OPTICAL FLAT SIMULATION AND RECONSTRUCTION TOOL

User Manual

JUNE 24, 2024

AHMAD SHAKLEYA
6-Bachelor's Project Electronics-ICT including Internship

Contents

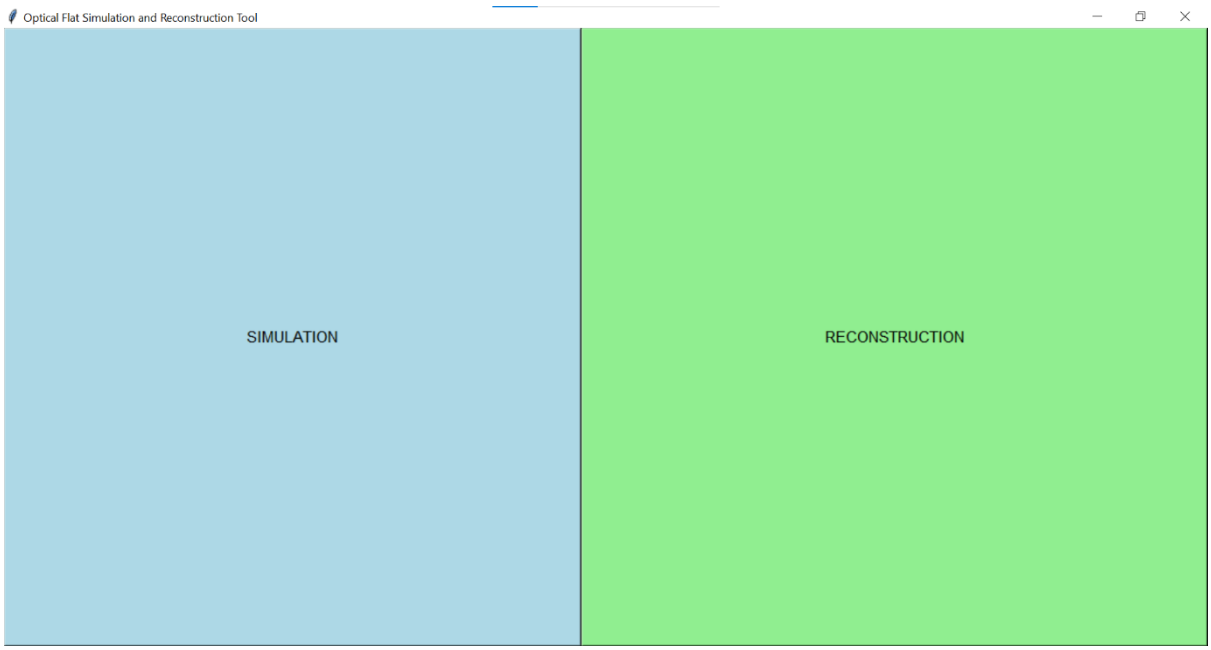
Introduction 2
Main Window 2
Simulation Window 3
Adding Shapes 3
Editing Shapes 4
Deleting Shapes 4
Calculating intersections 4
Saving configurations 5
Reconstruction Window 5
Importing images 5
Processing images 6
Generating height maps 6
Log Window 7

Introduction

The Optical Flat Simulation and Reconstruction Tool is a software designed for simulating optical flats and reconstructing 3D surfaces from images. This user manual provides detailed instructions on how to use the various features of the tool, including simulation of shapes, reconstruction from images, and analysis of results.

