MAICO Resolution Simulator
U17065-01
Instruction Manual

⚠CAUTION	• Follow the safety precautions in Chapter 1 in order to avoid personal injury and damage to property when using this software. The manual describes the correct handling method of the software and provides instructions that should be followed to avoid accidents. **Read this manual carefully** before using this software. After reading this manual, store it in a location where you can refer to it at any time.

Ver.1.0
Apr. 2023

HAMAMATSU PHOTONICS K.K.

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1. SAFETY PRECAUTIONS

1-1 CLASSIFICATION OF WARNINGS

We have classified the warnings symbols that appear in this instruction manual and on the system as follows for your convenience. Make sure that you fully understand them and follow the instructions they contain.

⚠ WARNING	Improper handling of the system without observing these warnings could lead to serious injury to the user and even death.
⚠ CAUTION	Improper handling of the system without observing these cautions could lead to personal injury to the user or damage to property.

Note	This symbol indicates a note to help you get the best performance from the system. Read the contents of the note carefully to ensure correct and safe use. Failure to observe one of these notes might impair the performance of the system.
	This symbol indicates a cautionary item that should be followed when handling the system. Read the contents carefully to ensure correct and safe use.
	This symbol indicates an action that is forbidden. Read and follow the instructions carefully.
	This symbol indicates a compulsory action or instruction. Read and follow the instructions carefully.

2. INTRODUCTION

Please read this manual carefully before using the U17065-01.

Note

- This software may not work satisfactorily on some computers. This software may fail to operate due to the operating system or system requirements. Read the "System requirements" carefully and use the software with adequate system requirements.

♦ **System requirements**

The system requirements for this software are as follows.

Type of computer	PC-AT compatibles
OS	Windows 10,11
Memory	4 GB or more
Available HDD space	2 GB or more
Screen Resolution	800x600 or higher windows size

♦ **Trademarks**

Windows 10 and Windows 11 are the registered trademarks of Microsoft Corporation in the United States and other countries. Other brand names are the trademarks or registered trademarks of each company.

Contents

3. OVERVIEW

This software is used to estimate the resolution that can be achieved with MAICO from the objective lenses used by customers.
The software simulates the optics inside MAICO and calculates the expected resolution.

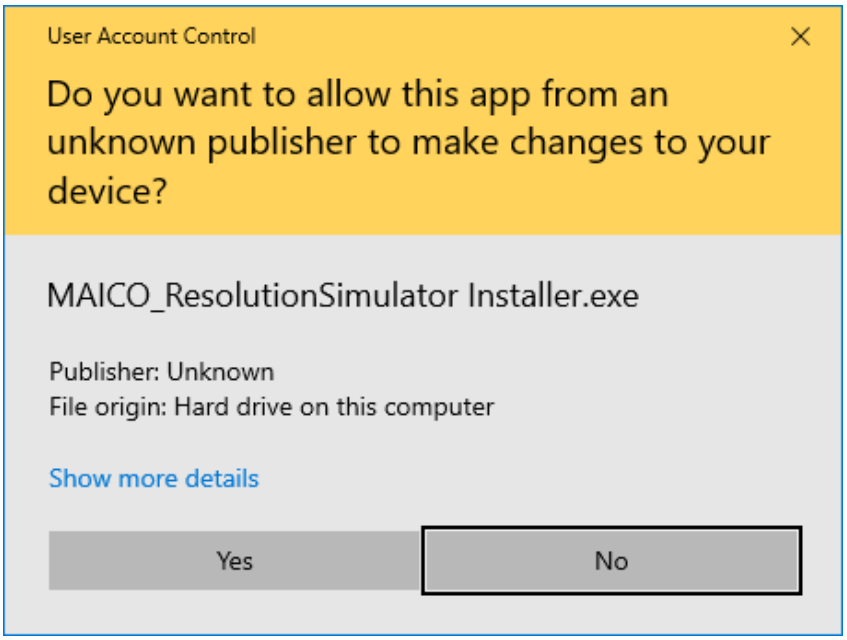
The values given here are only simulation values.
The actual observed resolution is affected by a number of factors, such as manufacturing errors of the MAICO, objective lens and microscope, the sample, etc., and may not always correspond to simulation value.
Please be aware of that when using the software.

