MREAL Platform 2025.0

Instruction Manual

EN

AT2-3130-B

Contents

Introduction

MREAL is an imaging solution to enable a mixed reality (MR) experience. An MREAL experience that combines real images and 3D CGs is made possible by using, for example, the MREAL Display, a dedicated head mounted display (HMD), and MREAL Platform, a platform software.

About This Instruction Manual

This guide describes operation of the platform software Canon MREAL Platform 2025 (hereinafter, MREAL Platform) for experiencing MREAL.

- The PDF file of this guide can be downloaded from the following website.
  https://cam.start.canon/en/M001/manual/m001.pdf

Conventions in This Instruction Manual

- Instructions in this guide apply to the version of MREAL Platform identified on the cover.
- Square brackets ([]) indicate menu and button names and window titles displayed on the PC monitor.
- Angle brackets (<>) indicate MREAL Display button names.

Icons in This Guide

	Links to pages with related topics
	Warnings and precautions
	Supplemental information
	Tips for optimal use or advice for better shooting
?	Information useful for troubleshooting

Recommended Environment

- CPU: Intel 13th Generation CPU Core i9, 16 cores or more
- Memory: 32 GB or more
- GPU: NVIDIA GeForce RTX 3080 or better / NVIDIA RTX A5000 or better
- OS: Windows 10 22H2 / Windows 11
- Must have a PCI Express slot of Generation 2 (×4) or higher available, or be equipped with a Thunderbolt 3 or higher interface

Note

- Set [**Power management mode**] to [**Prefer Maximum Performance**] in [**Manage 3D Settings**] of NVIDIA Control Panel.

Supported Devices

MREAL X1, MREAL S1, MREAL Display MD-20, and MREAL Display MD-10

Caution

- When using MREAL Display MD-20 or MD-10, see “Precautions for Using MREAL Display MD-20 or MD-10”.

Experiencing MREAL

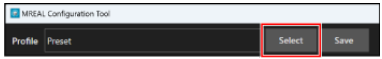
Perform the work required for an MREAL experience with the following procedures.

1. **Connecting the MREAL Display and PC ( )**

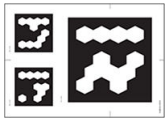
2. **Installing MREAL Platform ( )**

3. **Launching MREAL Configuration Tool ( )**

4. **Loading a Profile ( )**



5. **Placing the Default Marker ( )**



6. **Setting Camera Tracking Using Spatial Features ( )**

7. **Creating a Registered Map ( )**

8. **Displaying 3D CG ( )**

9. **Setting Color Masking ( )**

Connecting the MREAL Display and PC

Connect the MREAL Display to the PC. For how to connect, how to install the MREAL Display driver, and other instructions, refer to the instruction manual of the MREAL Display you will use.

Installing MREAL Platform

Preparation

Check the following settings on the PC to be used, and then install MREAL Platform.

- Configure the PC system settings ([**Date and Time**]).
  - Set [**Time zone**] to [**Pacific Time (US & Canada)**].
  - Set [**Set timeautomatically**] to [**On**].
- Clear the cache of Microsoft Edge.
- Disconnect all devices connected by USB except the keyboard and mouse.
- Enable the internal network interface card (NIC).
- Disable any non-wired/wireless LAN NIC (e.g., IP over 1394).

Installation

Double-click MRP*.**.**.exe copied to the PC, and perform installation according to the displayed guide. Perform the installation with administrator privileges.

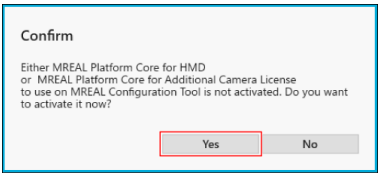
Performing License Activation

License activation is required for each function of MREAL Platform. Use the product key shown in “Product Key Certificate” issued by the distributor for license activation.
License activation is performed from the License Management Tool window. Launch License Management Tool with the following procedure.

When license is not activated

1. **Launch MREAL Configuration Tool.**

2. **Click [Yes].**

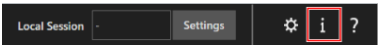


- License Management Tool launches.

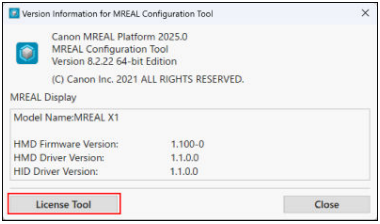
When performing additional license activation

1. **Launch MREAL Configuration Tool.**

2. **Click [i] in the Tool menu.**



3. **Click [License Tool].**



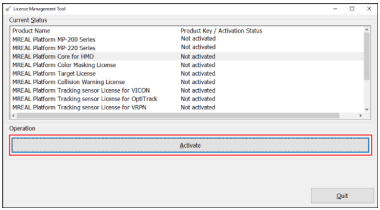
- License Management Tool launches.

The activation method differs for each of “Online Activation of Single License”, “Offline Activation of Single License”, “Online Activation of Multiple Licenses Simultaneously”, and “Offline Activation of Multiple Licenses Simultaneously”.

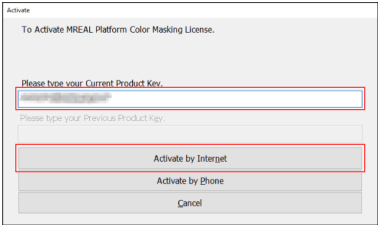
- Online Activation of Single License
- Offline Activation of Single License
- Online Activation of Multiple Licenses Simultaneously
- Offline Activation of Multiple Licenses Simultaneously

Online Activation of Single License

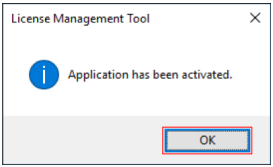
1. **Select the product name for which to activate the license in the Product name list in the License Management Tool window, and click [Activate].**



2. **Enter the product key in the [Product Key] field, and click [Activate by Internet].**



3. **Click [OK].**



Offline Activation of Single License

1. **Select the product name for which to activate the license in the Product name list, and click [Activate].**

2. **Enter the product key in the [Product Key] field, and click [Activate by Phone].**

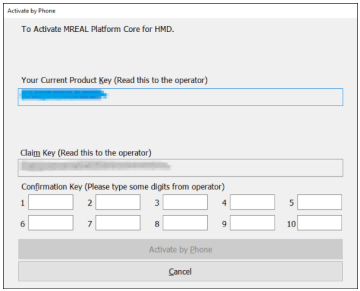
   - Make a note of the claim key displayed in the [**Claim Key**] field.