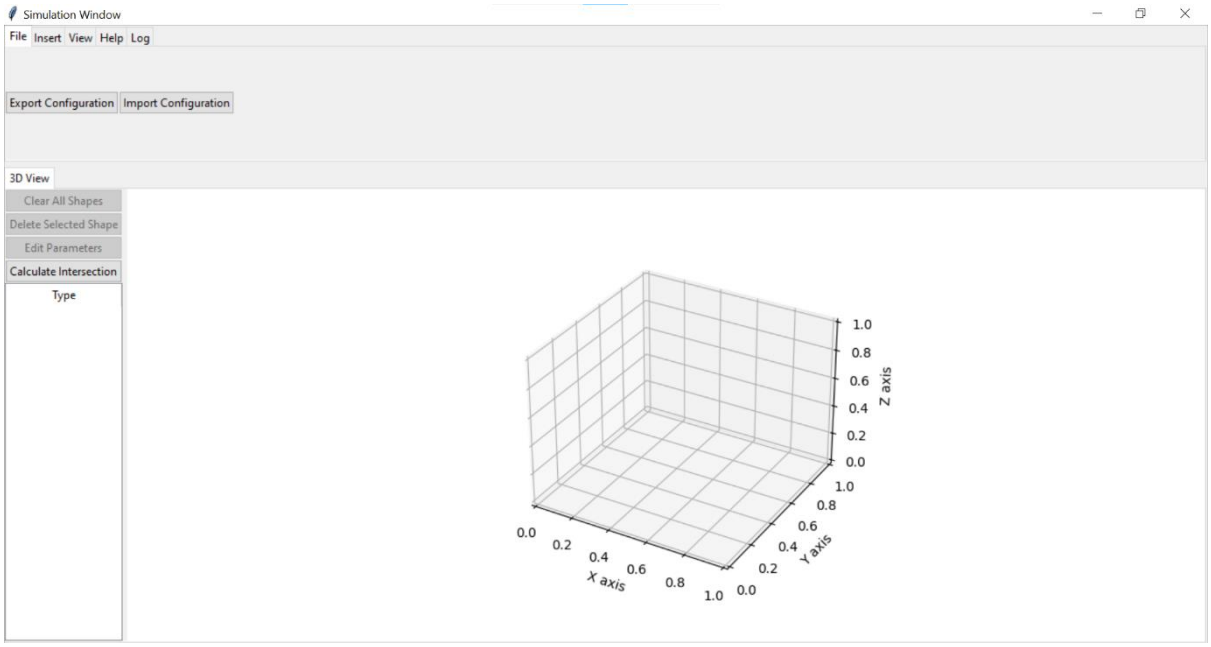
Main Window

The main window provides access to the two primary functions of the tool: Simulation and Reconstruction. Click on 'Simulation' to open the simulation window or 'Reconstruction' to open the reconstruction window.