4. INSTALLATION

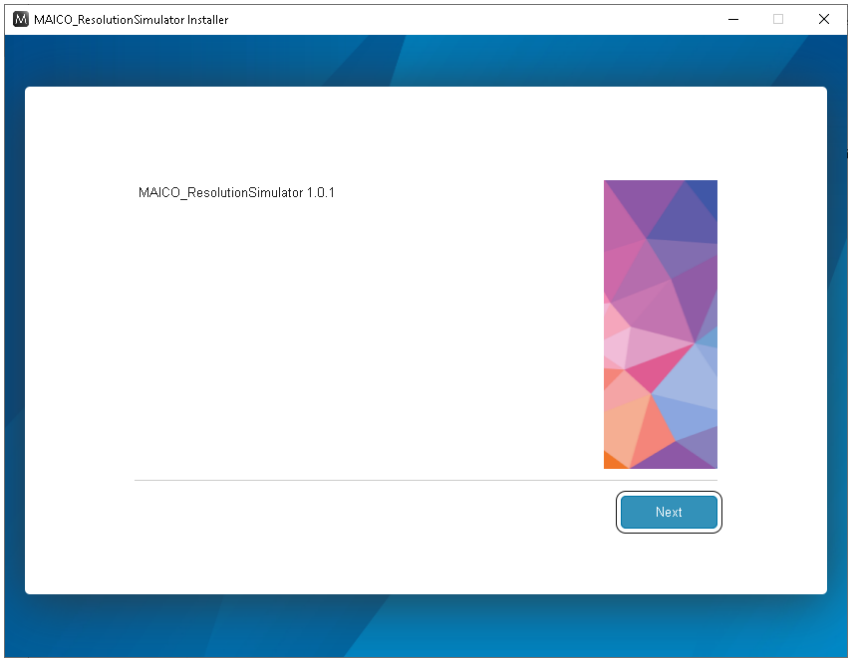
This software runs on Windows 10 and 11. Before installation, check the environment of the computer to be used. Moreover, when other application software is running, end all software. Keep in mind that the administrator authority may be required at the time of installation.

4-1 INSTALLATION OF MAICO RESOLUTION SIMULATOR

Double click “MAICO_ResolutionSimulator Installer101.exe.”
User account control window may pop up. Then, choose “Yes”



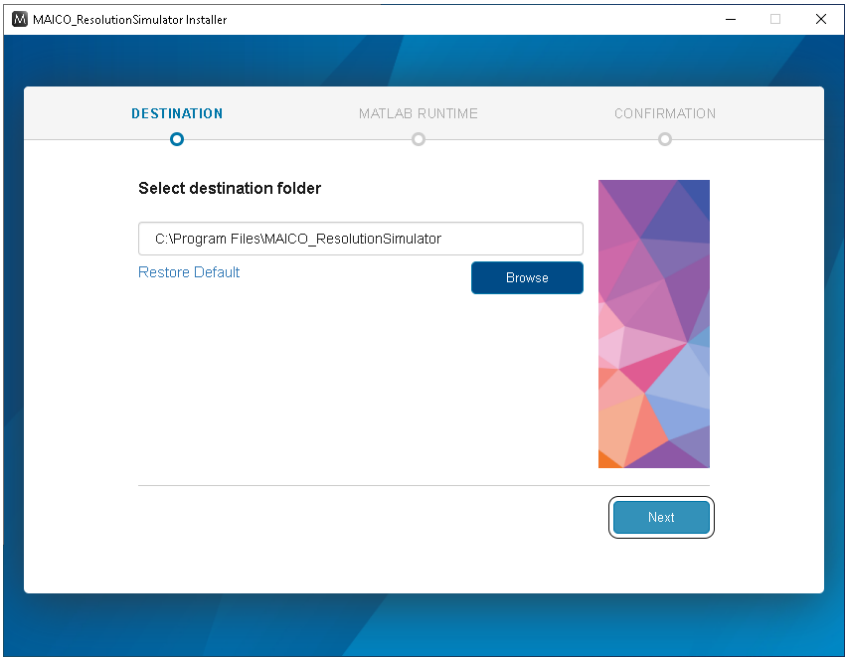
Next, the installer starts and a new window appears.