3. **Obtain a confirmation key.**

   - If you provide the product key and claim key to the activation support staff, a confirmation key will be issued.

4. **Enter the obtained confirmation key, and click [Activate by Phone].**

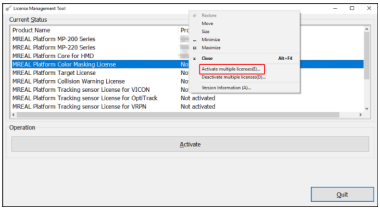
   - If you copy the entire string for the confirmation key and paste it into the first box of the [**Confirmation key**] field in the License Management Tool window, the numbers of the confirmation key are automatically assigned to the necessary boxes.



5. **Click [OK].**

Online Activation of Multiple Licenses Simultaneously

1. **Right-click the title bar of the License Management Tool window, and select [Activate multiple licenses].**



2. **Select [Activate multiple licenses by Internet].**

3. **Enter the product key in the [Product Key] field, and click [Activate].**

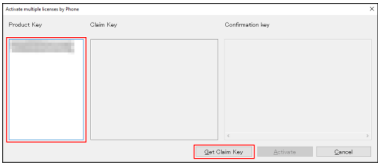
4. **When the confirmation window for activating multiple licenses appears, click [OK].**

Offline Activation of Multiple Licenses Simultaneously

1. **Right-click the title bar of the License Management Tool window, and select [Activate multiple licenses].**

2. **Select [Activate multiple licenses by Phone].**

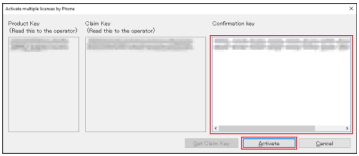
3. **Enter the product key in the [Product Key] field, and click [Get Claim key].**



- Make a note of the claim key displayed in the [**Claim Key**] field.

4. **Obtain a confirmation key.**

- If you provide the product key and claim key to the activation support staff, a confirmation key will be issued.
- Enter the obtained confirmation key in the [**Confirmation key**] field, and click [**Activate**].



5. **When the Activate multiple licenses window appears, click [OK].**

Launching MREAL Configuration Tool

- MREAL Configuration Tool Window
- Preview Tool Window

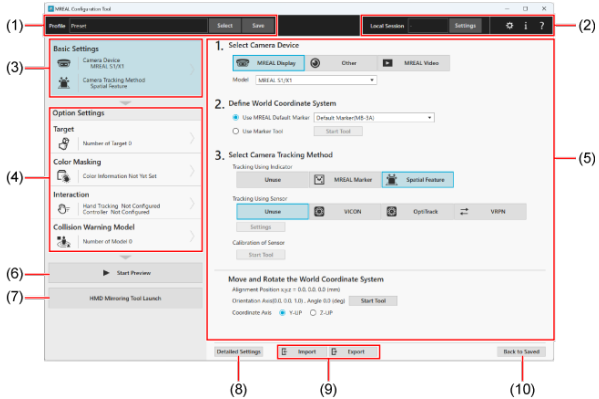
- Double-click the MREAL Platform icon on the desktop.

- The MRP Configuration Tool window and Preview Tool window appear.

MREAL Configuration Tool Window

- Overview
- Basic Settings / Selecting the Camera Device
- Basic Settings / Defining the World Coordinate System
- Basic Settings / Selecting the Camera Tracking Method
- Option Settings / Target Settings Window
- Option Settings / Color Masking Settings Window
- Option Settings / Interaction Settings Window
- Option Settings / Collision Warning Model Settings Window
- Tool Menu

Overview



(1) Profile management
- [**Profile**] displays the name of the applied profile.
- Load the profile to be used with [**Select**]. Save the settings as a profile with [**Save**]. For details, see “Saving and Editing Profiles”.

(2) Tool menu
- See “Tool Menu”.

(3) Basic settings
- See “Basic Settings / Selecting the Camera Device”, “Basic Settings / Defining the World Coordinate System”, and “Basic Settings / Selecting the Camera Tracking Method.

(4) Option settings selection area

(5) Setting input area

(6) Display the Preview Tool window.
- For details, see “Preview Tool Window”.

(7) Display the MREAL Display screen on an external monitor.
- For details, see “Displaying Images on External Monitors”.

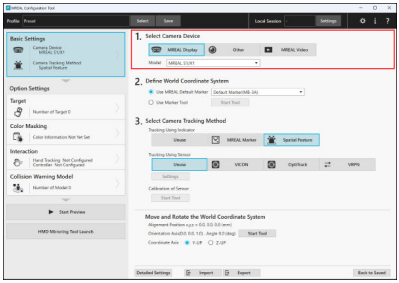
(8) Configure the detailed settings of the item selected in the setting input area.

(9) Import and export the information according to the setting items.

(10) Return the information of the selected profile to the status before editing.

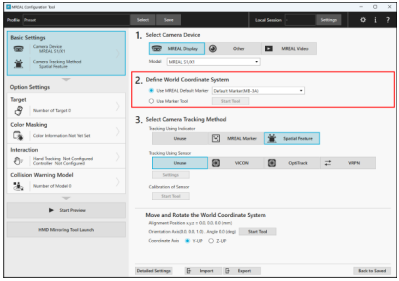
Basic Settings / Selecting the Camera Device

Select the MREAL Display to be used in the MREAL experience. The driver of the MREAL Display to be used must be installed in advance. For the setting method, see “Starting Camera Tracking”.



