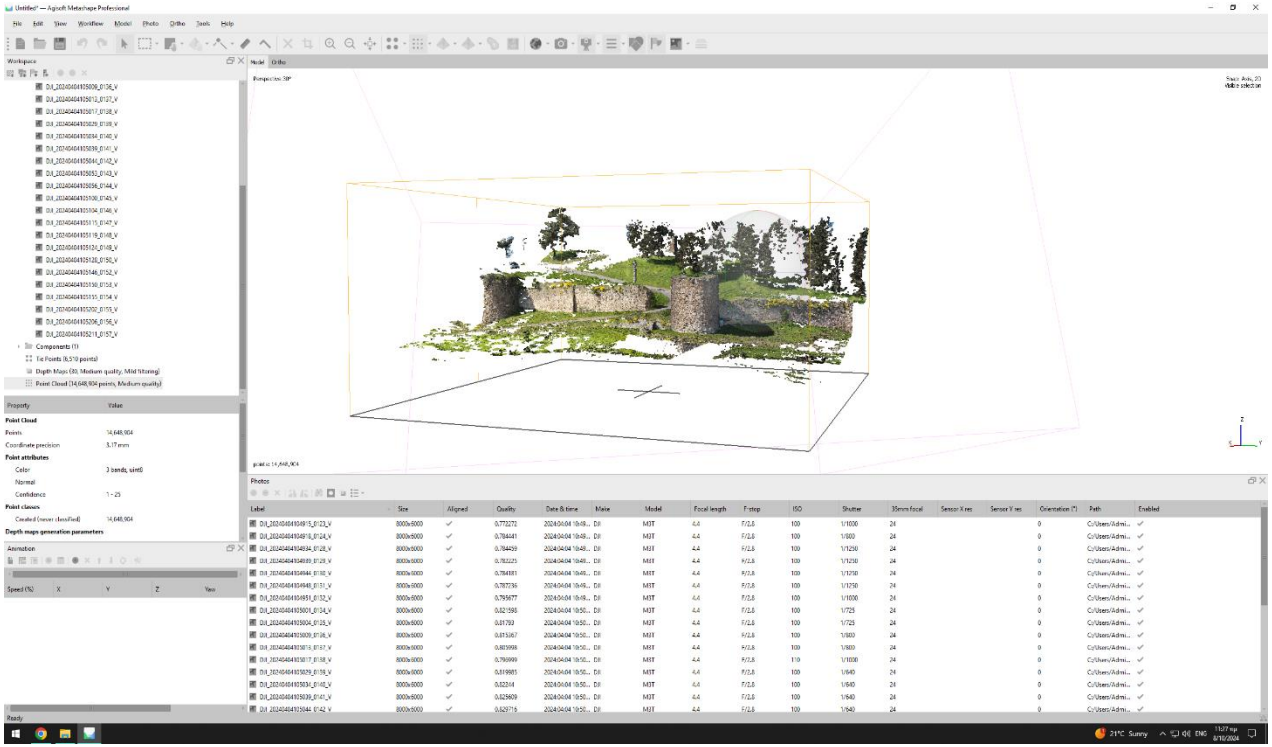
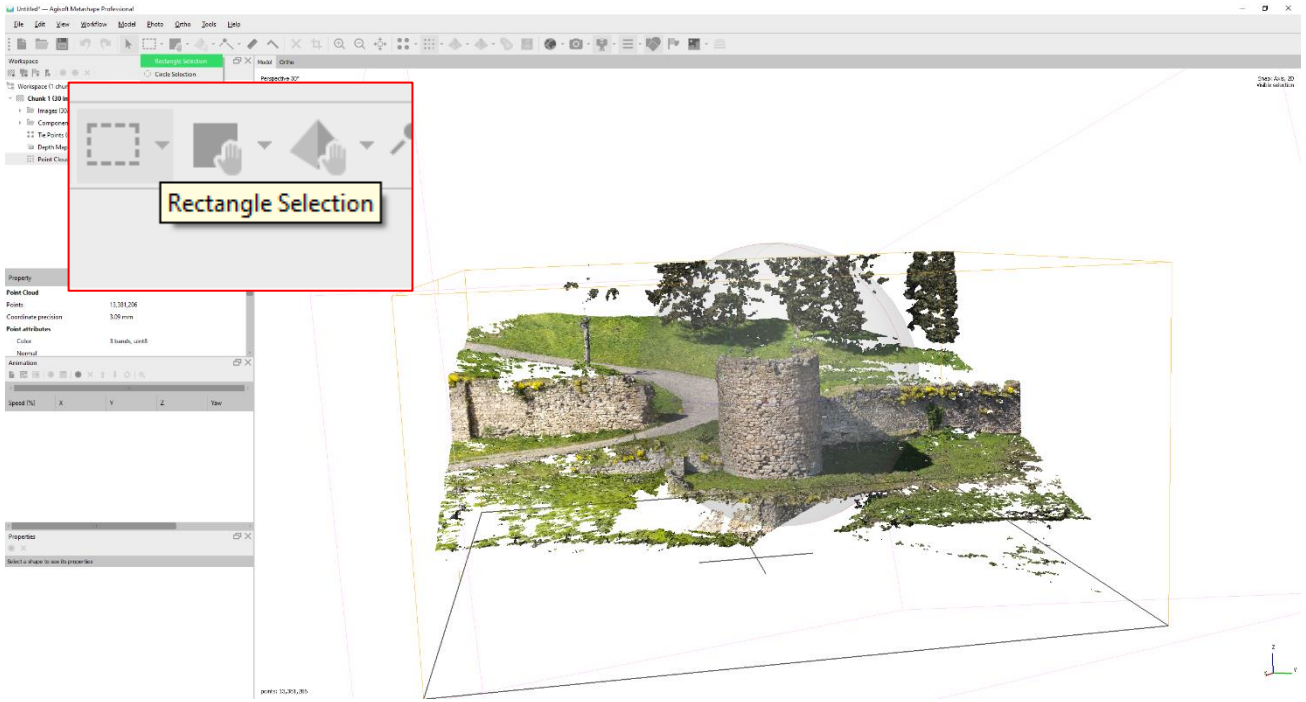


Clean the background

6. Select the rectangle button -> with your mouse hold and select the unwanted background



- Press Delete

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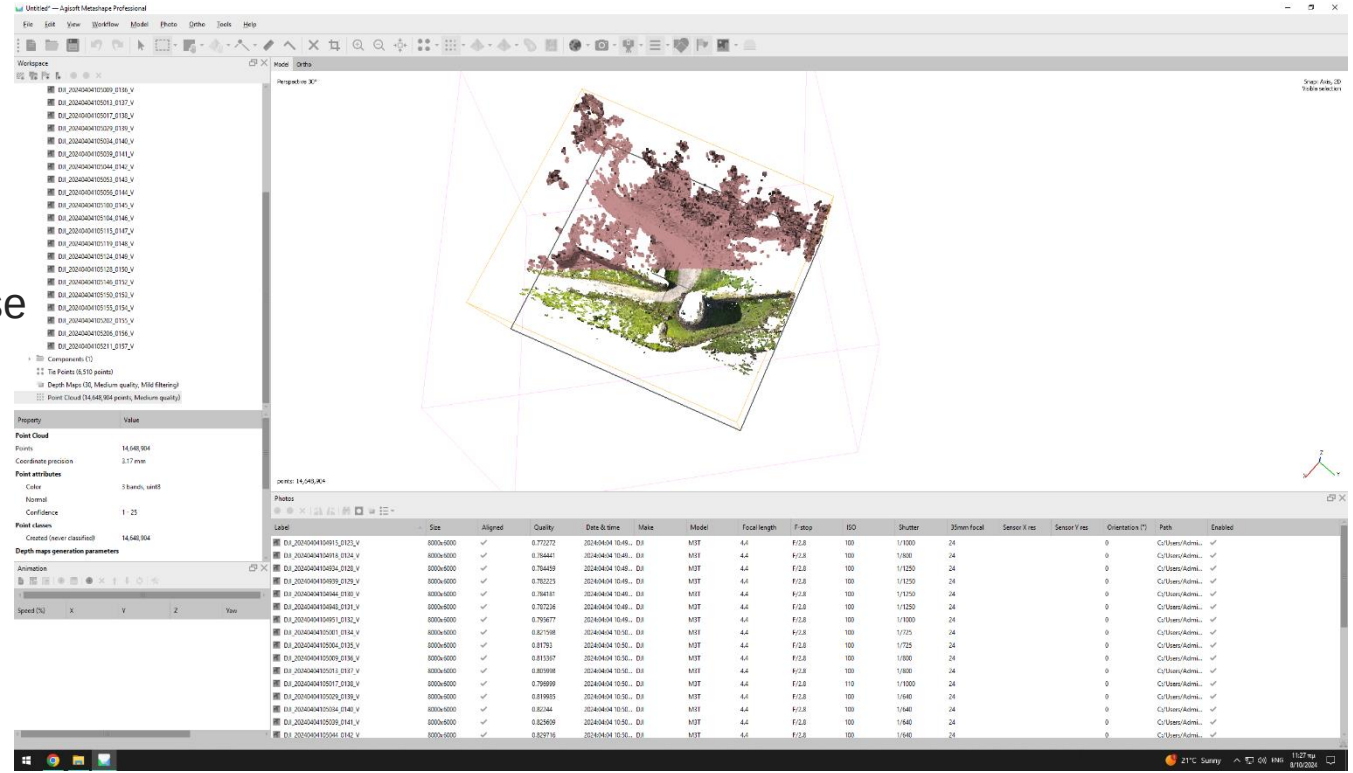
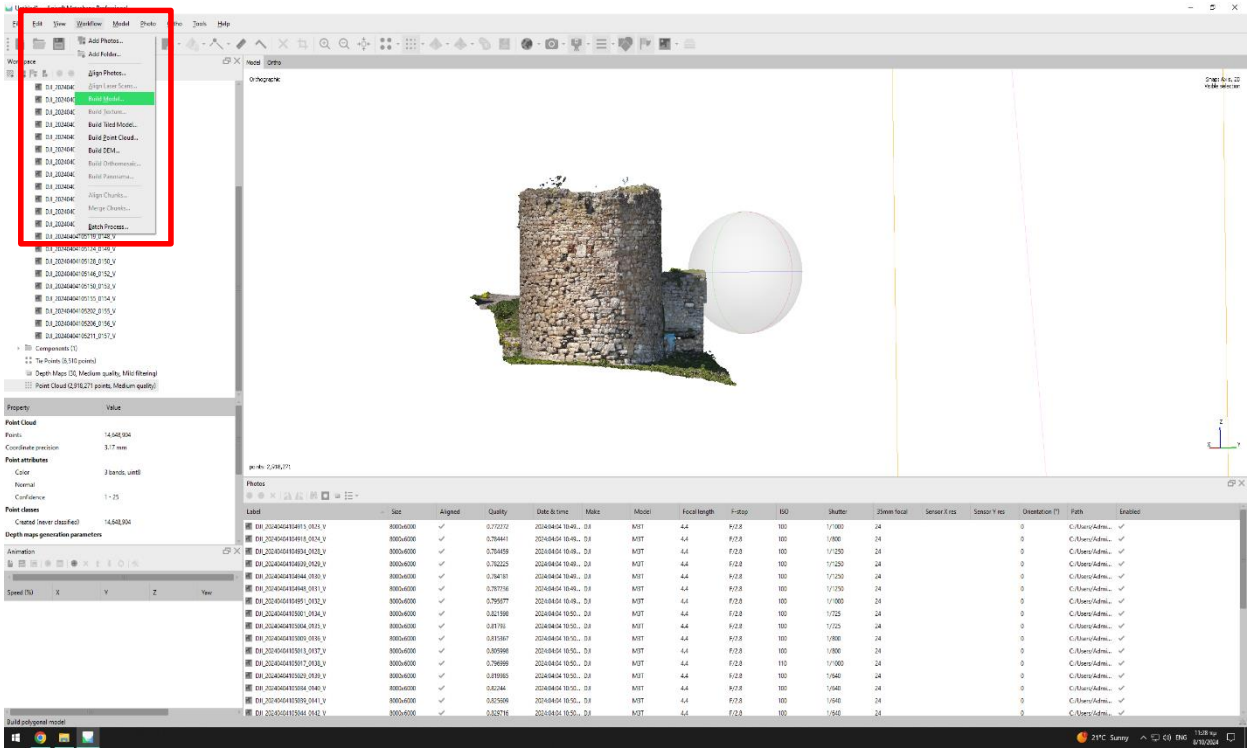