Note

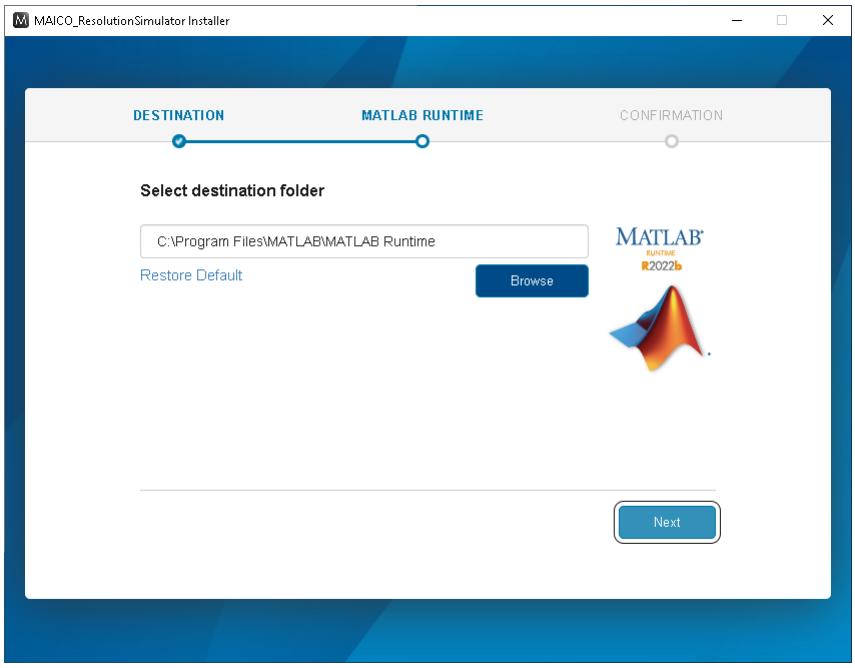
- It may take a minute for this window to appear.

Choose “Next”

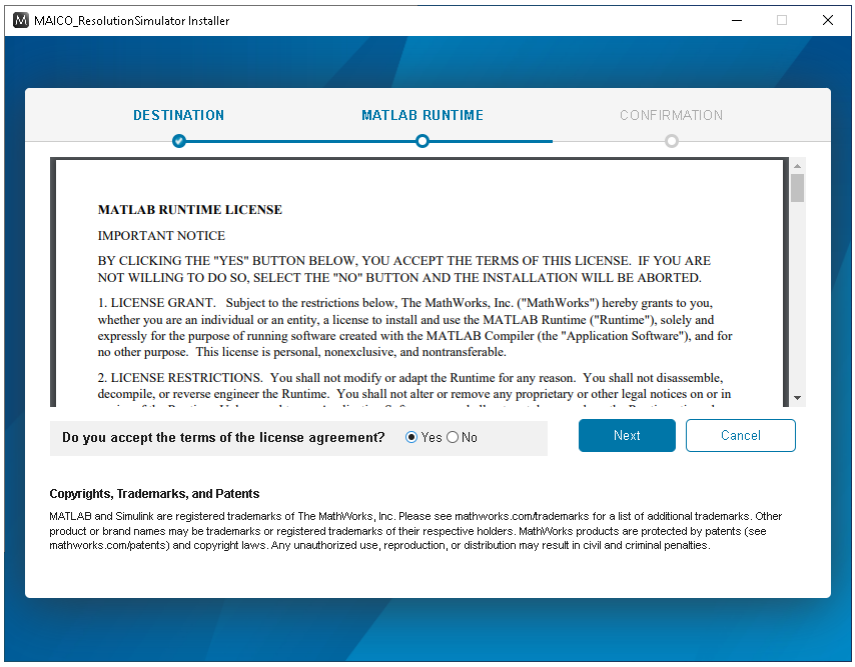


You can choose installation folder. It does not need to be changed unless there is a special reason.