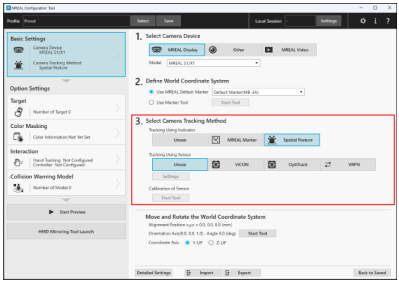
Basic Settings / Defining the World Coordinate System

Define the world coordinate system that will serve as the origin of the MREAL space. For details, see “Starting Camera Tracking”.



Basic Settings / Selecting the Camera Tracking Method

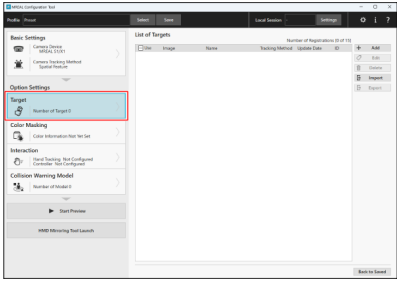
Select the method to track the movement of the MREAL user in the MREAL space (camera tracking method).



- When tracking using features, such as objects or structures, in the MREAL space, select [**Spatial Feature**] ( ).
- When tracking using MREAL markers, select [**MREAL Marker**] ( ).
- When tracking using an external sensor, select [**Tracking Using Sensor**] ( ).

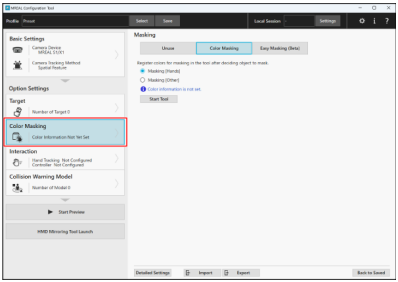
Option Settings / Target Settings Window

Configure the settings of the target (tool, mock-up, etc.) to be used in the MREAL experience. For details, see “Using a Target”.



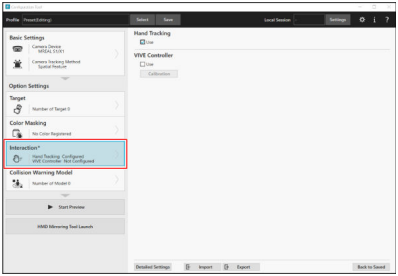
Option Settings / Color Masking Settings Window

“Color masking” is image processing to ensure the positional relationships appear correct for elements such as hands and background displayed in the MREAL space. For details, see “Setting Color Masking”.



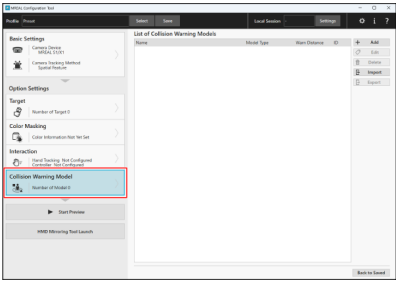
Option Settings / Interaction Settings Window

Configure the settings when using hand tracking ( ) and VIVE controller ( ).



Option Settings / Collision Warning Model Settings Window

Set the display of a warning on an obstacle such as a wall or desk in the MREAL space to prevent an MREAL user colliding with it. For details, see “Setting a Collision Warning Model”.

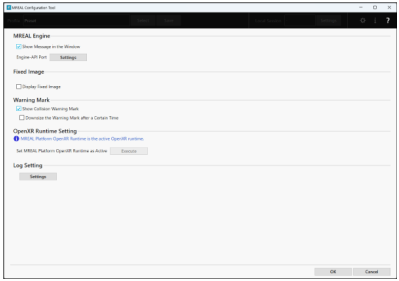


Tool Menu

- [**Settings**]
- [⚙]
- [i]
- [?]

[Settings]
Click this when starting a local session. For details, see “Experiencing MREAL with Multiple Users (Local Session)”.

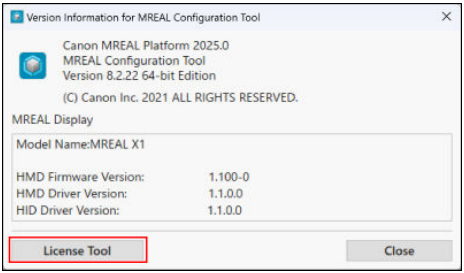
⚙
When you click this, the following window appears.



- Placing a check mark in [**Show Message in the Window**] enables various messages to be displayed at the top right of the MREAL images.
- Clicking [**Settings**] in [**Engine-API Port**] displays a window for setting the port number for MREAL system communication.
- Placing a check mark in [**Display Fixed Image**] displays a fixed image at the top right of the MREAL images.
- Placing a check mark in [**Show Collision Warning Mark**] enables the display of warning marks in the MREAL images. For details, see “Setting a Collision Warning Model” or “Experiencing MREAL with Multiple Users (Local Session)”. Placing a check mark in [**Downsize the Warning Mark after a Certain Time**] downsizes the displayed warning marks after a certain time.

- Clicking [**Execute**] in [**OpenXR Runtime Setting**] activates MREAL Platform OpenXR Runtime.
- Clicking [**Settings**] of [**Log Setting**] displays a window for exporting logs related to MREAL Platform and OpenXR.

[i]
If you click this, the version and other information of MREAL Configuration Tool is displayed. Clicking [**License Tool**] launches the License Management Tool required for the license activation work ( ).



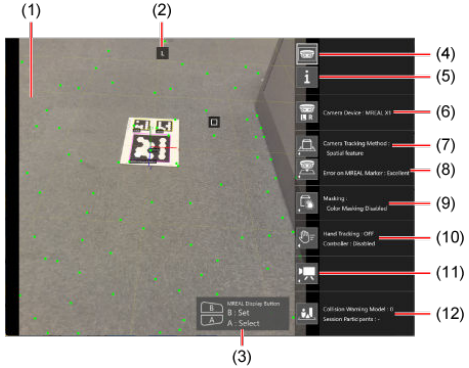
[?]
If you click this, the instruction manual of MREAL Platform is displayed.