Model creation

7. Workflow -> Build Model



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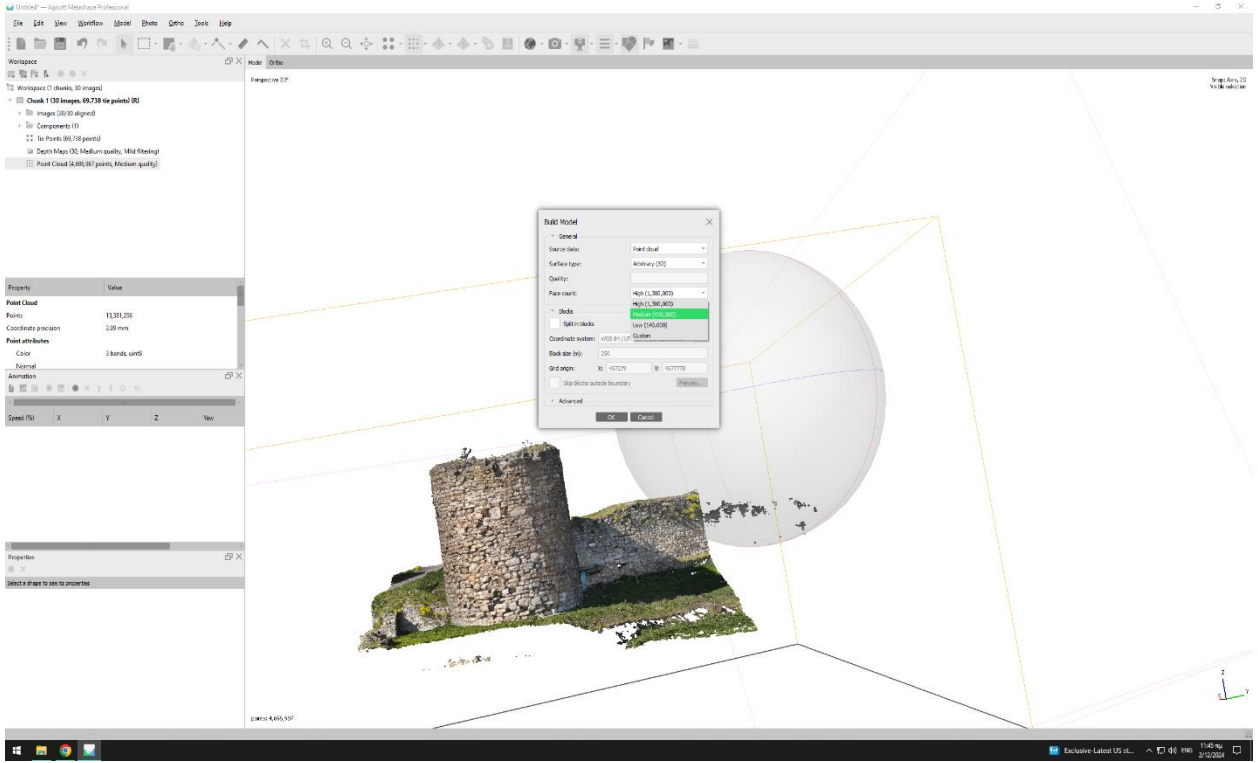
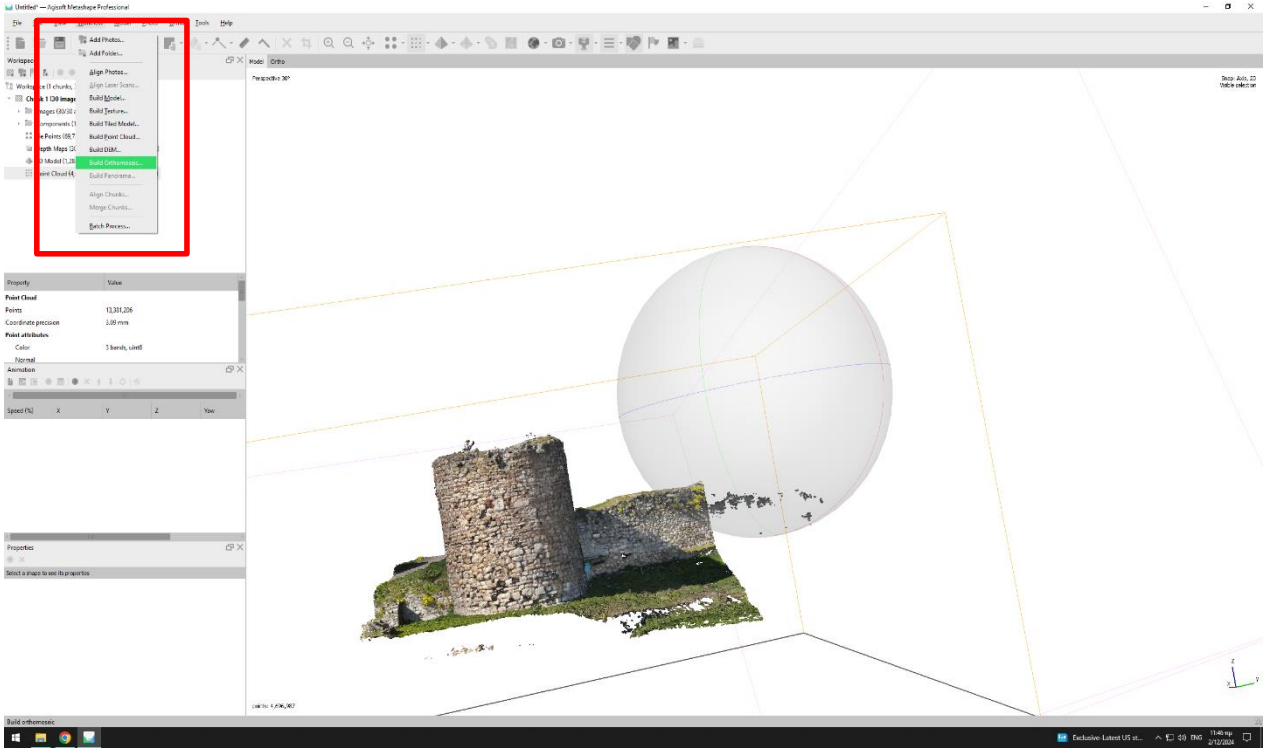


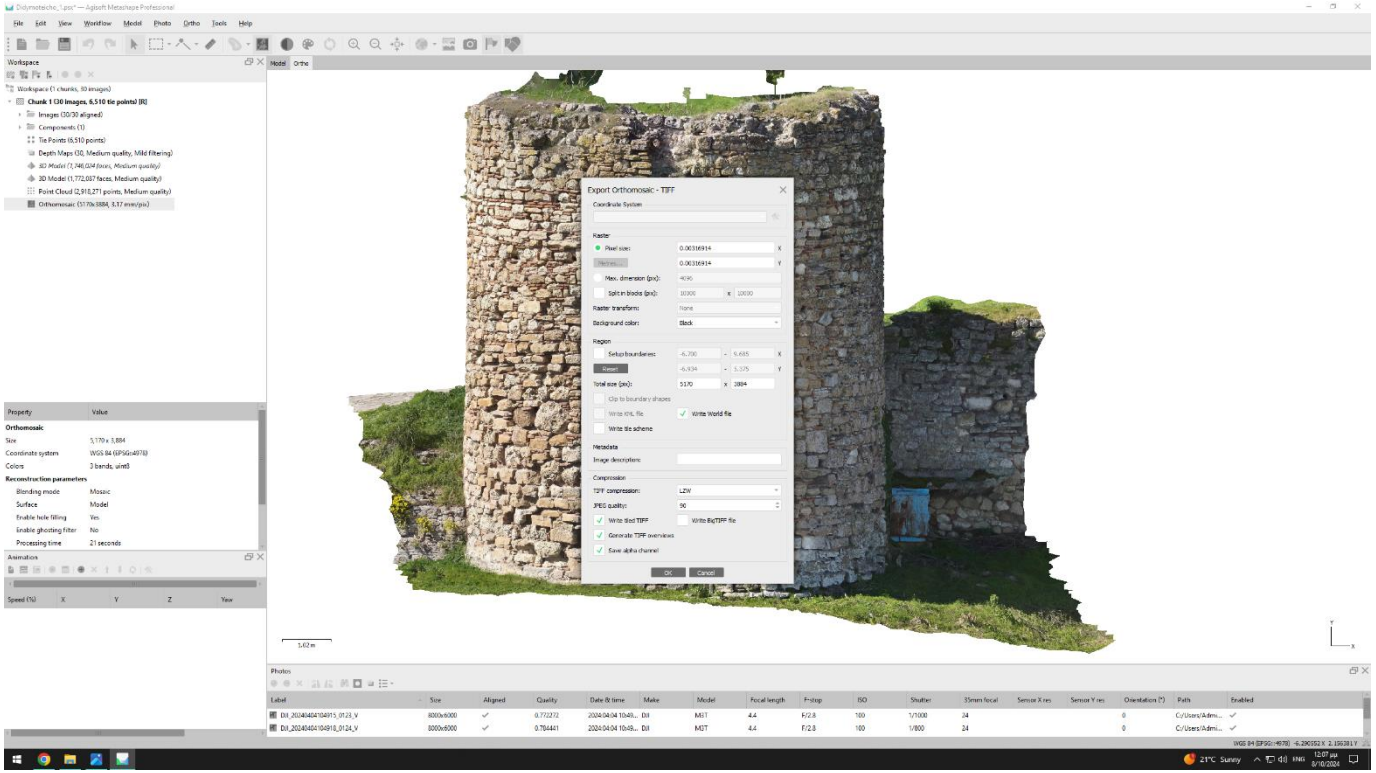
Orthomosaic creation

7. Workflow -> Build Orthomosaic



Orthomosaic creation

8. File -> Export -> Export Orthomosaic



Final Orthomosaic

Small Object Step by step

New Project

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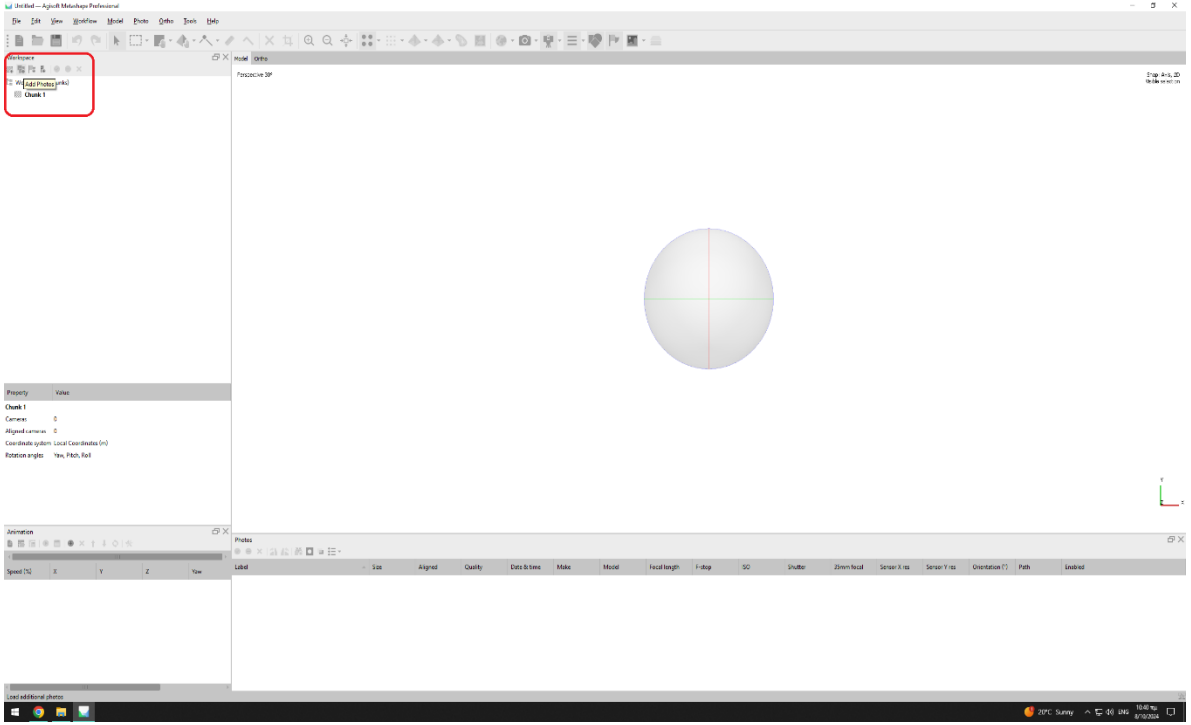

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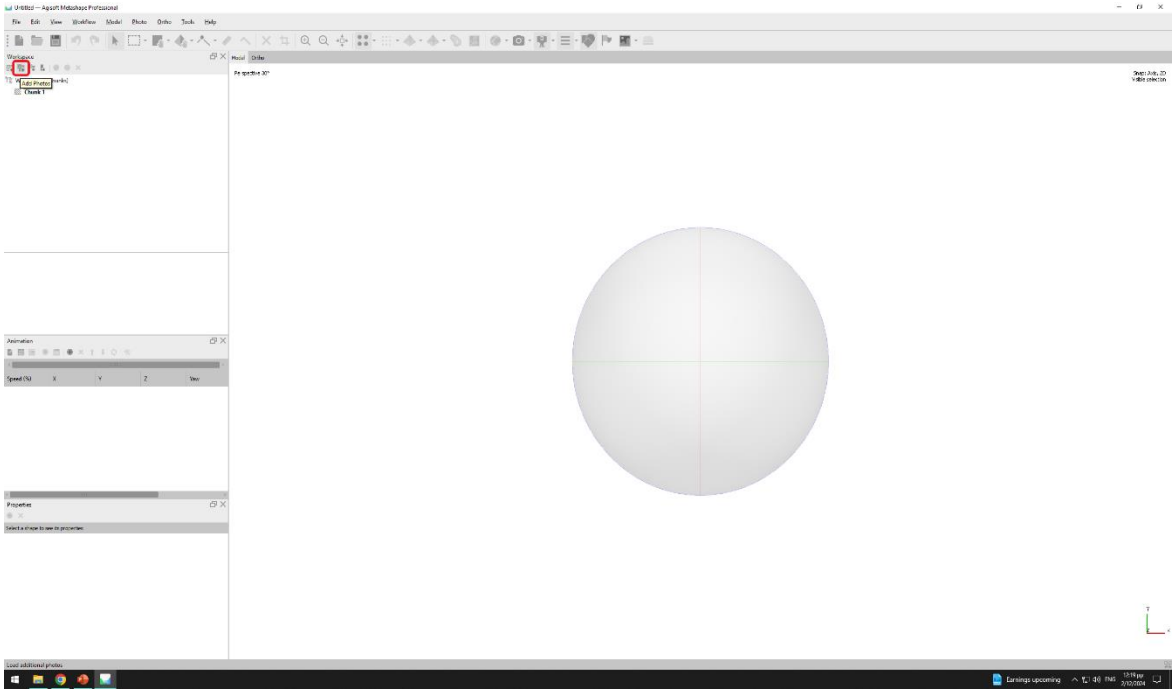