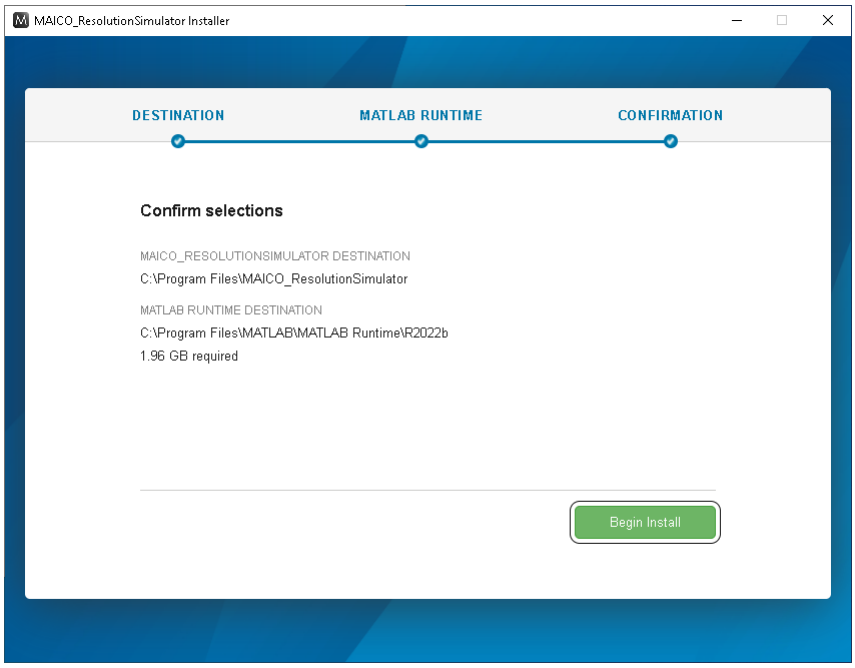
And then, you can choose MATLAB Runtime installation folder. It does not need to be changed unless there is a special reason.



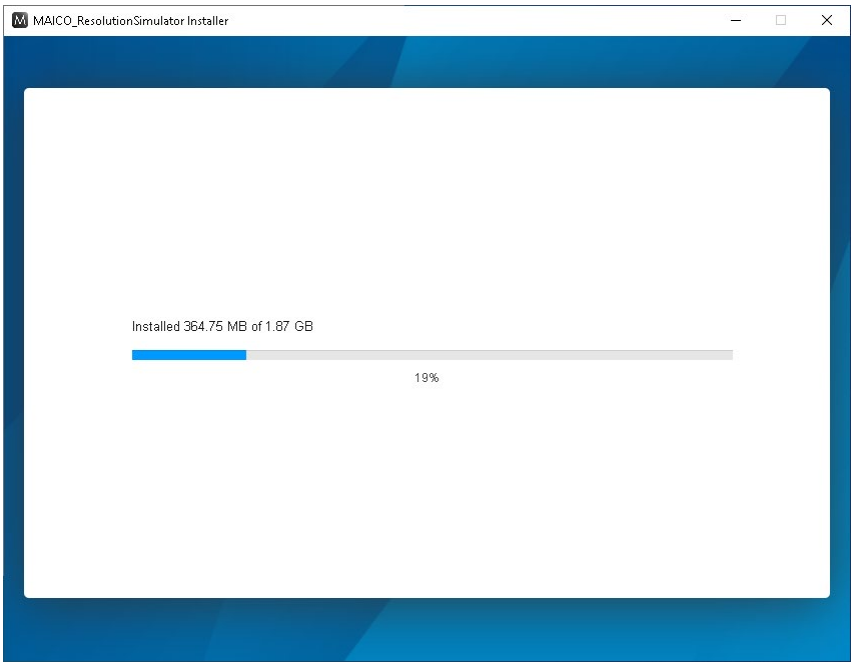
After that, license agreement dialog will open. Choose “Yes” radio button then click “Next” button.