Preview Tool Window

- Window Configuration
-  Displaying in Full Screen Mode
-  Displaying Detailed Information
-  Selecting Camera Image
-  Displaying Tracking Check CG Sub-Menu
-  Displaying Tracking Sub-Menu
-  Displaying Masking Sub-Menu
-  Displaying Interaction Sub-Menu
-  Displaying Video Sub-Menu
-  Switching Virtual Space Mode
- MREAL Display Button Operation
- Messages

The Preview Tool window is displayed together with the MREAL Configuration Tool window when MREAL platform is launched.
If the Preview Tool window is closed, click [**Start Preview**] in the MREAL Configuration Tool window to redisplay it.

Window Configuration



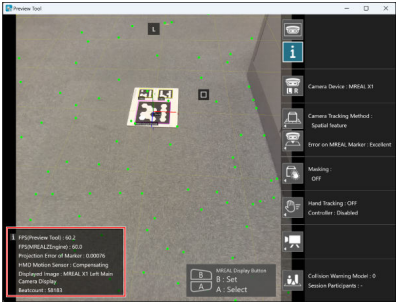
(1)	Main Window
(2)	Camera Image (L/R)
(3)	MREAL Display Button Operation
(4)	Displaying in Full Screen Mode
(5)	Displaying Detailed Information
(6)	Selecting Camera Image
(7)	Displaying Tracking Check CG Sub-menu
(8)	Displaying Tracking Sub-Menu
(9)	Displaying Masking Sub-Menu
(10)	Displaying Interaction Sub-Menu
(11)	Displaying Video Sub-Menu
(12)	Switching Virtual Space Mode

[ ] Displaying in Full Screen Mode

This displays the Preview Tool window in full screen mode. Press the [**Esc**] button to return to the original view.

[ ] Displaying Detailed Information

This displays detailed information in the main window.



[ ] Selecting Camera Image

This switches the camera image (main camera (right/left) and registration camera).

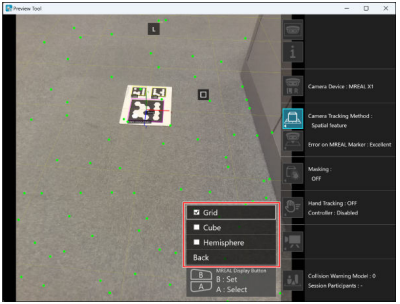
Camera Device Connection Status

When any of the following messages appears in the part indicated by the red frame, perform the procedure of “Measure”.

Message	Measure
Connection Error Not Connected	Check the connection status of the PC and camera device. Check that the model of the MREAL Display being used and the model name of [**Camera Device**] match. After checking the above, redisplay the Preview Tool window.

[ ] Displaying Tracking Check CG Sub-Menu

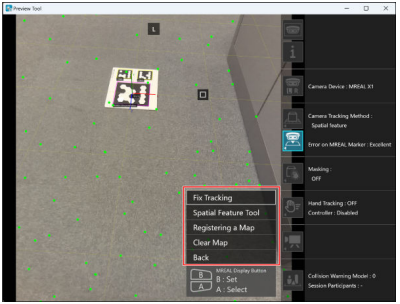
This allows you to check the status of camera tracking with a displayed 3D CG.



Sub-Menu	Function
Grid	Display a grid on the floor where the Default Marker is placed. This allows you to check the alignment between the actual floor and the floor in the MREAL space.
Cube	Display a 3D CG of a cube in the MREAL space. This allows you to check the MREAL space three-dimensionally.
Hemisphere	Display a 3D CG of a hemisphere centered on the world coordinate system. This allows you to check the status of content displayed with the world coordinate system at the center.

[ ] Displaying Tracking Sub-Menu

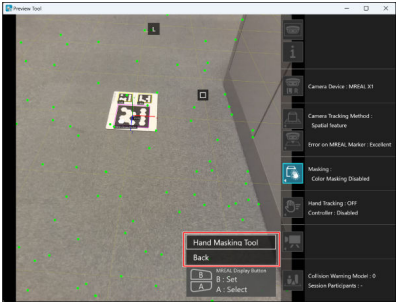
This allows you to configure settings related to camera tracking.



Sub-Menu	Function
Fix Tracking / Normal Tracking	This function is for the bird's eye view camera. It performs camera tracking by bird's eye view camera and cancels tracking by bird's eye view camera.
Spatial Feature Tool Register map Clear map	This is displayed when using spatial features for the camera tracking method. If you select [**Spatial Feature Tool**], the Spatial Feature Tool window appears. For details on [**Register map**] and [**Clear map**], see “Setting Camera Tracking Using Spatial Features”.

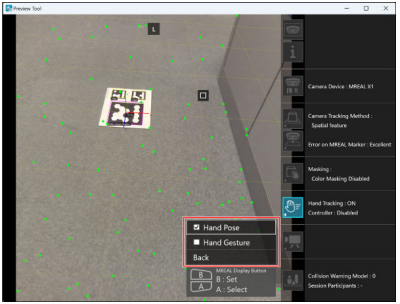
[ ] Displaying Masking Sub-Menu

This displays the Hand Masking Tool window to perform hand masking. For details on hand masking, see “Setting Color Masking”.



[ ] Displaying Interaction Sub-Menu

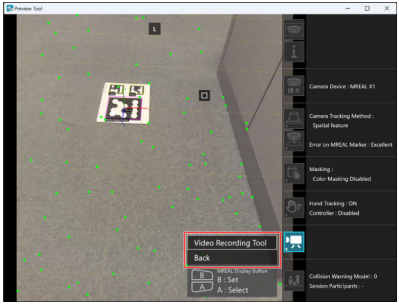
This allows you to configure settings related to hand interaction.



Sub-Menu	Function
Hand Pose	The recognition status of hand tracking can be checked using lines simulating a skeletal structure.
Hand Gesture	This allows you to check the status of hand interactions, such as gripping and pinching.