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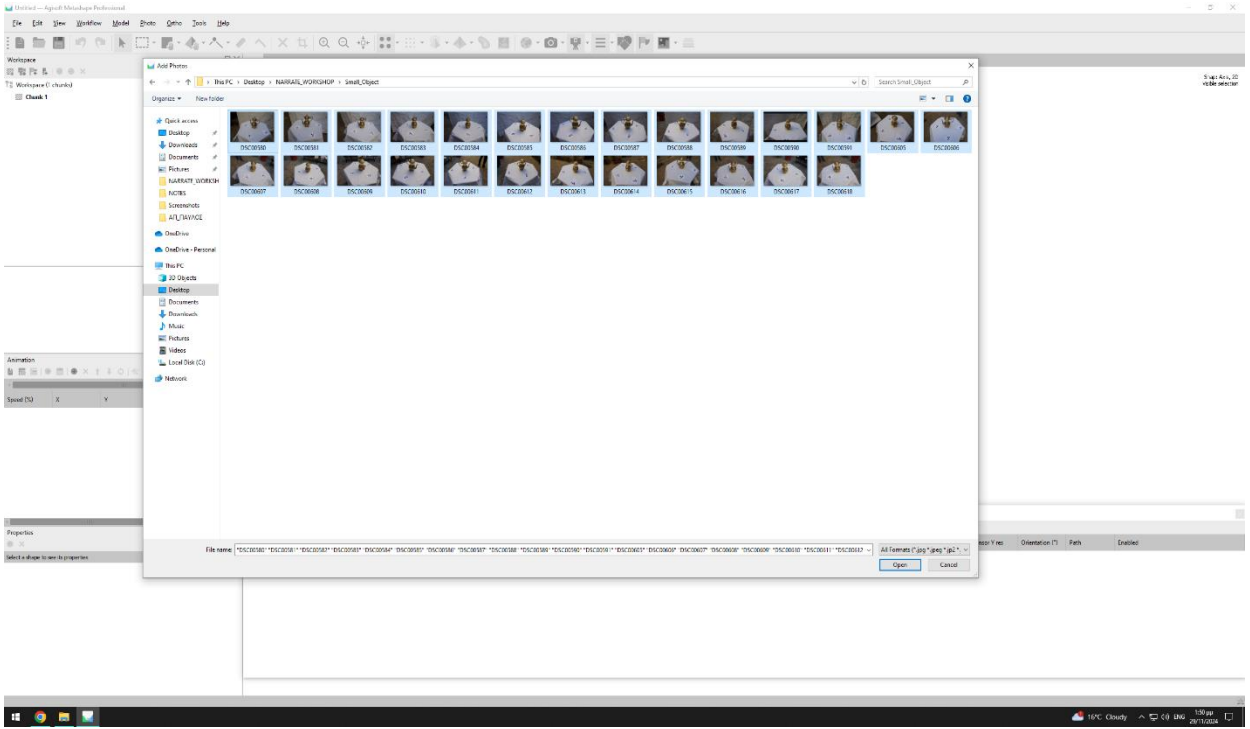
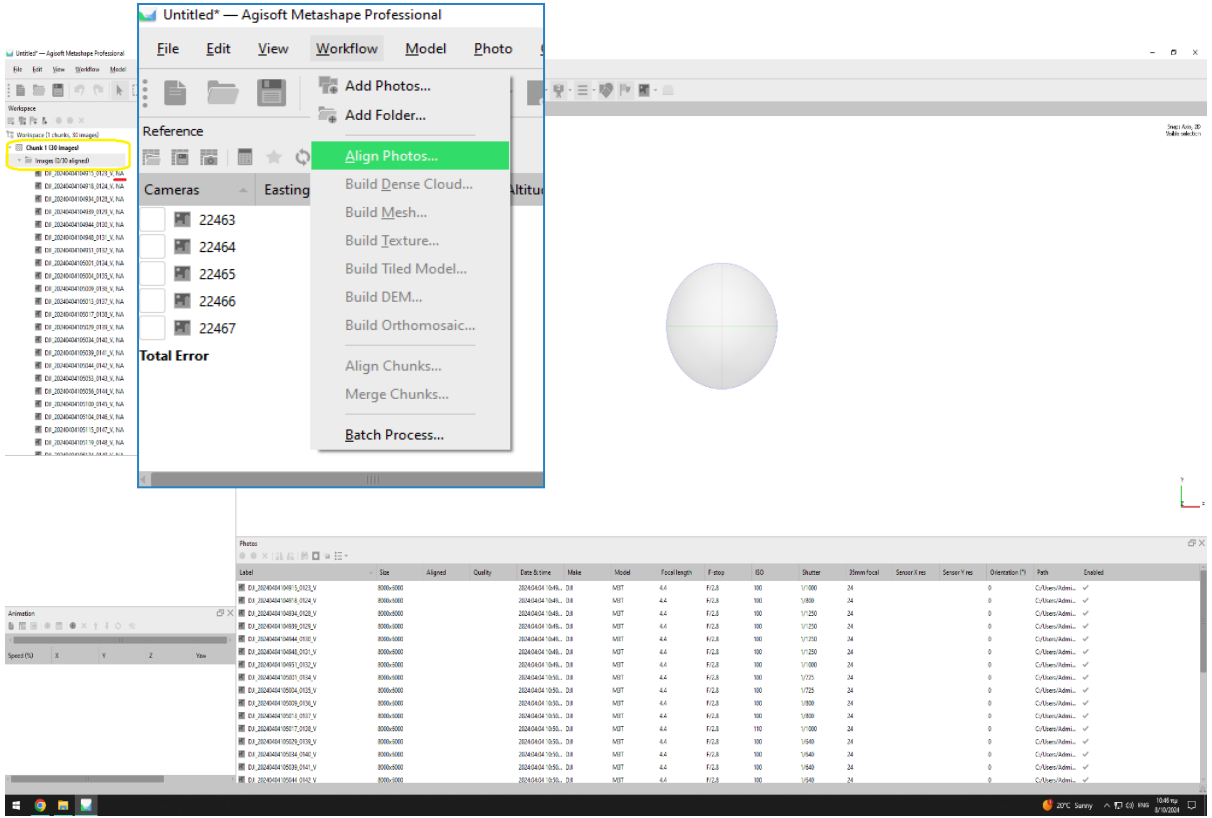


Alignment

2. Workflow -> Align Photos



Alignment parameters

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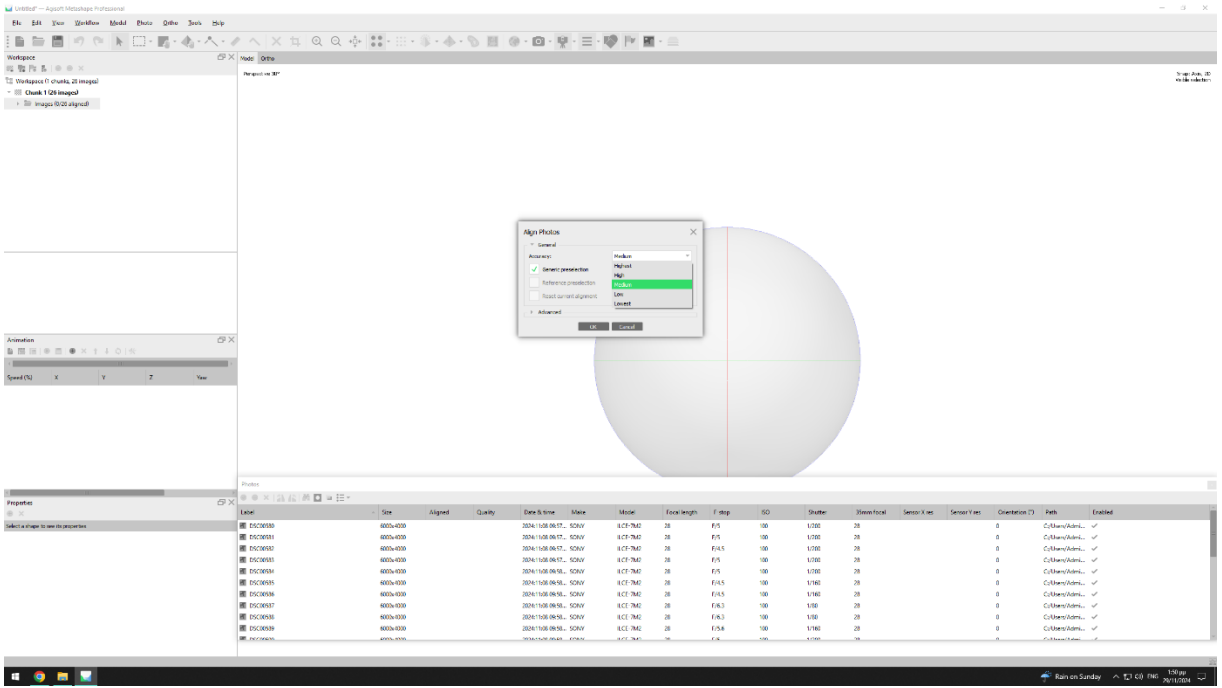
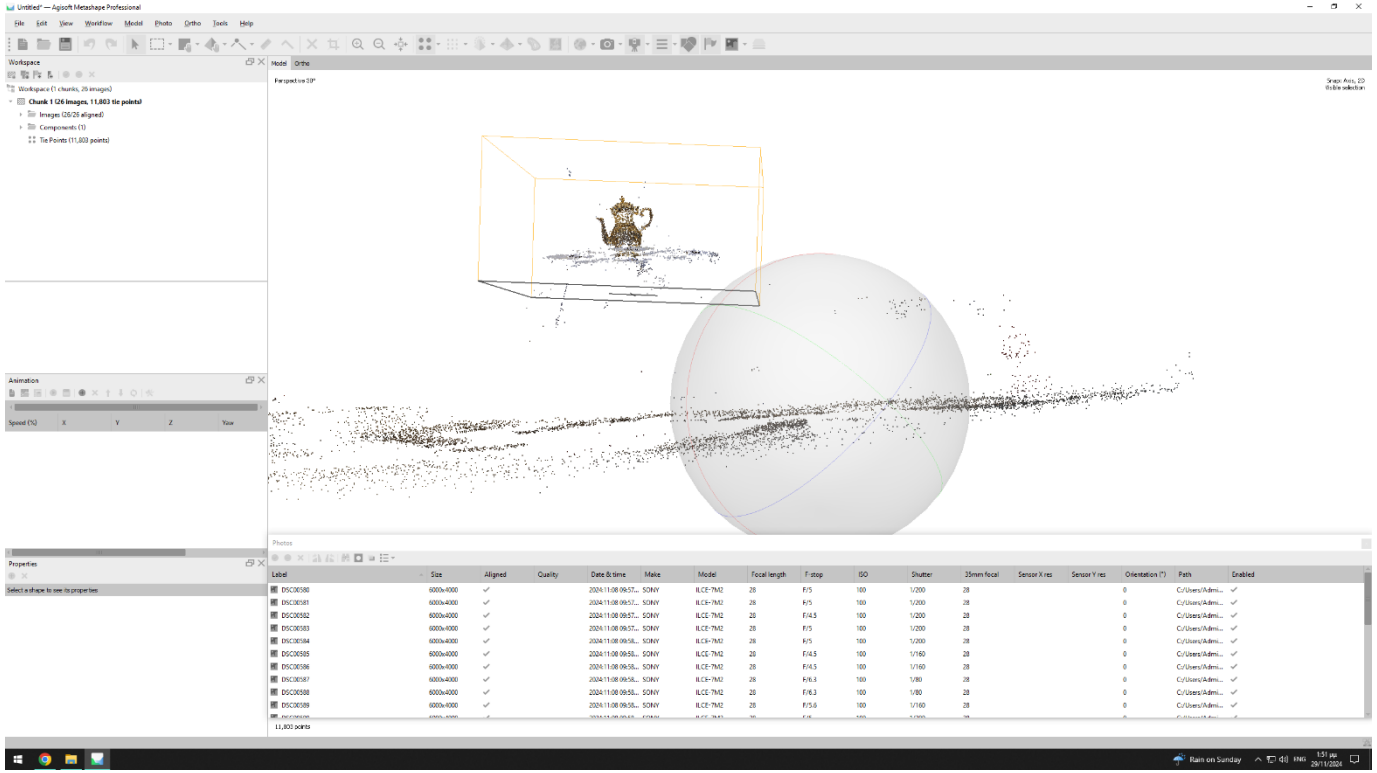


Tie points creation

3. Workflow -> Build Tiled model



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Tie points cleaning

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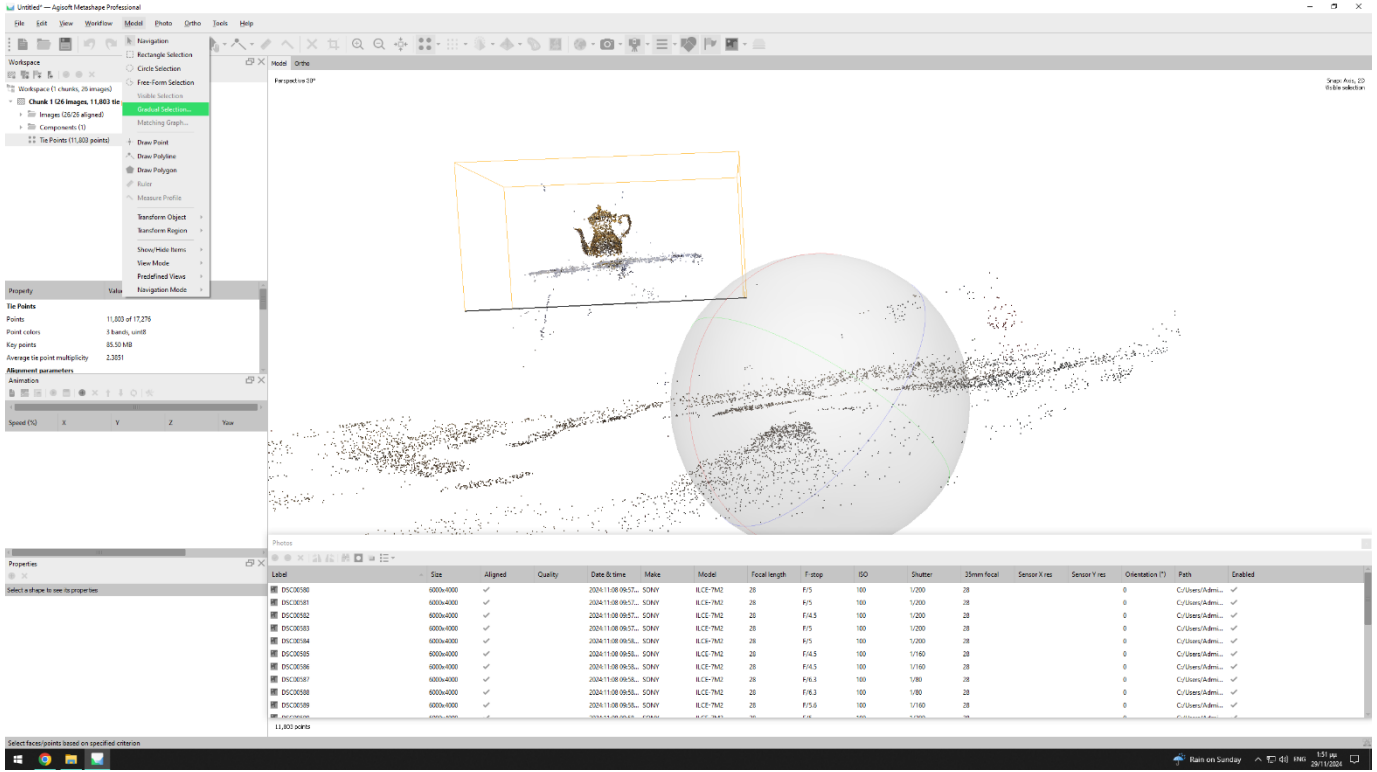
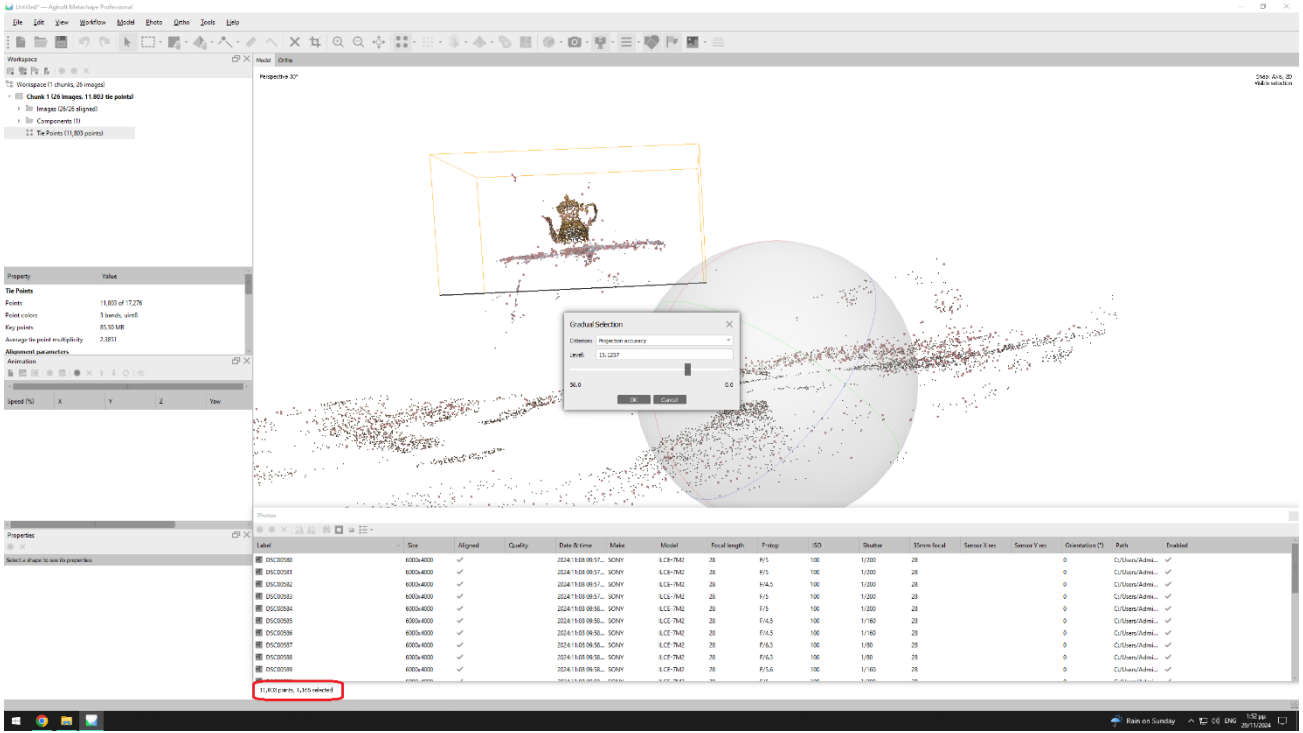