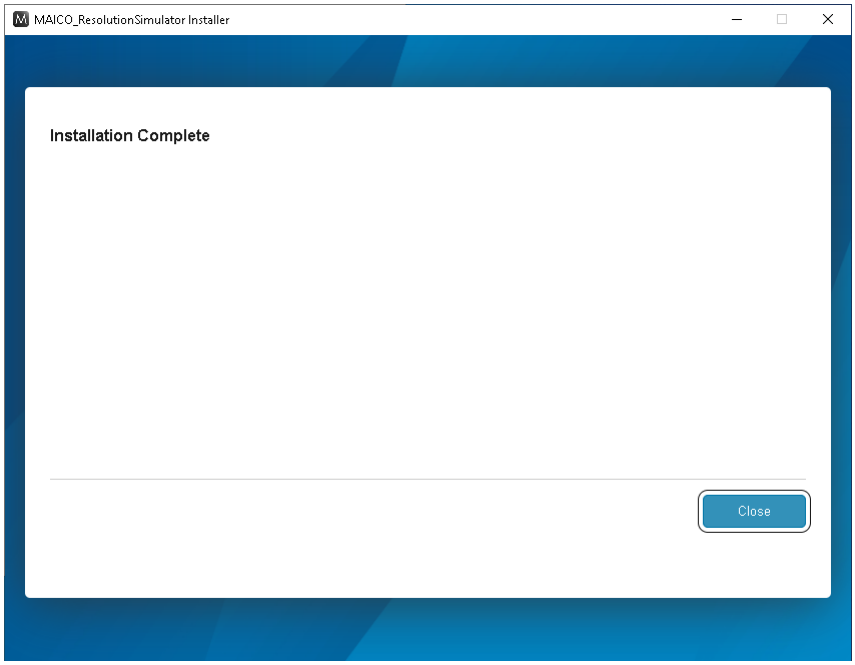
Then, the installer will display installation path for confirmation. Choose “Begin Install” if there is no mistake.



Now, installation process starts. This process takes several minutes to complete.



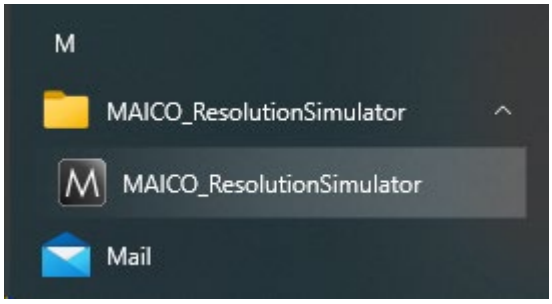
When the window below appears, the installation process is complete.



5. START

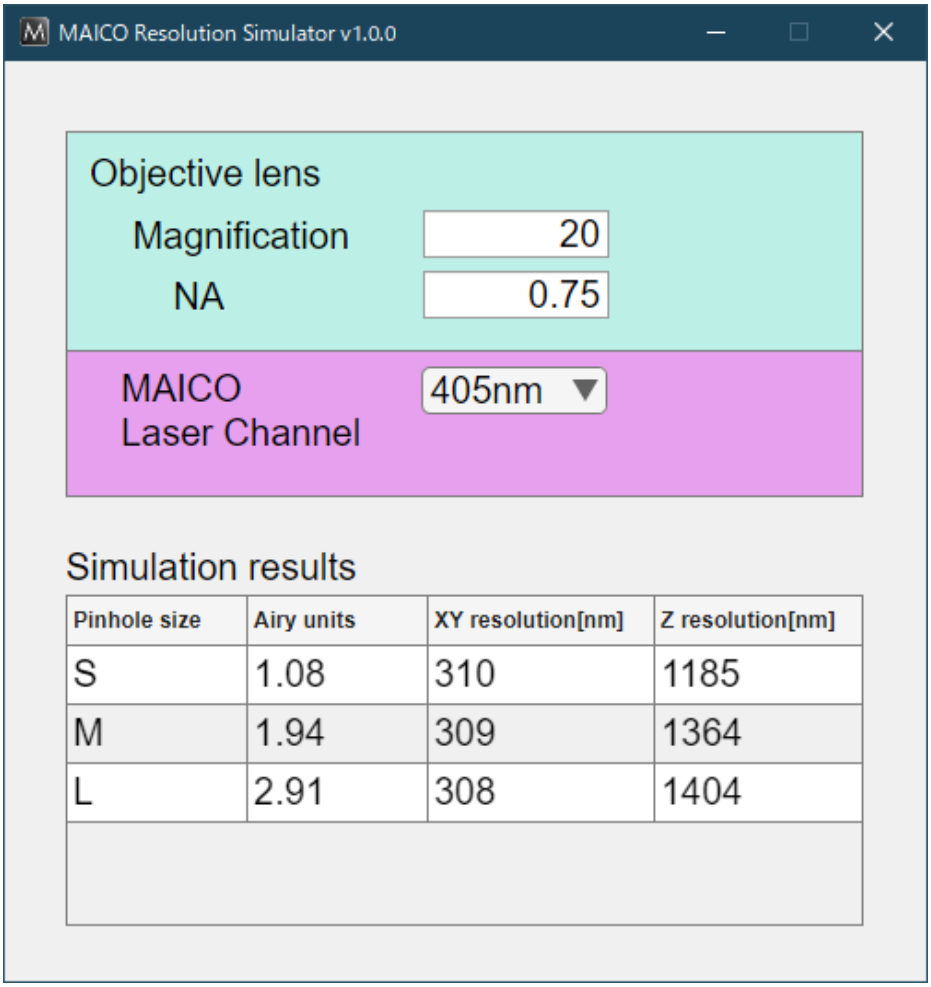
5-1 START

Choose “MAICO_ResolutionSimulator” from start menu.