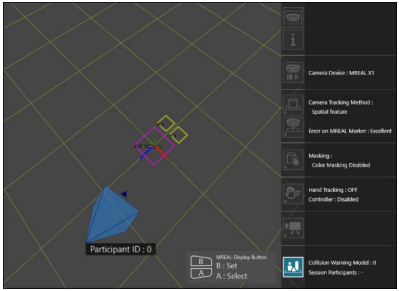
Displaying Video Sub-Menu

This displays the Video Recording Tool window. For details, see “Recording and Playing MREAL Video”.



[ ] Switching Virtual Space Mode

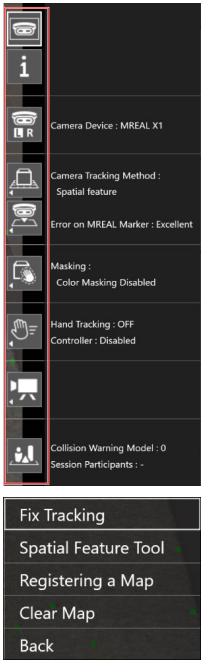
This switches the main window display to the virtual space mode.



- In the virtual space mode, the following elements are displayed.
  - Position where the world coordinate system is set
  - Position where the target coordinate system is set
  - Position where the collision warning model is set
  - Position and orientation of the MREAL user
  - Floor defined by the world coordinate system (shown as a grid)
- Viewpoint movement can be performed by mouse operation.

MREAL Display Button Operation

The select and set operations of each menu in the Preview Tool window and the select and set operations of the sub-menus displayed when a menu button is selected can be performed also with buttons <A> and <B> on the MREAL Display. Press button <A> to select an item, and button <B> to set it.



Note

- The button and sub-menu operations can also be performed with a mouse.

Messages

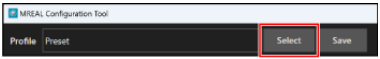
When any of the following messages appears, perform the procedure of “Measure”.

Message	Measure
Restart this tool	Close the Preview Tool window. Click [**Start Preview**] in the MREAL Configuration Tool window.
Set “Display Scale” of full-screen display to 100%.	Right-click on the desktop, and select [**Display settings**]. Select [**100%**] from [**Change the size of text, apps, and other items**] of [**Scale and layout**].
Map registration failed	Register the map again. For details on map registration, see “Creating a Registered Map”.
Check the user's manual, and connect correctly.	Check the instruction manual of the MREAL Display, and then check the connection status of the MREAL Display and PC.

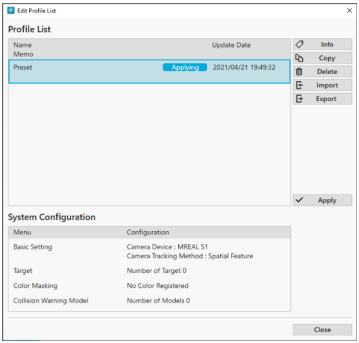
Loading a Profile

A “profile” is a configuration file that contains a collection of settings for an MREAL experience. The preset settings are used at initial startup. Loading of a profile is not necessary. The preset settings are as follows.
When using a saved profile, load the profile with the following procedure.

1. **Click [Select] in the Tool menu.**



- The Edit Profile List window appears.



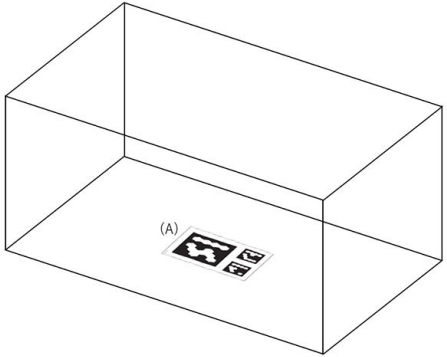
2. **Select the profile to be used, and click [Apply].**

Note

- When a profile is not be loaded, the profile at the launch of MREAL Configuration Tool is applied.

Placing the Default Marker

Place a separately sold Default Marker (A) on, for example, a level floor surface in the space (MREAL space) for the MREAL experience. The Default Marker will serve as the origin of the world coordinate system for defining the MREAL space.



Caution

- If the surface to place the Default Marker is tilted, accurate setting of the world coordinate system will not be possible.

Note

- The Default Marker can also be printed. For details, see “Printing the Default Marker”.

Setting Camera Tracking Using Spatial Features

Overview of Camera Tracking Using Spatial Features

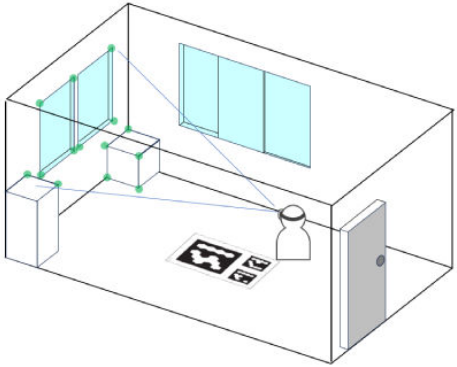
Starting Camera Tracking

The following describes the settings for camera tracking using spatial features.
Spatial features can be used with the following MREAL Displays.

- MREAL S1, MREAL X1, and MREAL Display MD-20

Overview of Camera Tracking Using Spatial Features

Extract the feature points (features that serve as recognition marks, such as boundaries and corners) of a structure (such as a joist, pillar, or window) and placed objects (such as a desk or cabinet) from an image captured with the MREAL Display and use them as indicators for tracking the movement of the MREAL user. This allows you to experience MREAL without using special equipment.



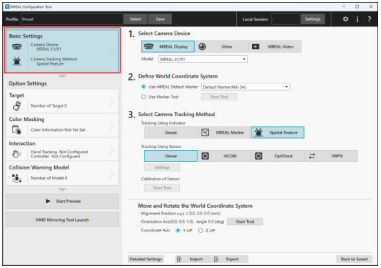
Environments Suitable for Spatial Features

We recommend using spatial features in environments such as the following.

- Where there is a pattern on a wall or the floor
- Where an object is fixed or stationary within the space
- Where a structure in the space has few curved or long straight line parts, and has intersecting and angled parts.