Noise filtering 1/3

Projection Accuracy

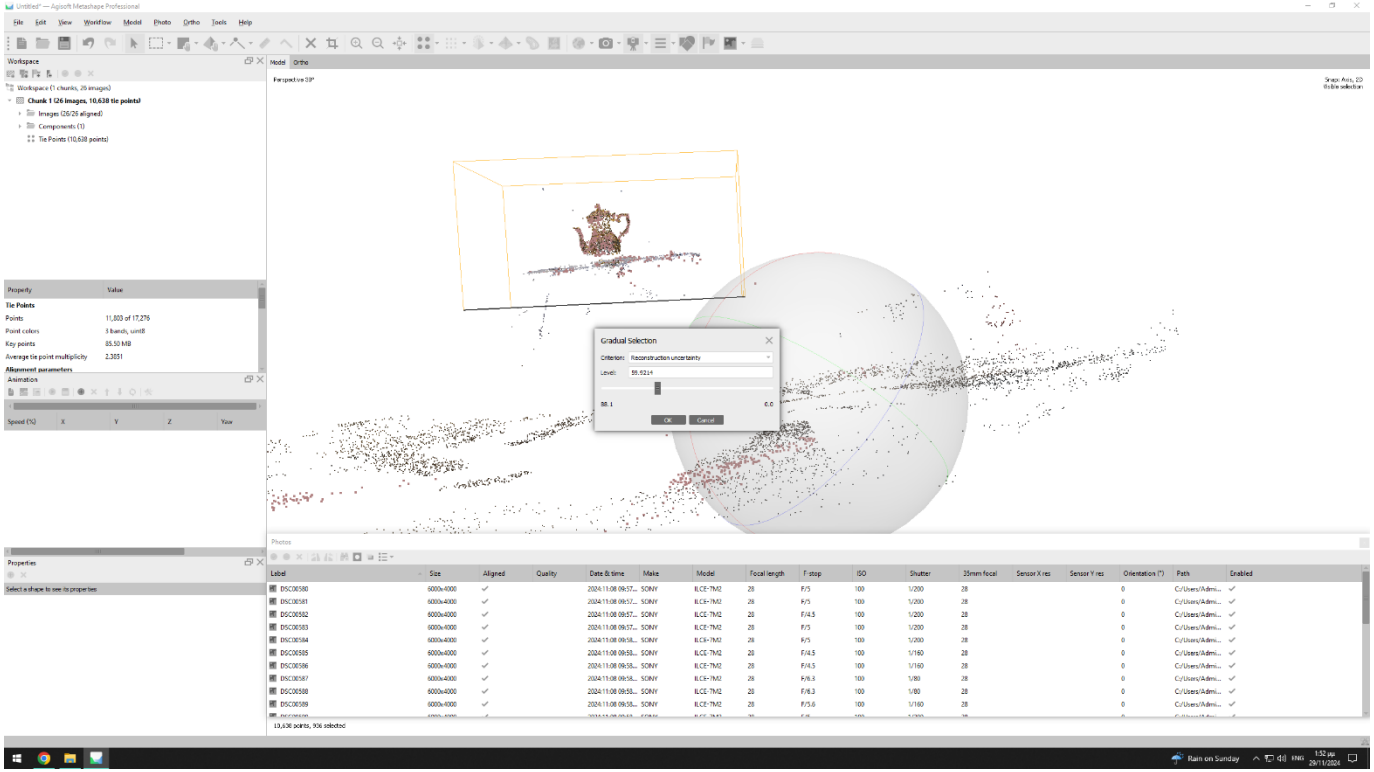
Projection Accuracy
10-30



Noise filtering 2/3

Reconstruction uncertainty

Reconstruction Uncertainty
~10



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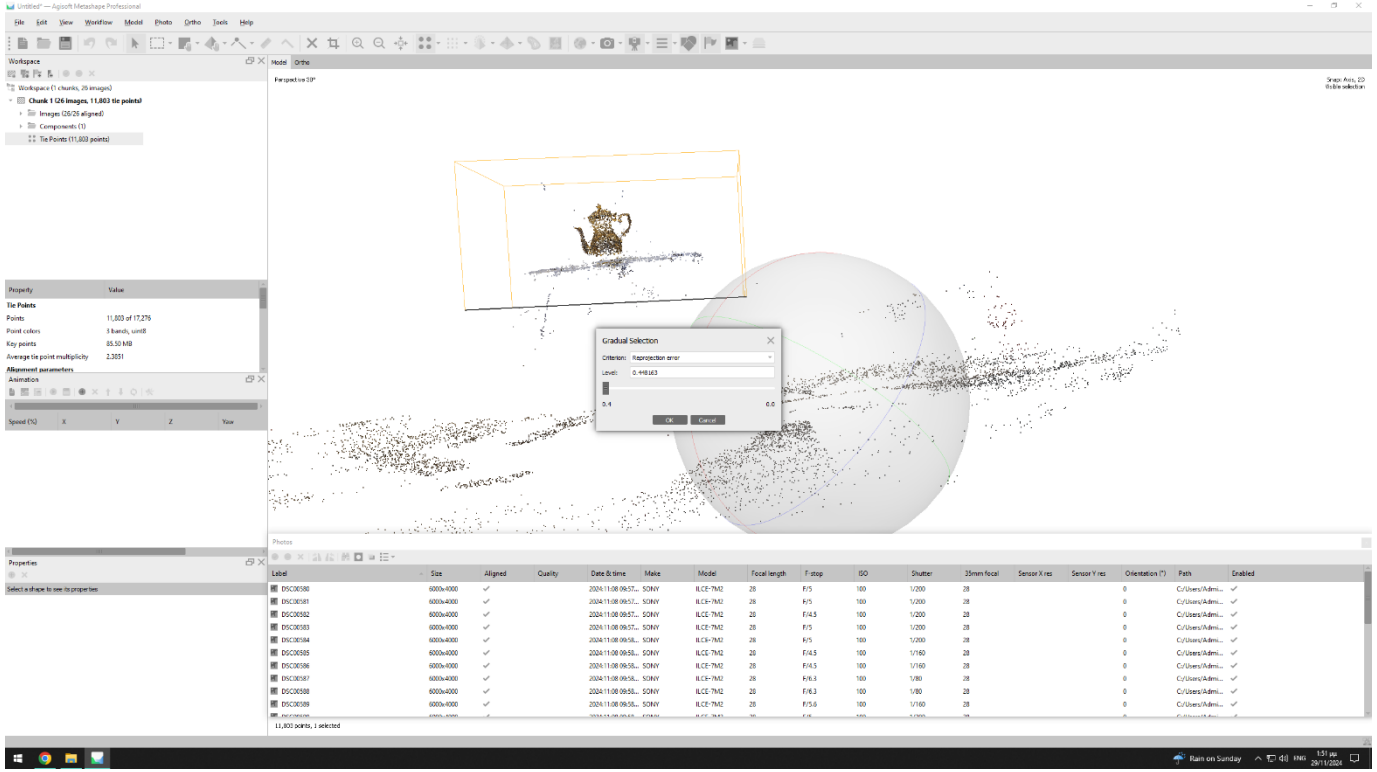
Noise filtering 3/3

Reprojection error

Reprojection error <1



Optimizing cameras

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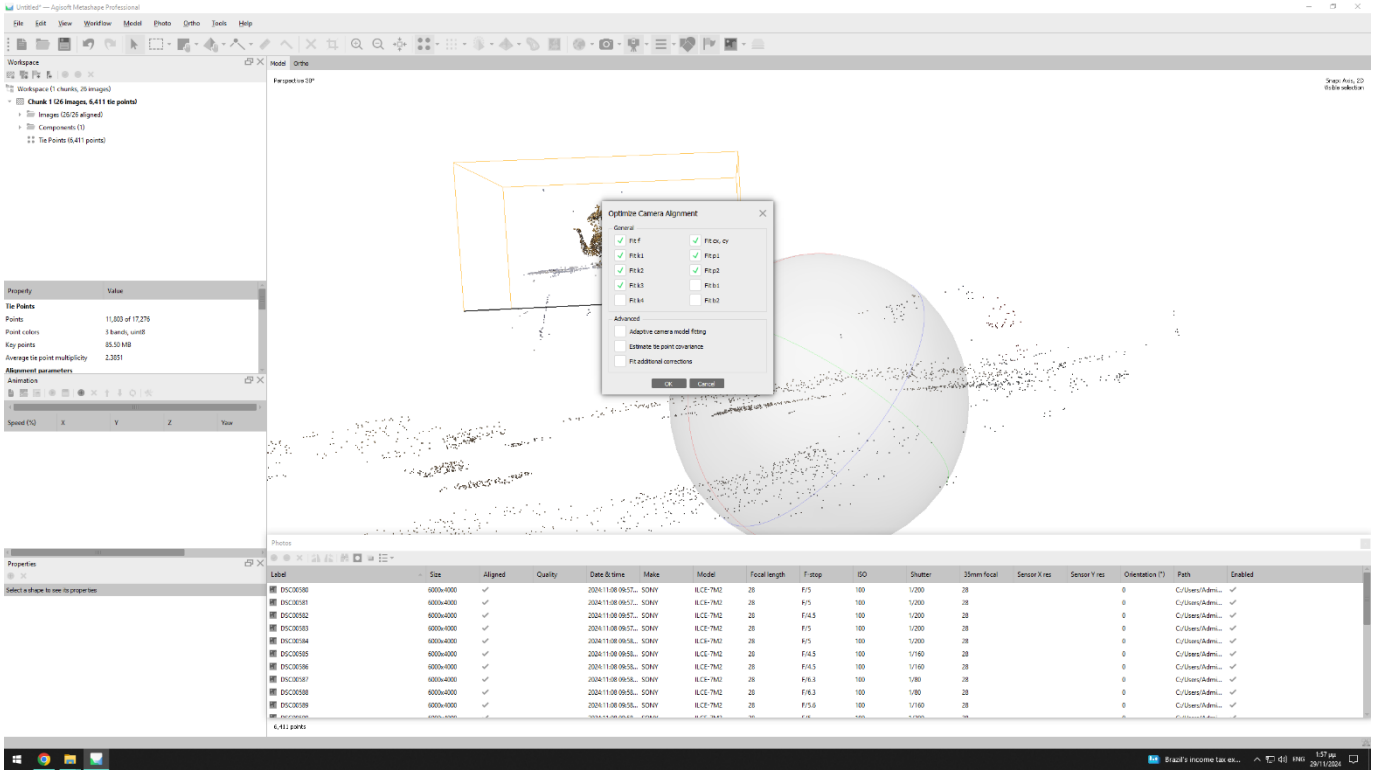