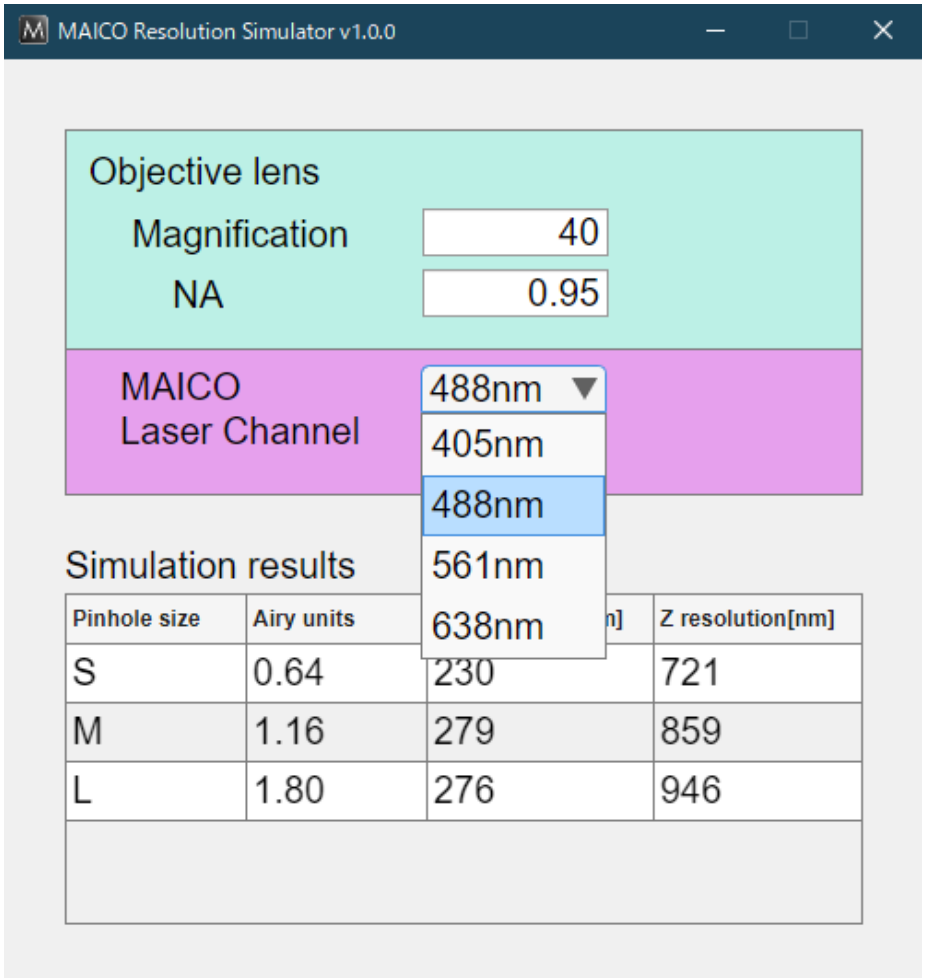
Then, you will see a splash screen below.

If you see a windows blow, now you are ready to use the software.



6. SIMULATION

Now enter the parameters of the objective lens you consider using magnification and NA.
Next, choose MAICO laser channel with pull-down menu. Then the simulator output expected XY resolution[nm] and Z resolution[nm] depending on Pinhole size.