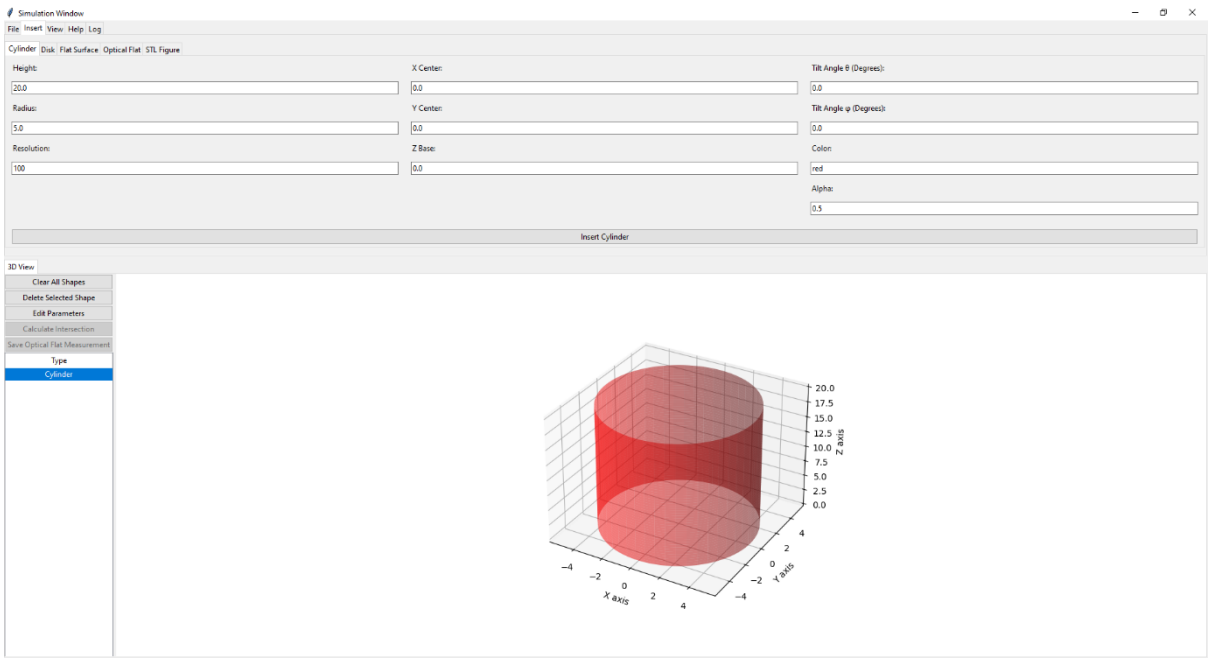
Simulation Window

The simulation window allows users to create, manipulate, and visualize 3D shapes. It includes several tabs for different types of shapes: Cylinder, Disk, Flat Surface, Optical Flat, and STL Figure.



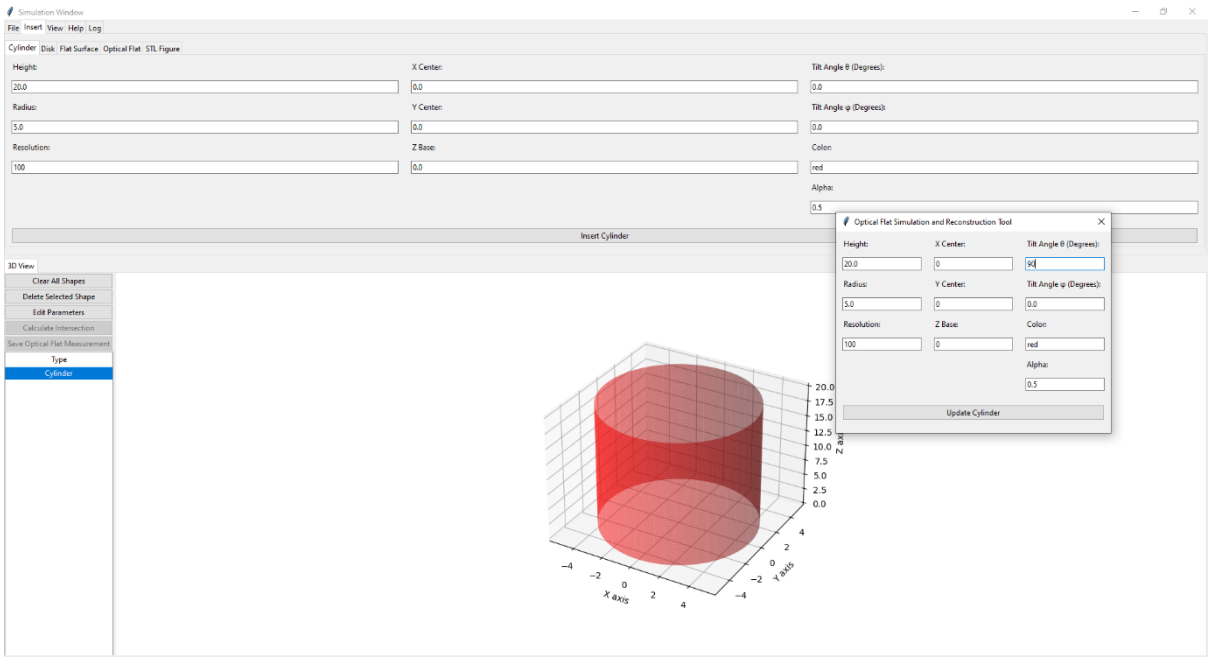
Adding Shapes

To add a shape, select the appropriate tab and enter the required parameters. For example, to add a cylinder, go to the 'Cylinder' tab and fill in the height, radius, center coordinates, resolution, tilt angles, color, and transparency (=alpha). Then click 'Insert Cylinder'.