Clean the background

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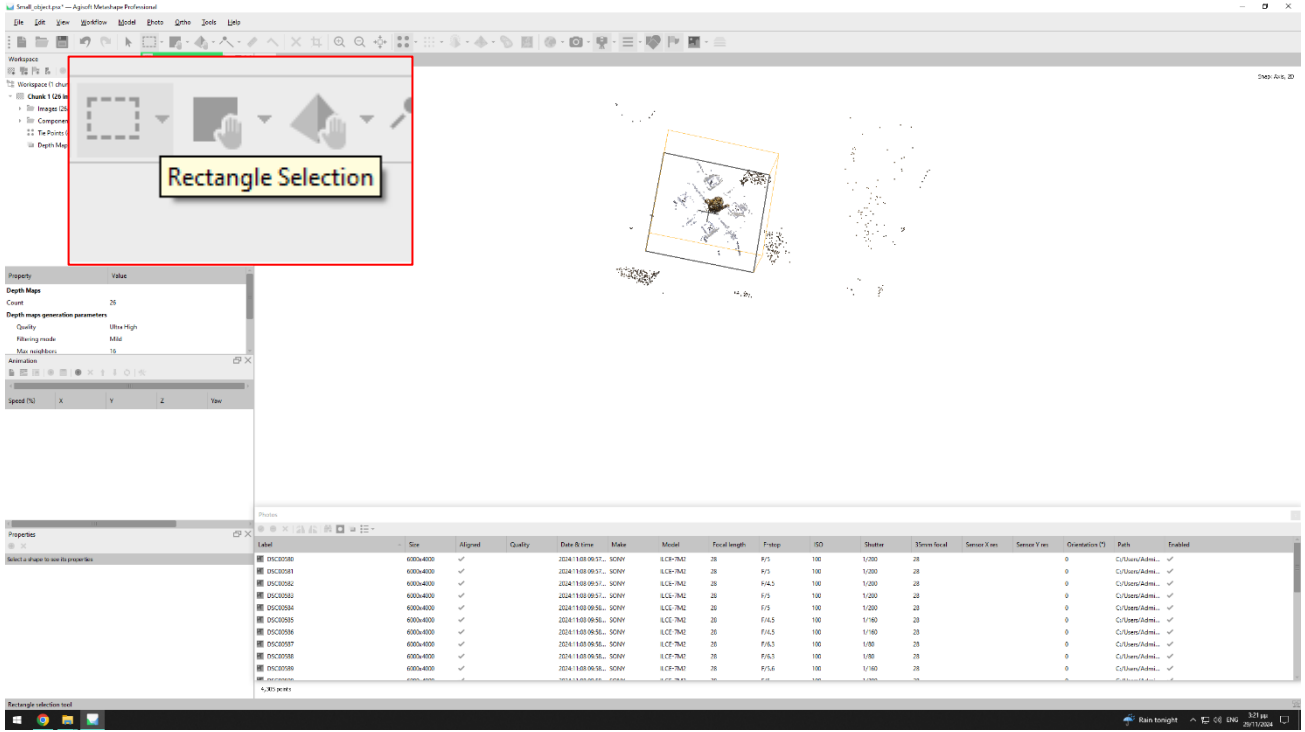
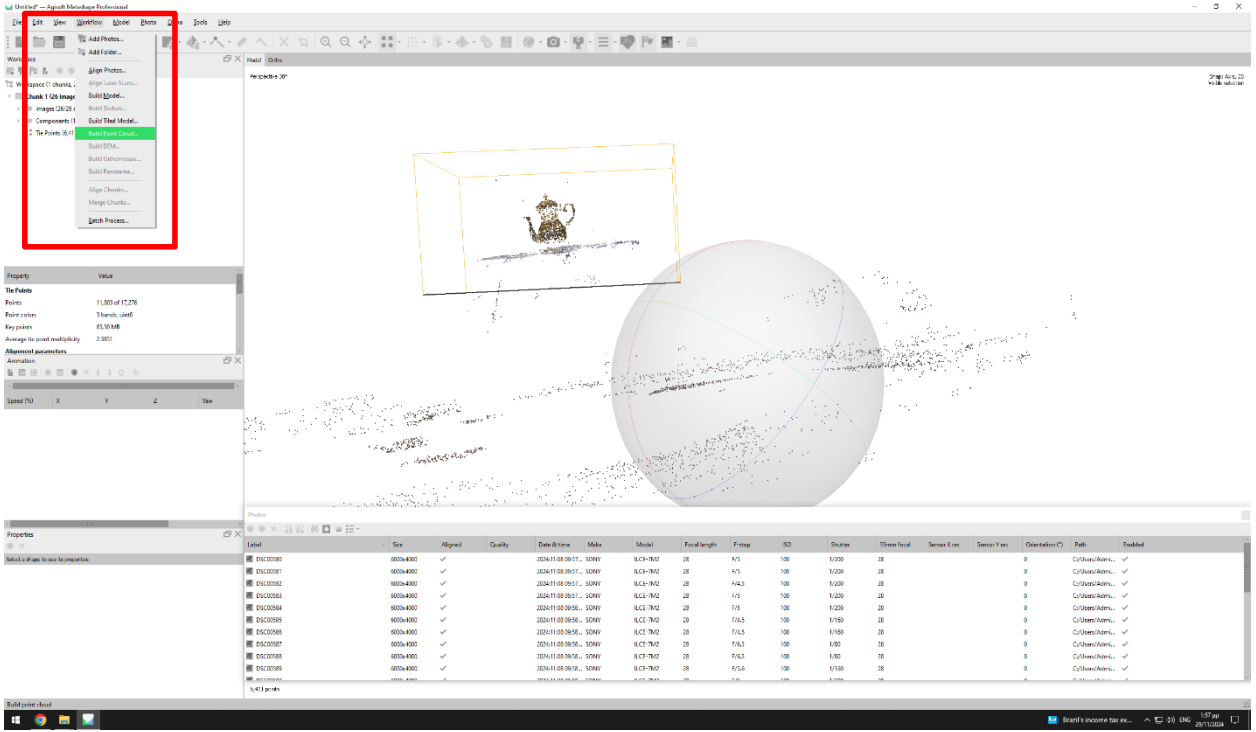


- Press Delete

Point Cloud creation

7. Workflow -> Build Point Cloud



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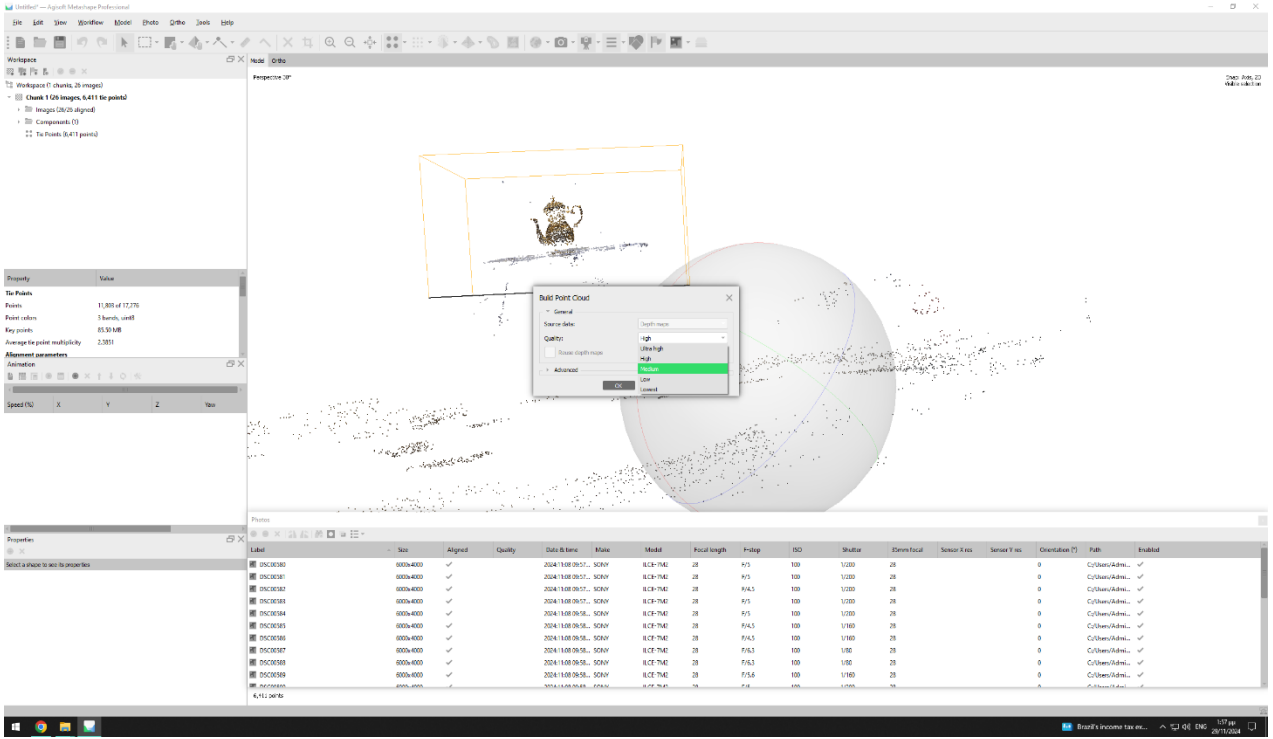

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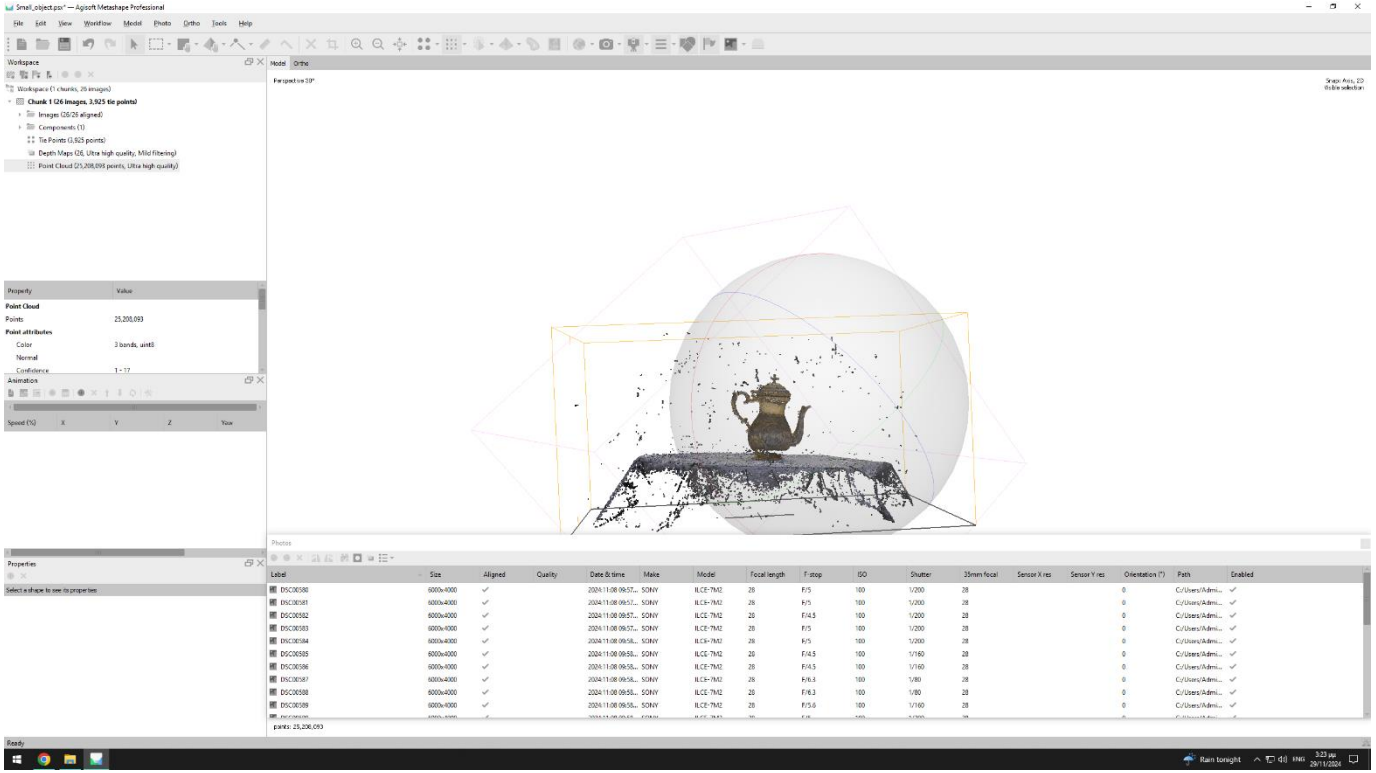
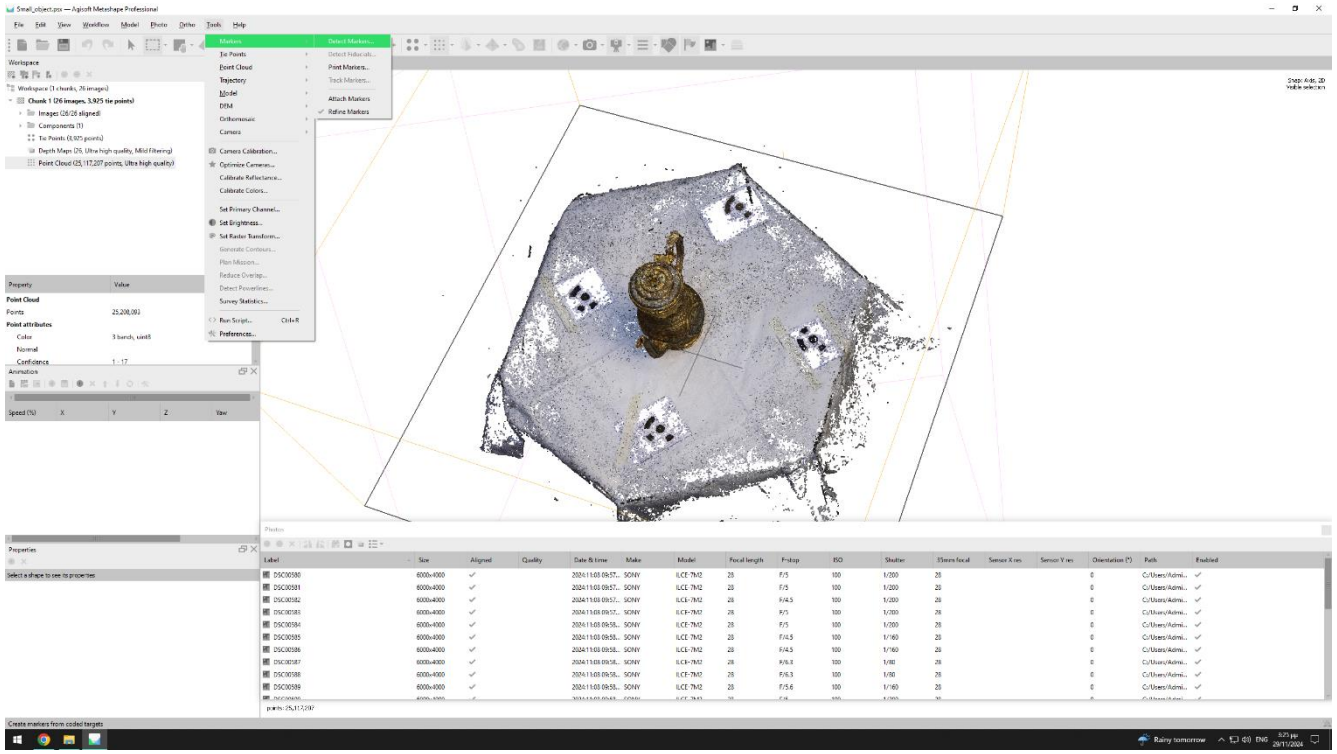