Starting Camera Tracking

1. **Select [Basic Settings] in the MREAL Configuration Tool window.**



2. **Select [MREAL Display] in [1. Select Camera Device].**

   - Select the model name of the MREAL Display from the [**Model**] list, and turn on the power of the MREAL Display.

3. **Select the placed Default Marker from the [Use MREAL Default Marker] list of [2. Define World Coordinate System].**

4. **Select [Spatial Feature] in [3. Select Camera Tracking Method].**

5. **Click [ ] in the Preview Tool window.**

6. **Look at the Default Marker with the MREAL Display.**

   - Camera tracking starts.

Caution

- If the driver of the MREAL Display is not installed, the model name is not displayed in the [**Model**] list.

Displaying 3D CG

You can launch an MREAL linked application and add the display of 3D CG in the MREAL images. For details, refer to the instruction manual of the MREAL linked application.

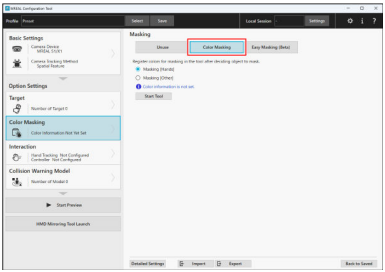
Setting Color Masking

- Masking [Hands]
- Masking [Other]
- Easy Masking

Register a specific color area so that the front-back positional relationship of the real image and 3DCG is shown correctly. Configure the masking settings with the following procedure.

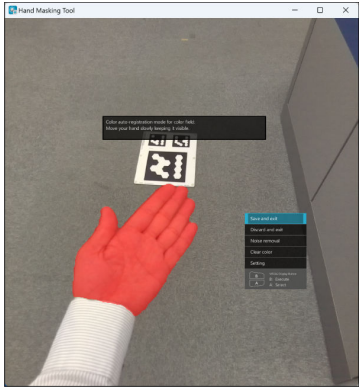
1. **Select [Color Masking] in [Option Settings] of the MREAL Configuration Tool window.**

   - Select [**Color Masking**] in the item detailed settings area on the right side.

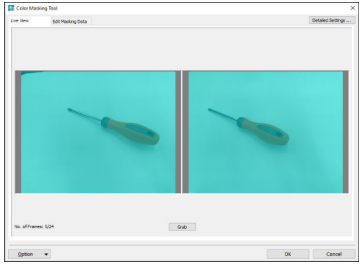


2. Select the item to mask, and click [Start Tool].

- Select [**Masking [Hands]**] when masking a hand, and [**Masking [Other]**] when masking another object.
- With [**Masking [Hands]**], the following Hand Masking Tool window appears.



- With [**Masking [Other]**], the following Color Masking Tool window appears.



Note

- The following setting procedure assumes that MREAL X1/S1 is being worn.

Masking [Hands]

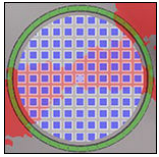
With [**Masking [Hands]**], the color of the hand is distinguished automatically and then masking is performed.

1. **Move a hand within the Hand Masking Tool window.**

   - Move the hand slowly until red color (masking area) completely covers the area of the hand.
   - Show both the palm and back of the hand in the image, ensuring both are covered by the red color.

2. Remove the noise.

- If an area other than the hand is masked, perform the noise removal operation.
- Select [**Noise removal**] from the menu.
- The following registration frame is displayed within the window.



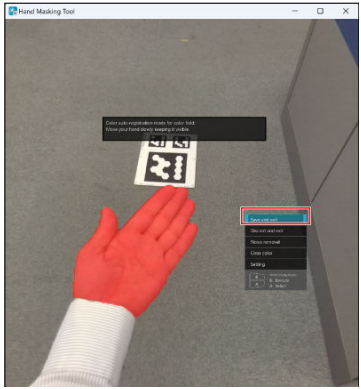
- Place the registration frame over the part where you want to erase the masking, and press button <B>.
- Repeat the above work until the area of the hand is covered by red color.

Note

- The Hand Masking Tool menu can be operated with the PC keyboard and mouse in addition to buttons <A> and <B> on the MREAL Display.

3. Save the masking information.

- Press button <A> on the MREAL Display to select [**Save and exit**], and then press button <B>.



- With the PC, perform the following operation.
  - When in the MREAL Display display mode, press the [**F11**] key to switch to the window mode.
  - Select [**Save and exit**] with the arrow keys, and press the [**Enter**] key.
  - Click [**Save and exit**].
  - Press the [**Alt**] and [**F4**] keys at the same time or click [**×**] on the window.
  - Select [**Yes**] in the displayed window.

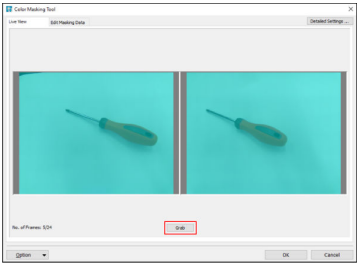
Masking [Other]

With [**Masking [Other]**], register a target you want to mask for each color.

1. **Select the [Live View] tab in the Color Masking Tool window.**

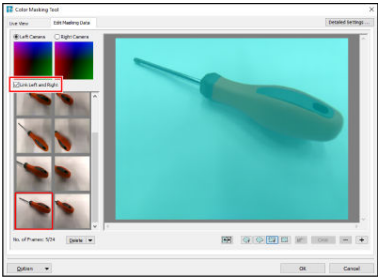
2. **Capture the target you want to mask.**

   - Display the target you want to mask while viewing the MREAL Display.
   - Click [**Grab**] to capture an image.



   - Change the position and angle from which you view the target, and capture multiple images (up to 24).

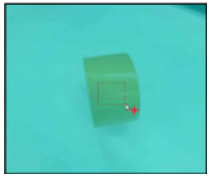
3. **Select the [Edit Masking Data] tab.**



4. Register the color to mask.

- If you select the image for which to perform masking from the thumbnail images on the left side, it is displayed in the area on the right side. If there is an unnecessary image, select the thumbnail image and click [**Delete**].
- Use the tools in the Color Masking Tool window to register the colors while switching the captured images.