Editing Shapes

To edit an existing shape, select it from the shape list and click 'Edit Parameters'. This will open a window where you can modify the shape's parameters. After making changes, click 'Update Cylinder' (or the appropriate update button for the selected shape).

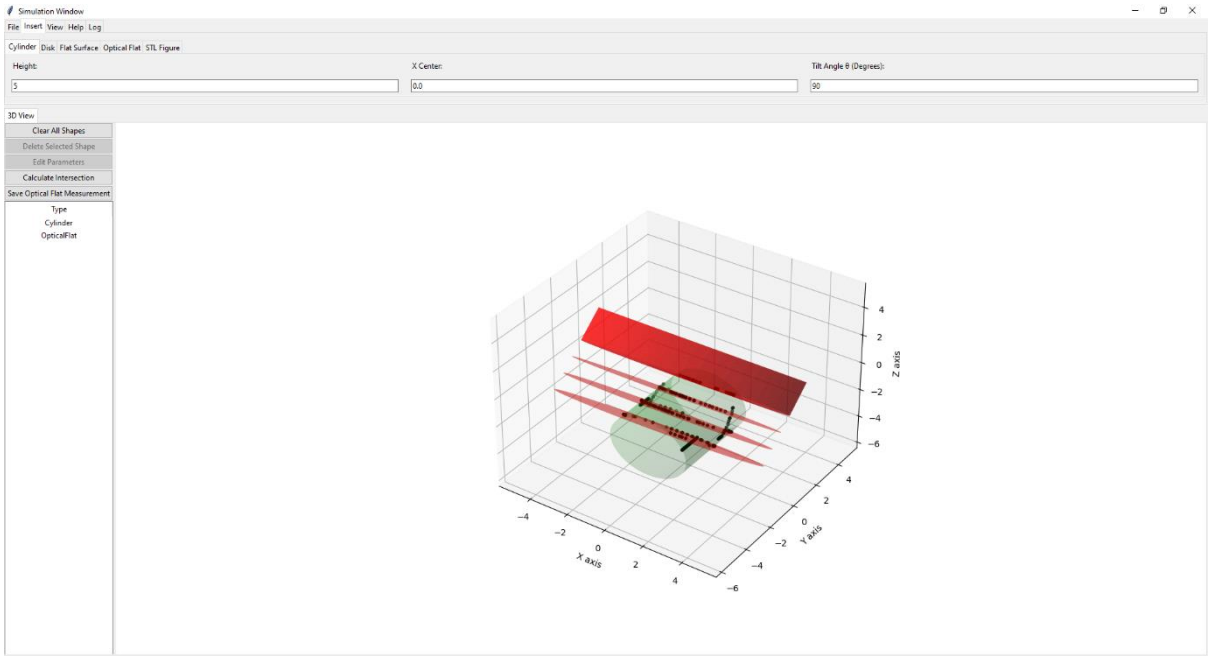


Deleting Shapes

To delete a shape, select it from the shape list and click 'Delete Selected Shape'. The shape will be removed from the list and the 3D view will be updated.

Calculating intersections

To calculate intersections between shapes, add multiple shapes to the 3D view and click 'Calculate Intersection'. The tool will compute the intersection points and display them in the 3D view.