Markers' detection

8. Tools -> Markers -> Detect Markers



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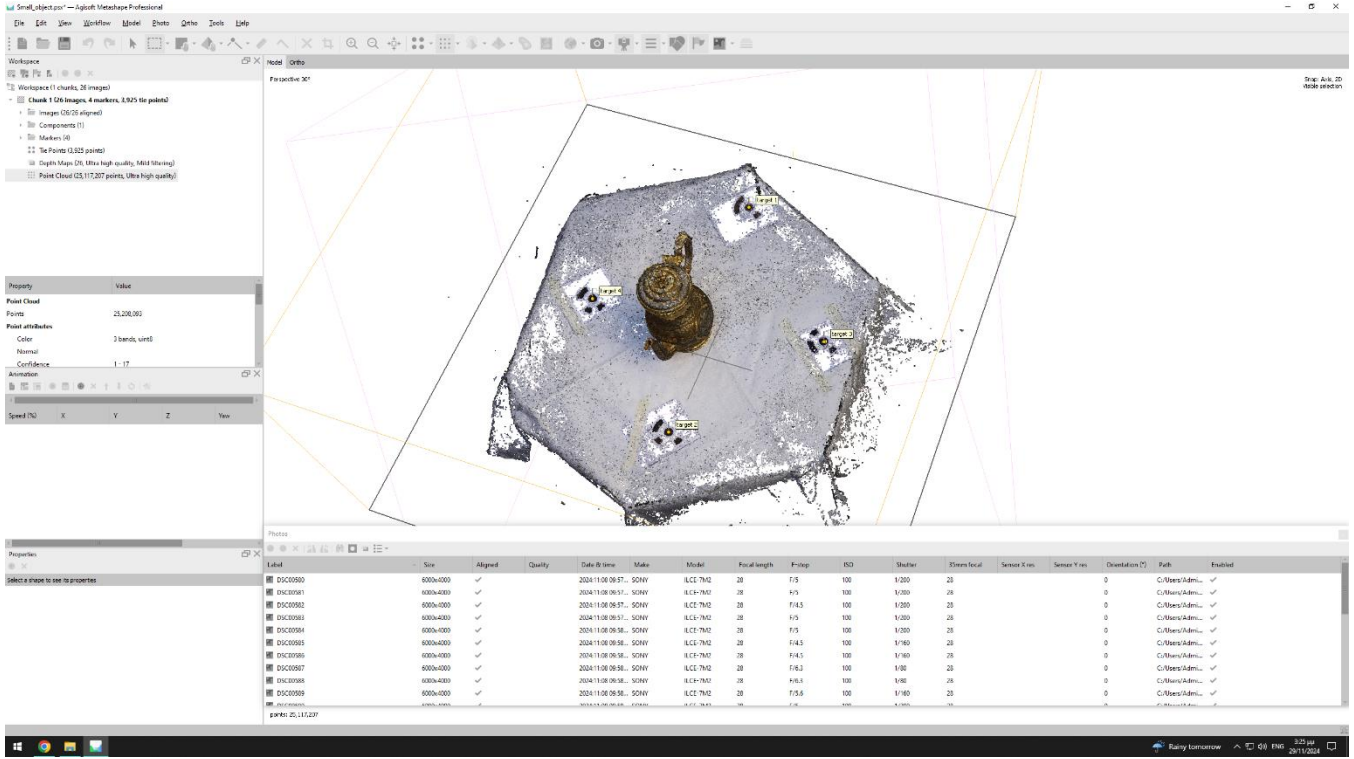
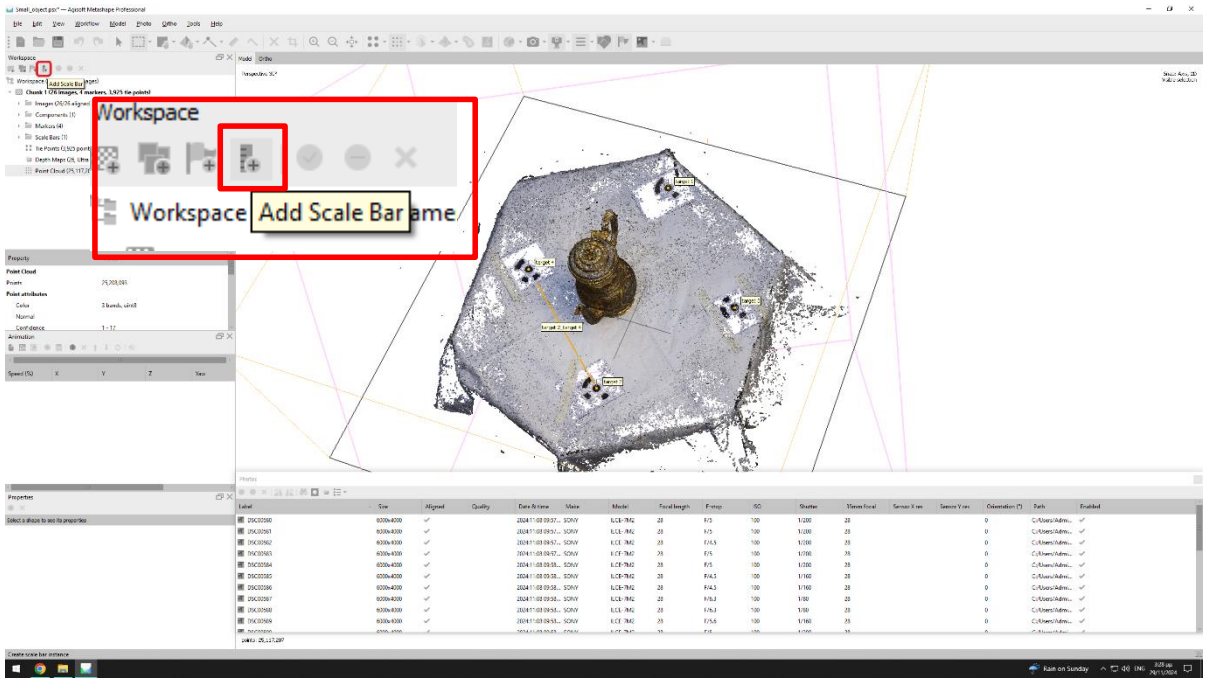


Scale bar

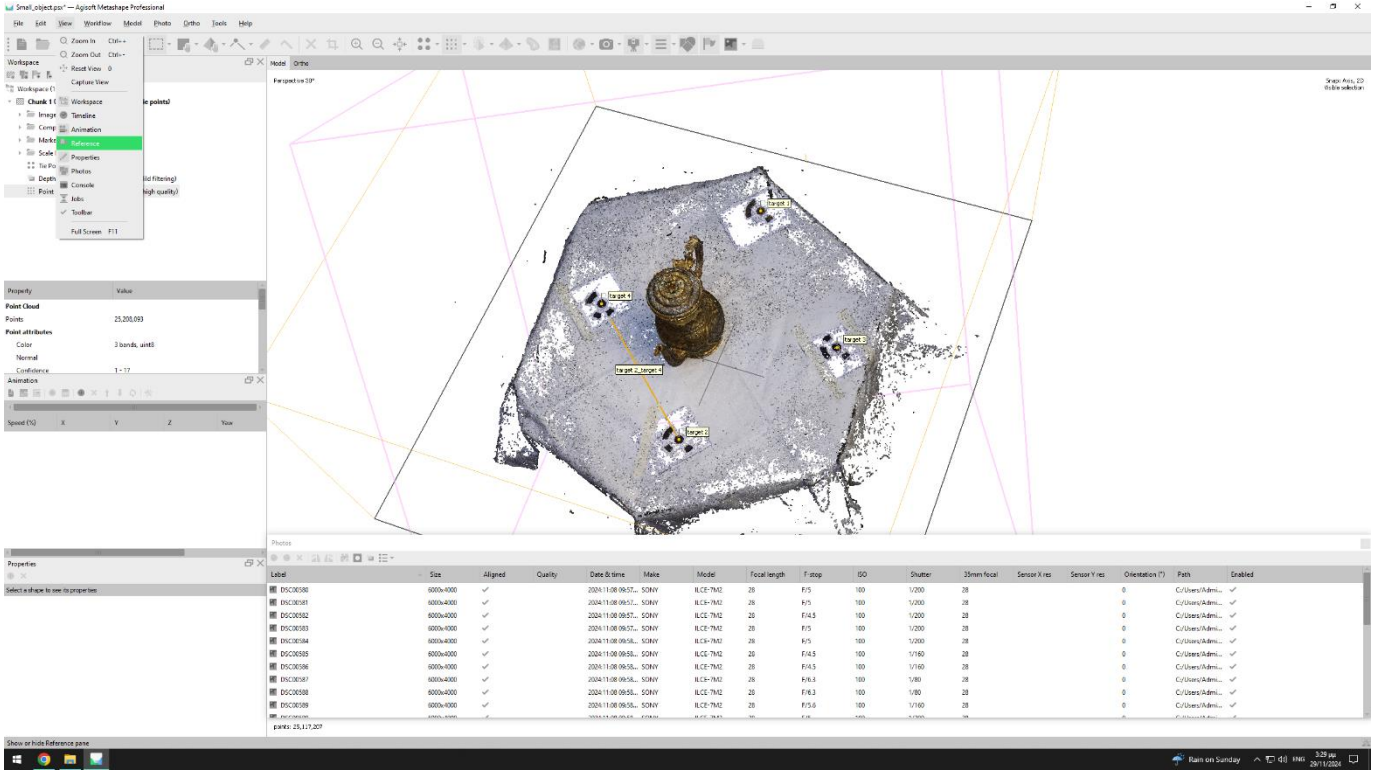
9. From Workspace menu
-> Add scale bar



Reference menu

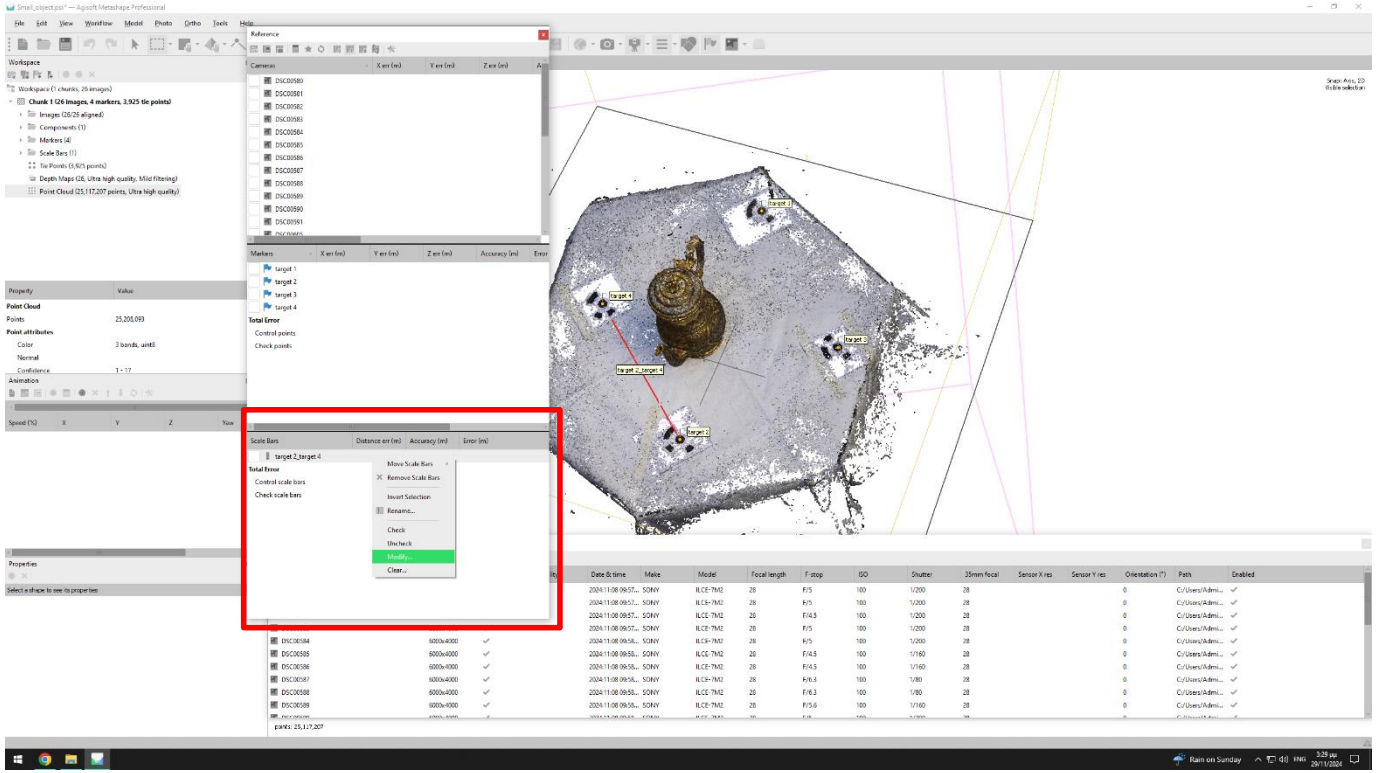
9. Go to Reference menu

(you can add it from View-> Reference)