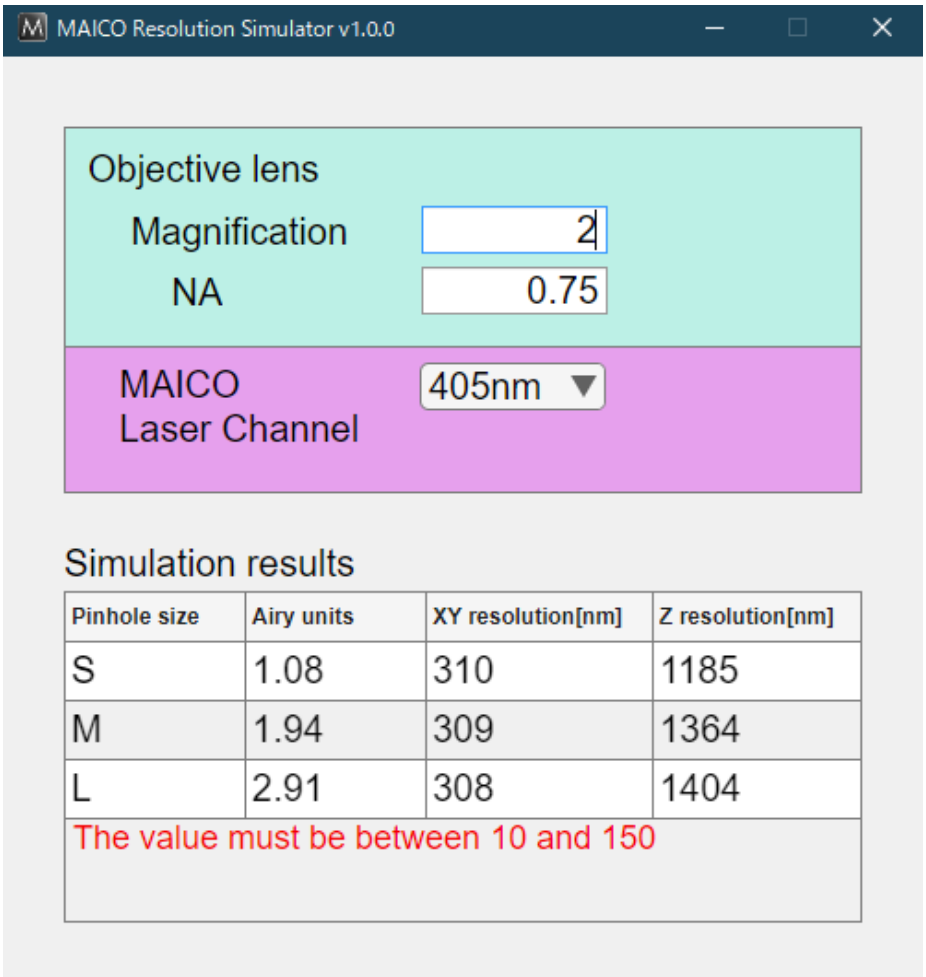
Now you can imagine, how much resolution can be achieved using MAICO in your environment.

7. PARAMETER LIMITATION

(1) For calculation reasons, the parameters that can be entered have operative ranges.

Magnification should be between 10 and 150.
NA should be between 0 and 1.5.