- Select tool a or c, and select the range of the color to be the target.



- If a part other than the masking target is selected, select tool b or d and select the range of the color to exclude.
- The masking status can be confirmed on the [**Live View**] tab or in the Preview window or other window.
- Use the other tools depending on the masking operation conditions.
  e: Undoes the last operation.
  f: Deletes the registered masking target color.
  g/h: Reduces/enlarges the image.

5. Save the masking information.

- Click [**OK**] in the Color Masking Tool window.
- If you click [**Cancel**], Color Masking Tool ends without reflecting the settings in the profile.

Note

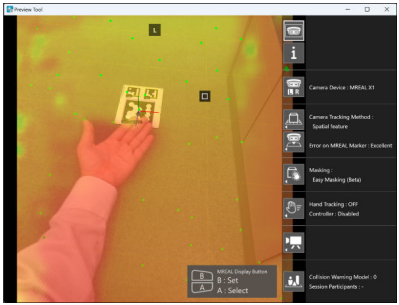
- The following operation is recommended when you want to mask a target such as a person that contains various colors.

1. Place the target you want to mask in front of a solid color background, and capture an image.
2. Click [ ].
3. Check that the entire target is masked, and click [**OK**].

- If you want to reduce the noise, click [**Detailed Settings**] at the top right of the Color Making Tool window and configure the noise reduction settings in the displayed window.

Easy Masking

If you select [**Easy Masking**] in the MREAL Configuration Tool window, you can perform easy masking.



Caution

- With the MREAL Display MD-10, there will be areas where masking cannot be applied at the edges of the screen.

Note

- We recommend checking the masking function using an application such as MREAL Visualizer.
- This function is a trial version, so the display in the depth direction is only an approximation.

Various MREAL Experiences

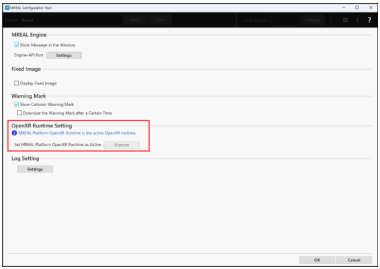
- Experiencing MREAL Using an OpenXR Compatible Application
- Using a Target
- Interaction
- Experiencing MREAL with Multiple Users (Local Session)
- Sharing MREAL Images in Microsoft Teams

Experiencing MREAL Using an OpenXR Compatible Application

MREAL Platform allows you to experience MREAL using an OpenXR compatible application.
MREAL Platform includes an OpenXR compatible sample program (OpenXR Native Sample). Configuring the following settings enables experiencing MREAL with the 3D CG of the sample program displayed.

1. **Click [⚙] in the Tool menu (⚙).**

2. **Click [Execute] of [OpenXR Runtime Setting].**



3. **Select [Basic Settings] in the MREAL Configuration Tool window, and click [Detailed Settings].**

4. **Configure the following settings on the [Display] tab.**

- When the delays in the movement of the 3D CG of the sample program are noticeable relative to the background image, place a check mark in [**Reduces Application Delays**].
- If the relationship between the background image and 3D CG transparency is unnatural, place a check mark in [**Invert Transparency**].
- To use external monitors in the MREAL space, place a check mark in [**Display**]. This prevents erroneous detection when markers are displayed on external monitors.
- When setting is finished, click [**OK**].

Using a Target

Register the target to be used in the MREAL space to the system with the following procedure.
When using a target using a sensor, see “Registering the Target Using a Sensor”.

Registering the Target

Preparation

- Print multiple markers. For details on printing, see “Printing Markers”.
- Affix the printed markers to the target for superimposing a CG image. When doing so, determine which marker is to serve as the origin of the target (origin marker).

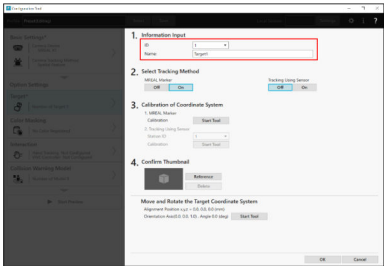
Registering the Target

1. **Select [Target] in [Option Settings] of the MREAL Configuration Tool window.**

2. **Select [Add] in [List of Targets].**

3. **Enter the target information.**

   - Select the ID number and enter the name of the target to be registered in [**1. Information Input**] of the screen below.



Registering the Origin Marker

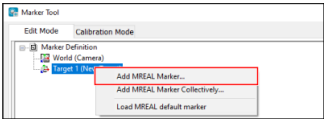
Register the origin marker affixed to the target.

1. **Select [On] in [MREAL Marker] of [2. Select Tracking Method].**

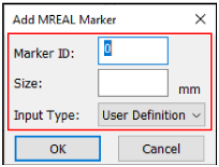
2. **Click [Start Tool] in [3. Calibration of Coordinate System].**

   - The Marker tool window appears.

3. **Right-click the registered target name on the [Edit Mode] tab, and select [Add MREAL Marker]**



4. **Enter the information for the origin marker in the Add MREAL Marker window.**



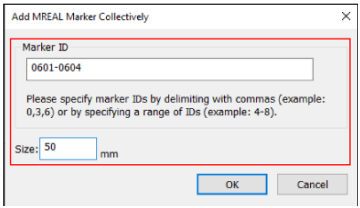
   - Select [**Origin Marker**] in [**Input Type**].
   - Enter the number on the printed origin marker in [**Marker ID**].
   - Enter the size (side length) of the printed origin marker in [**Size**].
   - When input is finished, click [**OK**].

Registering the Other Markers

When the size of the origin marker is the same as that of the other markers, register the other markers with the following procedure.

1. **Select the registered target name, then right-click and select [Add MREAL Marker Collectively].**

   - Enter the marker ID and size for the other markers.



   - When input is finished, click [**OK**].

2. **Click [Apply] in the Marker Tool window.**

Note

- When the size of the origin marker differs from that of the other markers, the registration work of the other markers is not necessary.