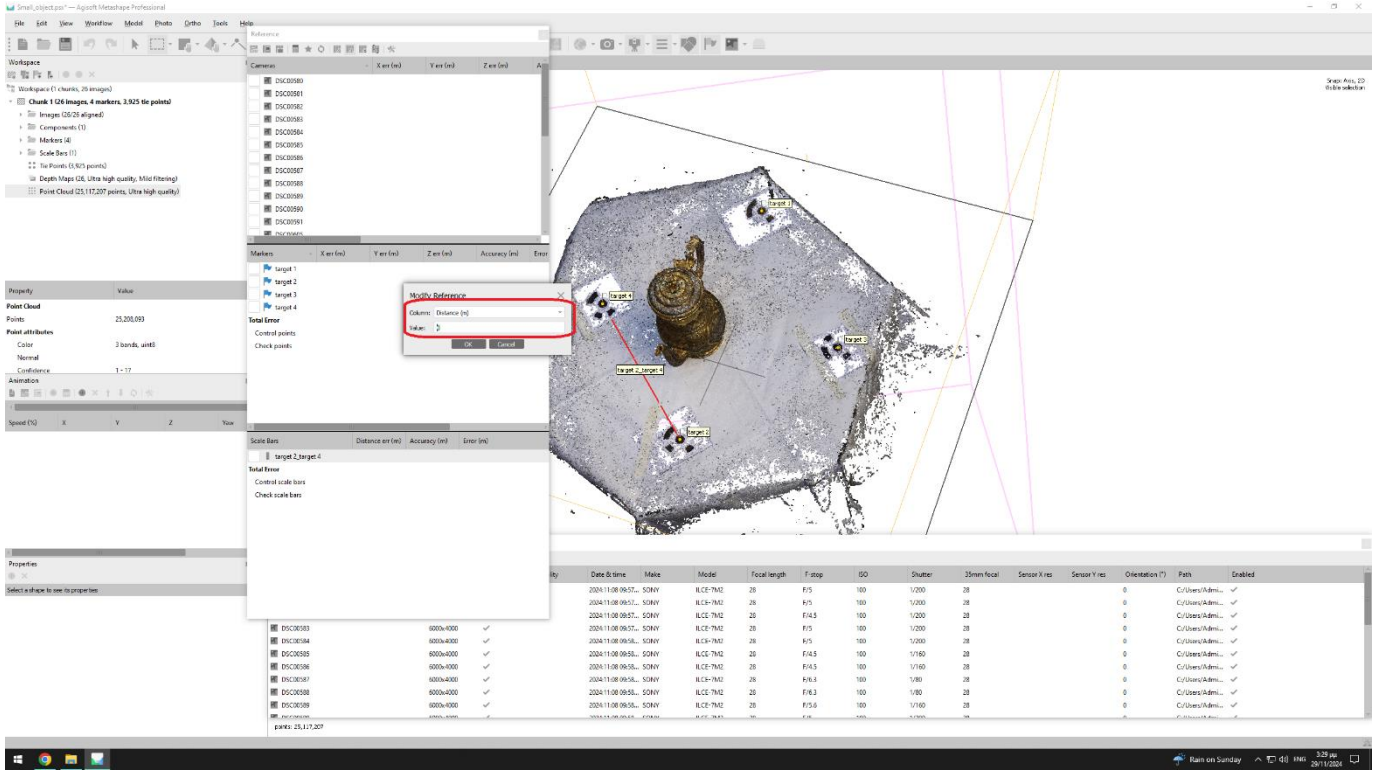
Modify Reference

Target	Distance (m)
1-4	0.390 m
1-3	0.362 m
2-3	0.370 m
2-4	0.355 m



Distance between points

10. Type the measured distance between marker points



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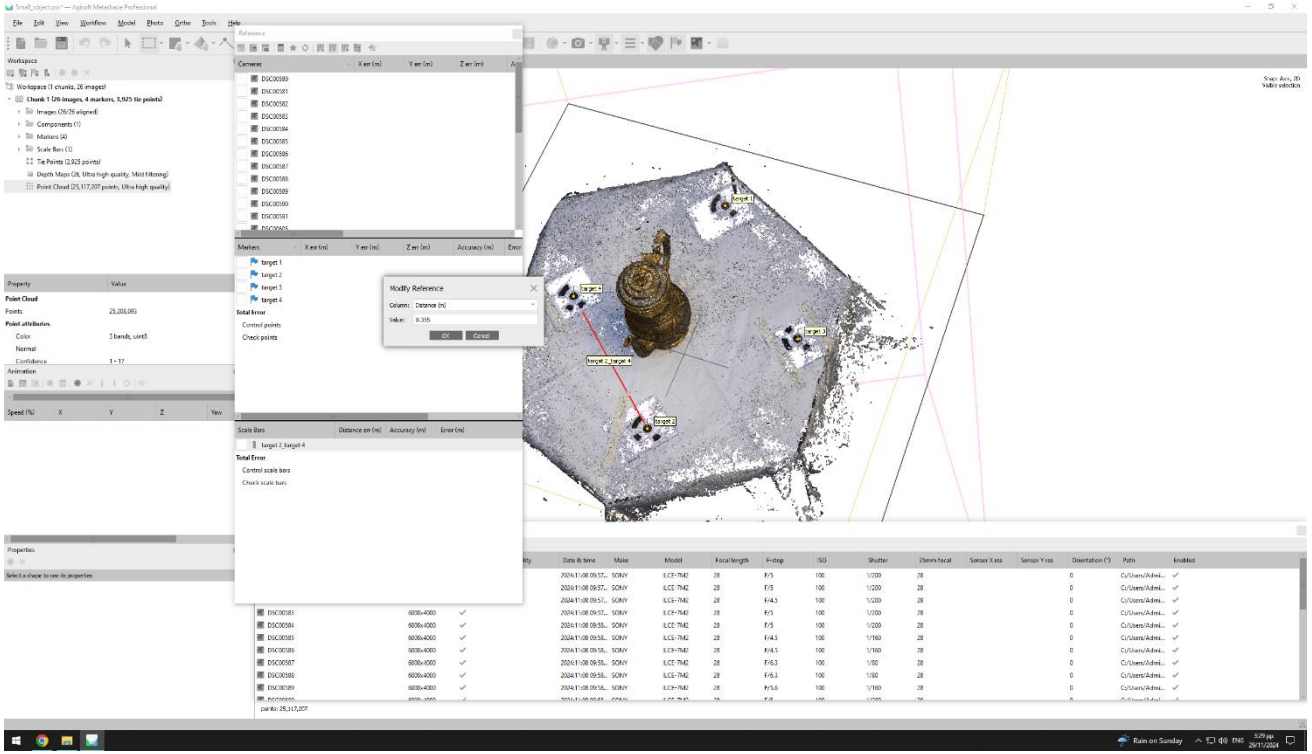
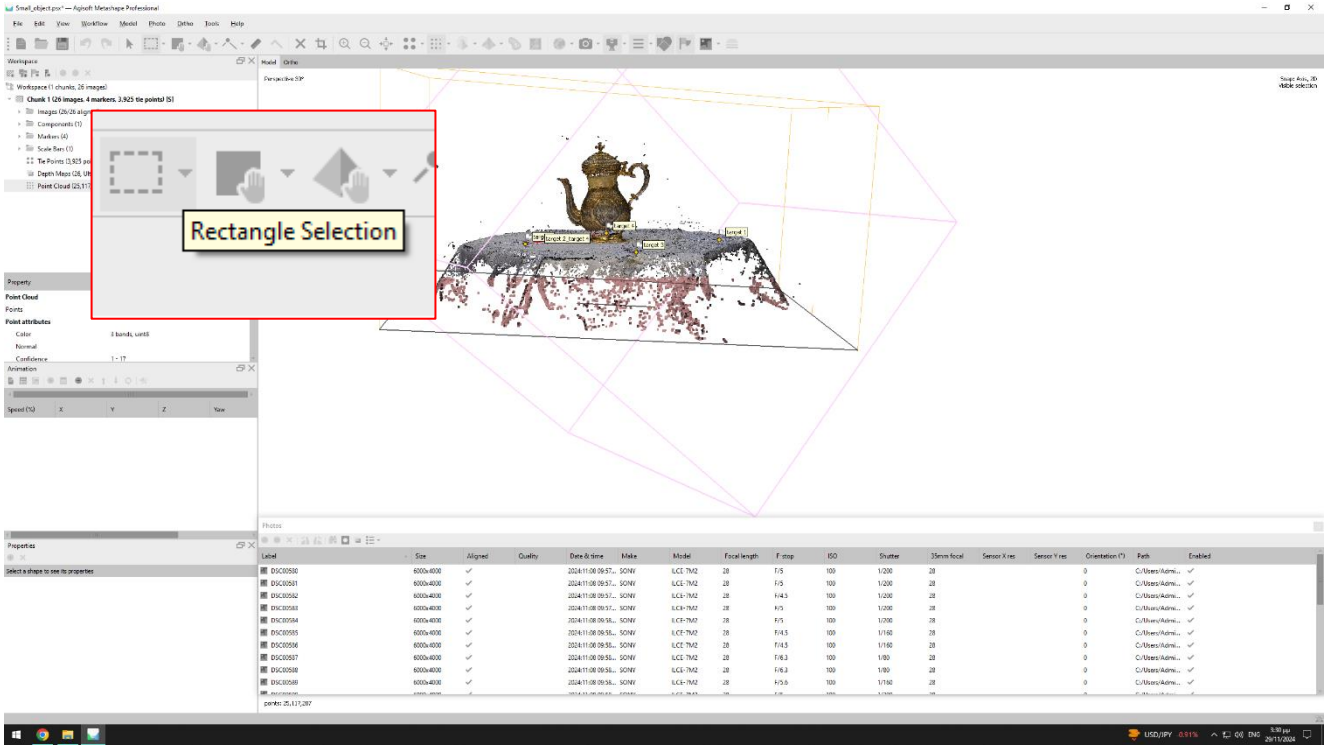


Point cloud cleaning

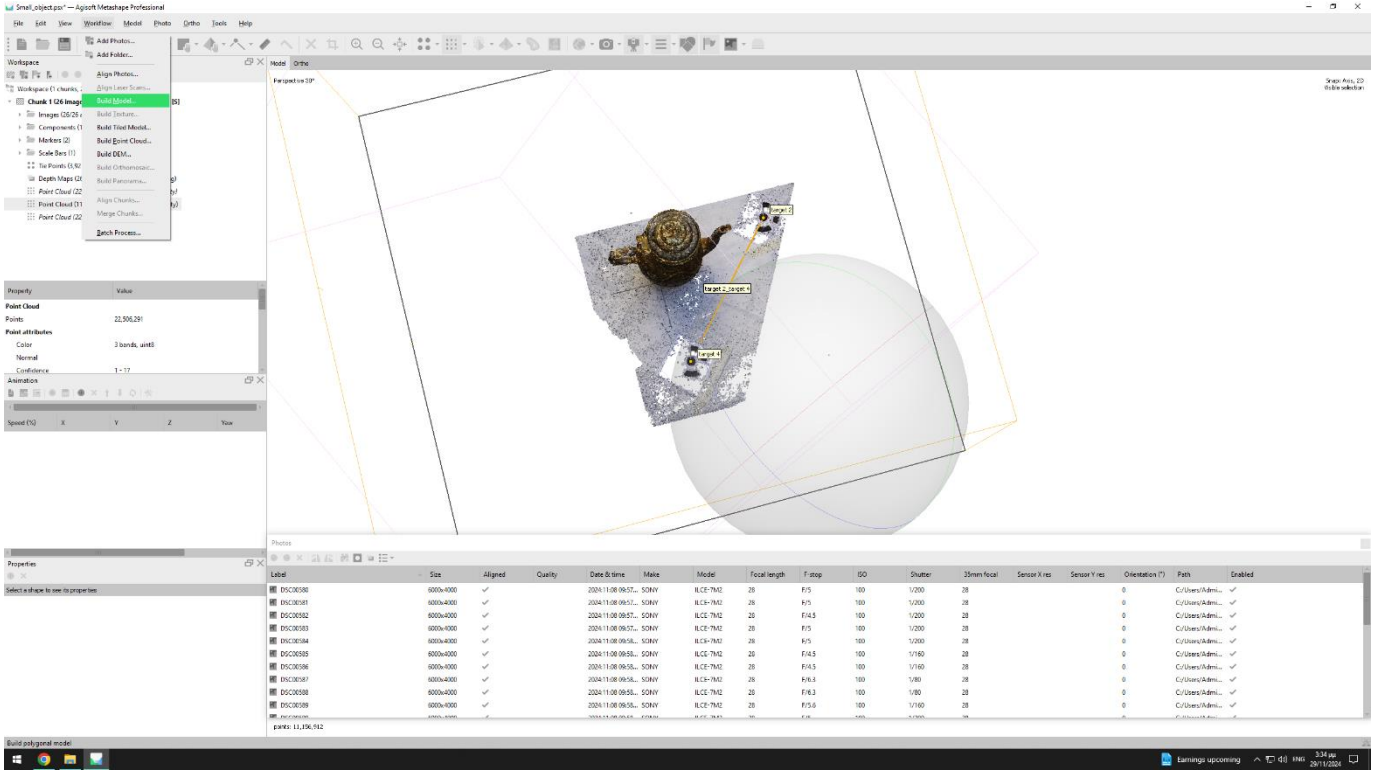
11. Select the rectangle button -> with your mouse hold and select the unwanted background

- Press Delete



Model creation

12. Workflow -> Build Model



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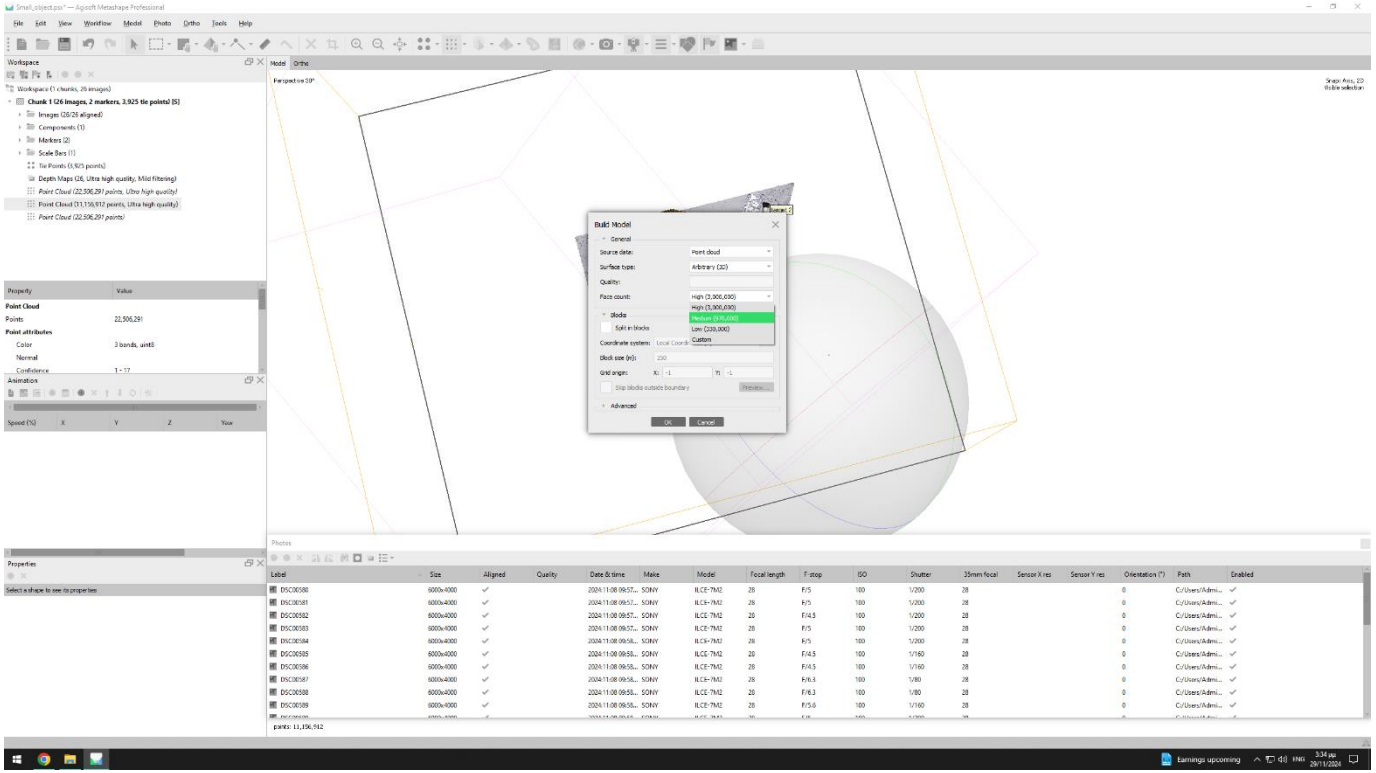

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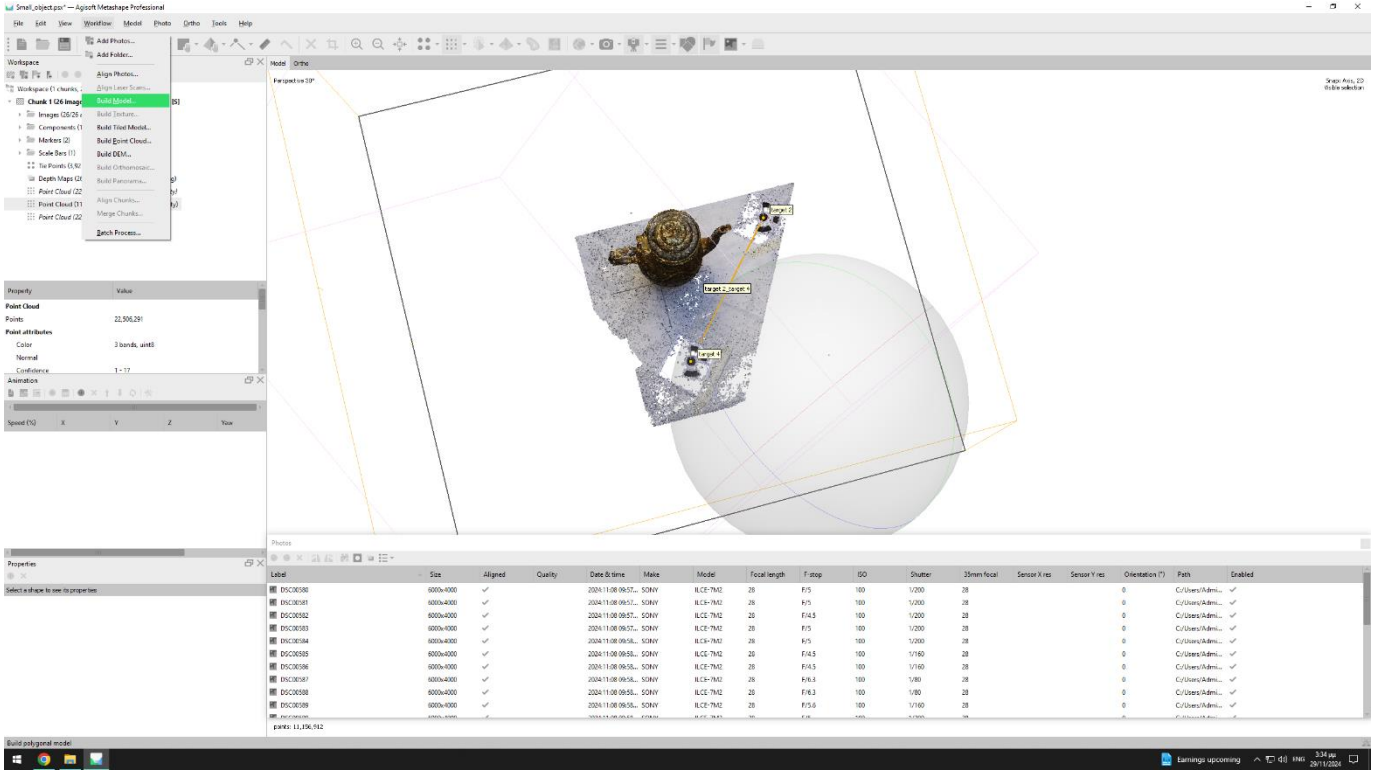