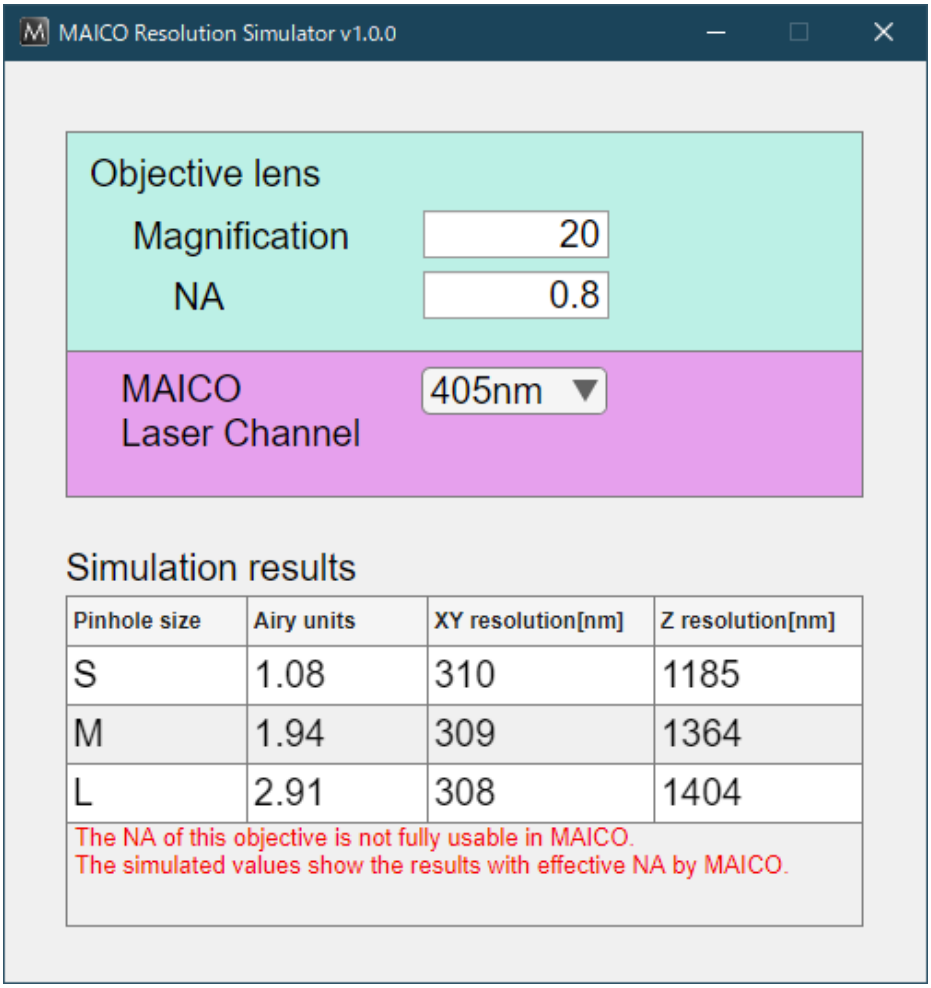
If a value outside the operative range is entered, the number will be automatically corrected to the previous value after a warning message.



(2) Even within the above ranges, the parameters may not be used in the calculation that are exactly as input values.

This is due to MAICO internal optics. The diameter of the optical flux that MAICO can handle is limited. It is expressed by the following formula: NA/magnification<= 0.0375.

If you enter an objective lens parameter that exceeds the limit, the following red text will be displayed.



In this case, the calculation is not carried out with the entered NA value, but with the NA that can be effectively handled by MAICO.
For example, the maximum NA that can be handled by 20x magnification is 0.75 (0.75/20=0.0375). Therefore, even if 0.8 is input, only a resolution value that is the same as 0.75 will be output.

In actual MAICO operation, in such cases it is not possible to achieve an optical diameter that satisfies the objective NA of 0.8, and an optical diameter of up to NA 0.75 is used. The software displays the resolution at that NA 0.75.
However, the field of view is not affected in such cases.

8. SOFTWARE USER AGREEMENT

The user must agree to the following terms and conditions. Be sure to read these terms and conditions before use.

8-1 COPYRIGHTS

All ownership rights, intellectual property rights and all other rights relating to this software and instruction manual are the property of Hamamatsu Photonics K. K. (hereafter called "Hamamatsu"). Except for those items expressly permitted in this user agreement, Hamamatsu does not assign or grant any rights to the user, and Hamamatsu retains all rights relating to this software and instruction manual.

8-2 SCOPE OF USAGE RIGHTS

Hamamatsu grants the user non-exclusive rights to use of this software subject to the following conditions.

(1) User may not analyze, change or modify this software.

8-3 SCOPE OF WARRANTY LIMITED WARRANTY

(1) Hamamatsu accepts absolutely no liability in any case whatsoever, for direct or indirect incidental damages, losses and costs from using this software.

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The legal liability of Hamamatsu including warranty against defects relating to this software and its usage is limited to the contents of this software user agreement. Hamamatsu shall not be liable to provide compensation for any damage or loss resulting from using this software, including direct, indirect or incidental damages or losses to the user. This holds true even if Hamamatsu or its suppliers have been advised of the possibility of such damages or losses.

8-5 GOVERNING LAW

This software user agreement shall be governed by the laws of Japan.

8-6 OTHERS

If a conflict or doubt should arise regarding this software user agreement or items not established within this software user agreement, then that matter shall be resolved by mutual consultation carried out in good faith by both parties. In the event a lawsuit should arise, it shall be resolved by a court of law having jurisdiction in the area where the head office of Hamamatsu Photonics is then located.

9. CONTACT INFORMATION

Manufacturer

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