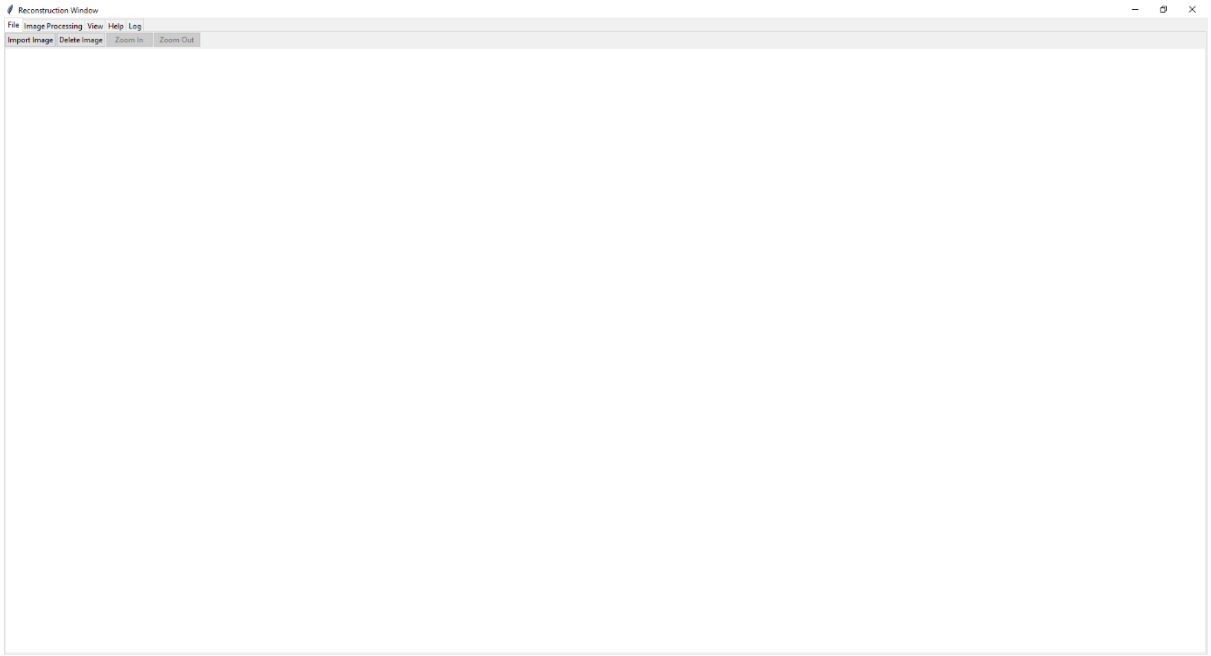


Saving configurations

To save the current configuration of shapes, use the 'File' menu to export the configuration. You can also import a previously saved configuration using the same menu.