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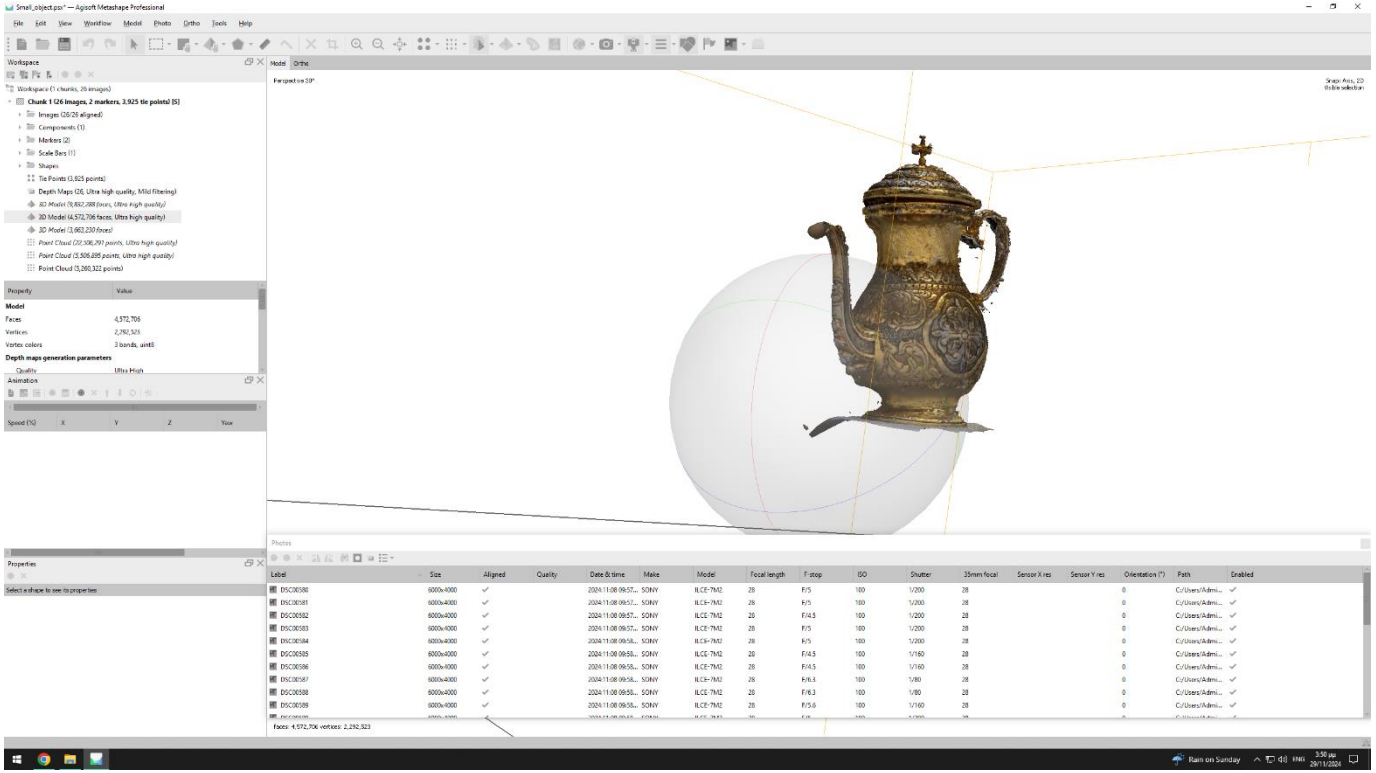
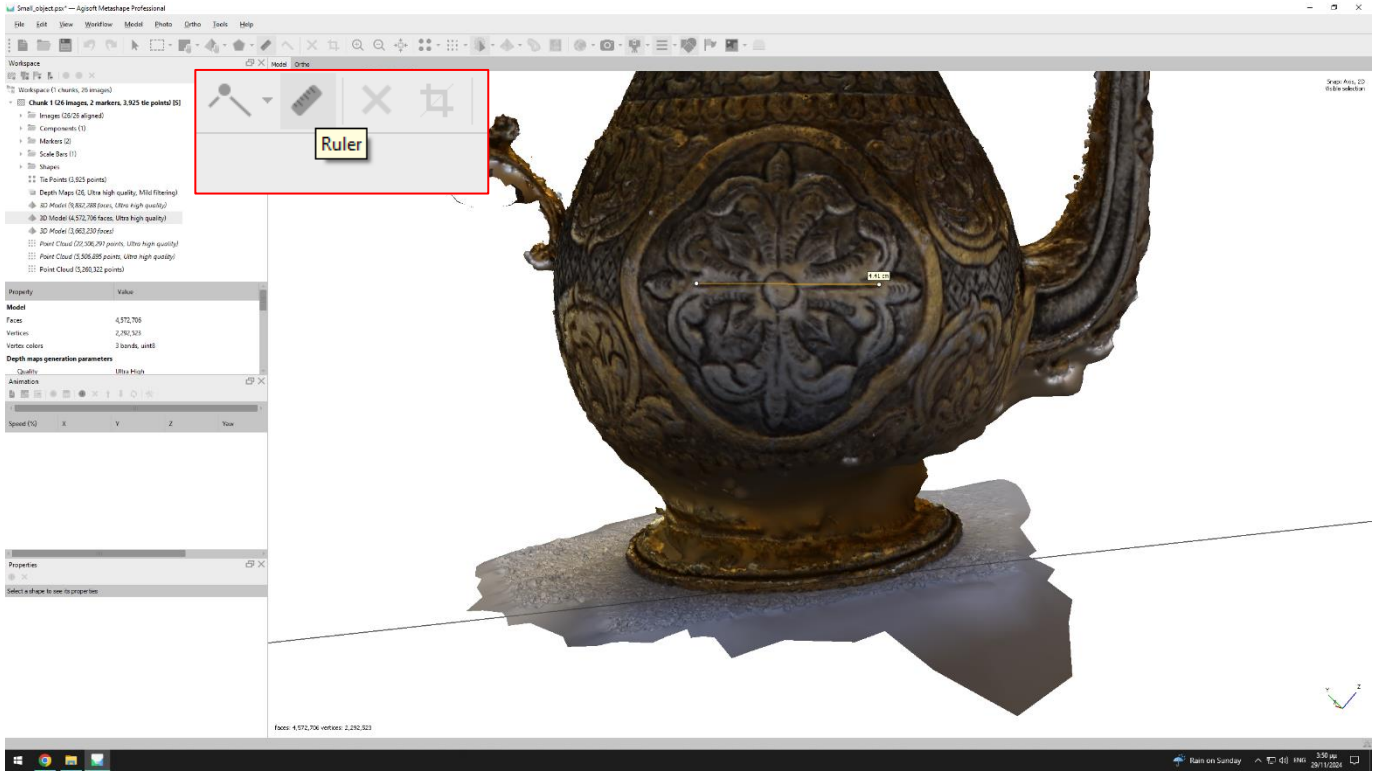


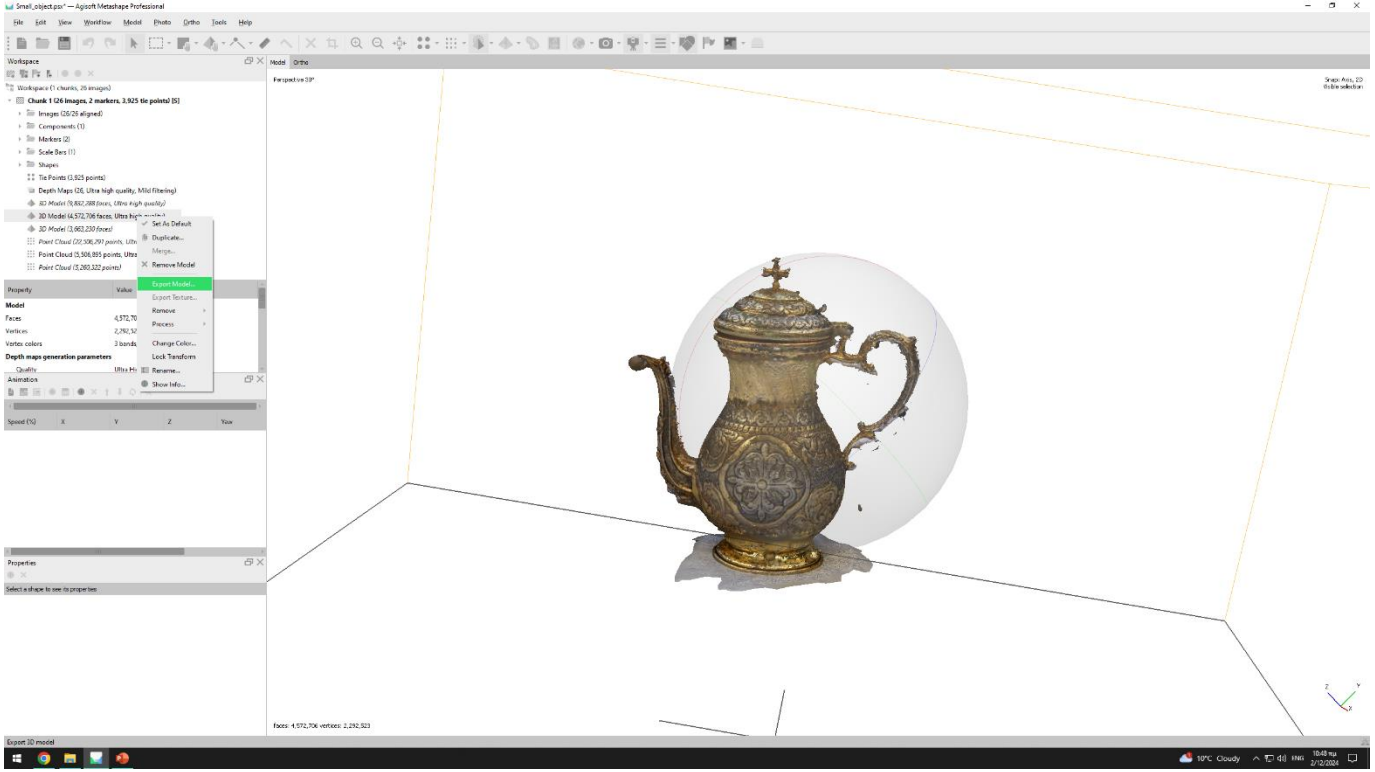
Measuring

12. Select the Ruler button -> with your mouse define on the model the distance you want to measure



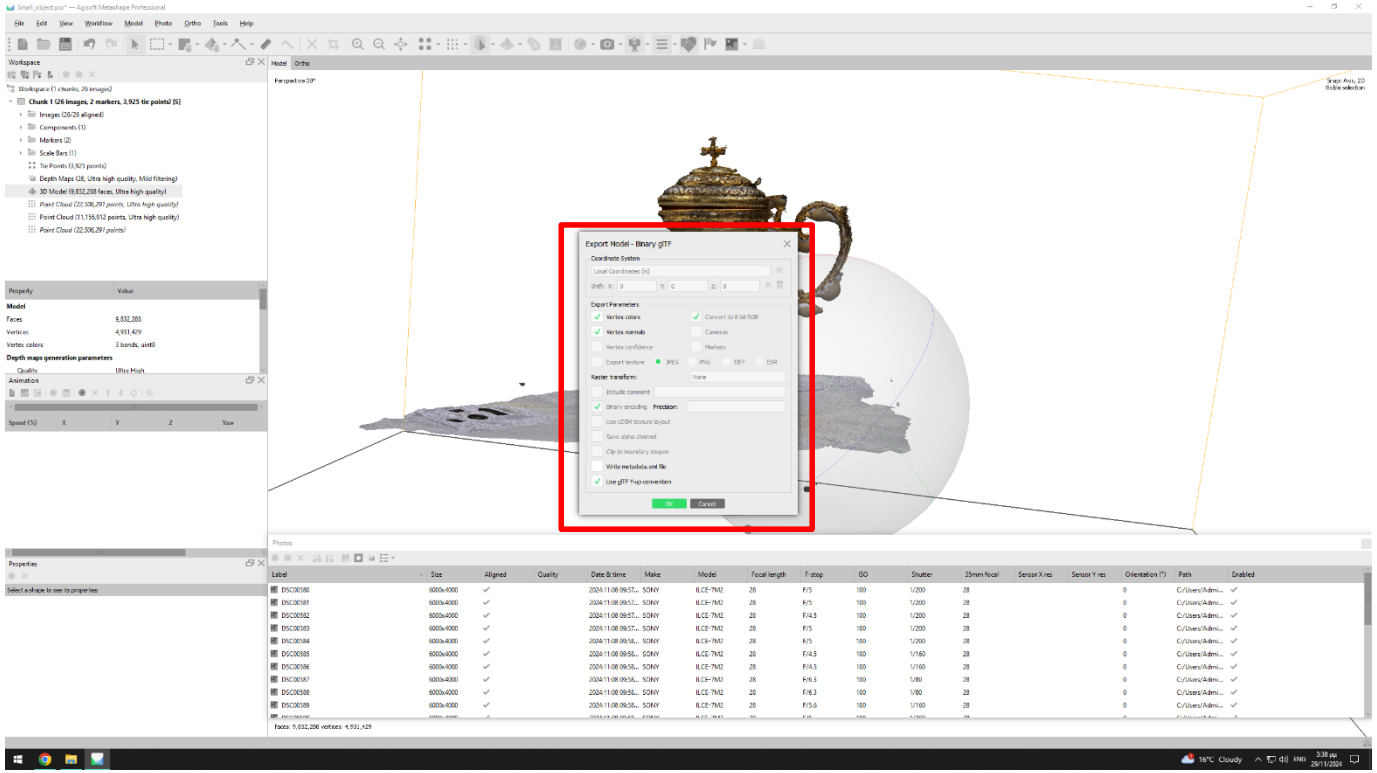
Export model

12. File -> Export -> Export Model



Export model

Exporting parameters



Results: 3D Models

Thank you!