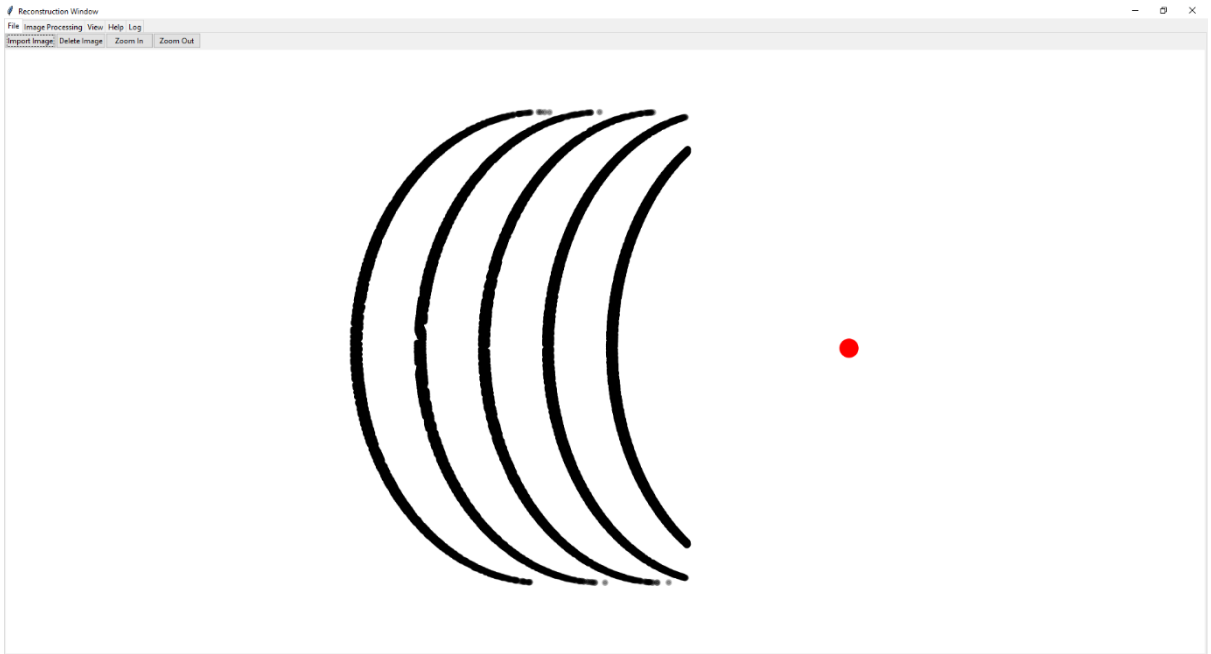
Reconstruction Window

The reconstruction window is used to process images and reconstruct 3D surfaces. It includes options to import images, process them, and generate height maps.



Importing images

To import an image, click 'Import Image' in the 'Image Processing' menu. Select the image file from your computer. The imported image will be displayed in the main area.

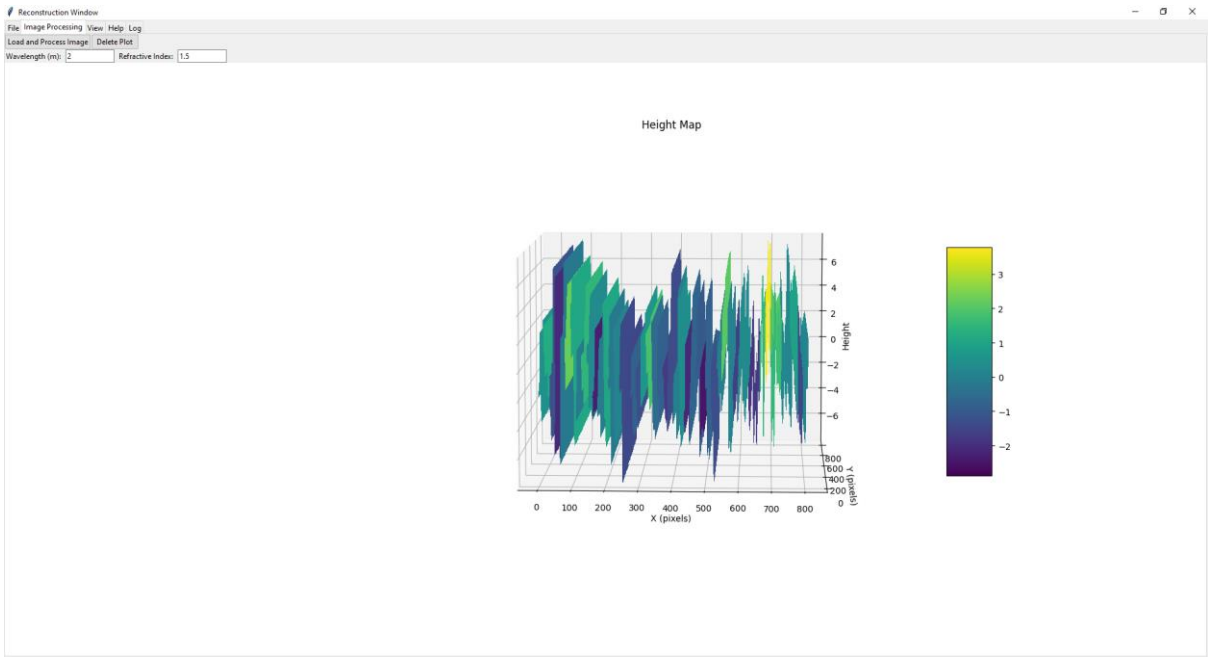


Processing images

Once an image is imported, you can process it to generate a height map. Use the 'Load and Process Image' button to start the processing. The tool will apply various algorithms to extract the height information from the image.

Generating height maps

After processing the image, the tool will display the height map. This 3D plot represents the surface profile based on the imported image.



Log Window

The log window keeps track of all actions performed within the application. It logs messages such as image loading, processing steps, and errors. You can export the log messages for further analysis.