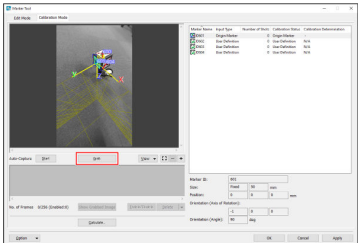
Calibrating the Registered Markers

Perform calibration so that the markers affixed to the target are tracked.

1. **Select the [Calibration Mode] tab in the Marker Tool window.**

2. **Capture the marker with the MREAL Display.**

   - Align the target within the screen, and click [**Grab**] to capture an image. With the MREAL X1/S1, you can capture an image by pressing button <B>.

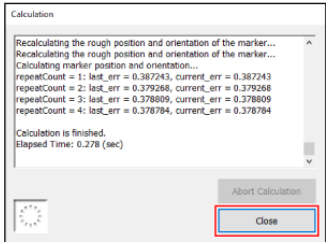


   - Changing the angle of the target, capture images of all markers affixed to the target.

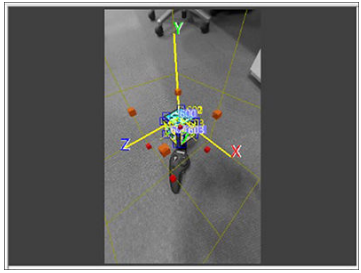
   - Check that [**Good**] or [**Excellent**] is displayed in the [**Calibration Determination**] column. If [**Good**] or [**Excellent**] is not displayed, repeat capturing.

   - When capturing is finished, click [**Calculate**].

3. **When the following window appears, click [Close].**



- The coordinate system of the target is defined, and the tracking of the target becomes possible.



4. **Click [Apply] then [OK] in the Marker Tool window.**

5. **Click [OK] in the MREAL Configuration Tool window.**

Interaction

You can use the functions of [**Interaction**] to perform operations such as manipulating 3D CG.

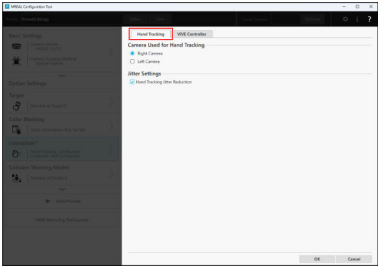
Hand Tracking

When using an OpenXR compatible application that supports hand interaction functions, you can manipulate a 3D CG as if it is being touched with a hand by tracking hand movements within the MREAL space (hand tracking).

1. **Select [Interaction] in [Option Settings] of the MREAL Configuration Tool window.**

2. **Place a check mark in [Use] of [Hand Tracking], and click [Detailed Settings].**

3. **Configure the settings on the [Hand Tracking] tab.**



- [**Camera Used for Hand Tracking**] allows you to select the camera (right camera / left camera) to use for hand tracking. To improve the detection accuracy, we recommend matching the camera (right camera / left camera) to the hand to be tracked (right hand / left hand).
- Placing a check mark in [**Hand Tracking Jitter Reduction**] of [**Jitter Settings**] allows you to reduce variations (jitter) of the 3D CG by detecting subtle hand movements.
- When setting is finished, click [**OK**].

Note

- For details on the hand interaction API of OpenXR, refer to the OpenXR website.

VIVE Controller

An object in the MREAL space can be manipulated by using a separately sold VIVE controller.

Preparation

Perform the following work.

- Install a base station in the MREAL space.
- Attach the VIVE tracker to the MREAL Display.
- Turn on the power of the VIVE controller and VIVE tracker, and check that they are connected with SteamVR.

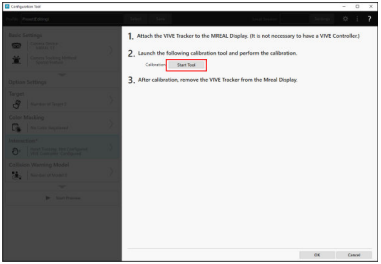
Executing Calibration

When using the VIVE controller for the first time, execute calibration of the VIVE controller with the following procedure.

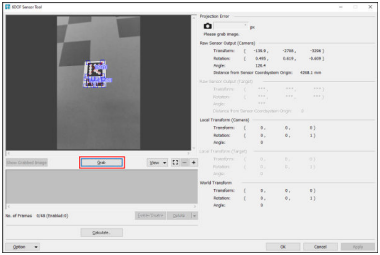
1. **Select [Interaction] in the MREAL Configuration Tool window.**

2. **Place a check mark in [Use] of [VIVE Controller], and click [Calibration].**

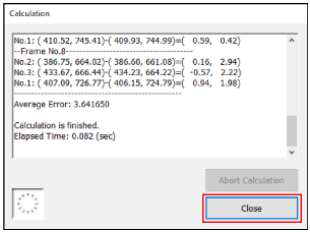
3. **Click [Start Tool] in the following window.**



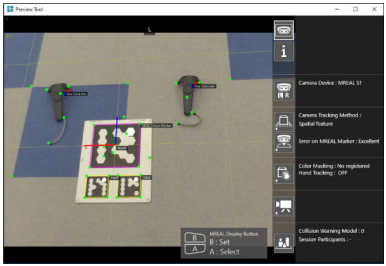
4. **Align the Default Marker within the MREAL Display, and click [Grab] to capture an image.**



- Capture at least three images of the Default Marker while changing the direction.
- When capturing images is completed, click [**Calculate**].
- When the following window appears, click [**Close**].



- If the world coordinate system is displayed on the VIVE controller in the Preview Tool window and you can confirm tracking of the movement of the VIVE controller, the VIVE controller is ready to be operated.

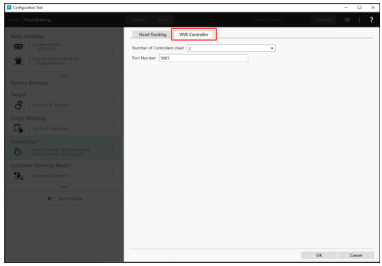


5. **Remove the VIVE tracker from the MREAL Display and turn the power of the VIVE tracker off.**

Detailed Settings

1. **Click [Detailed Settings] in the MREAL Configuration Tool window.**

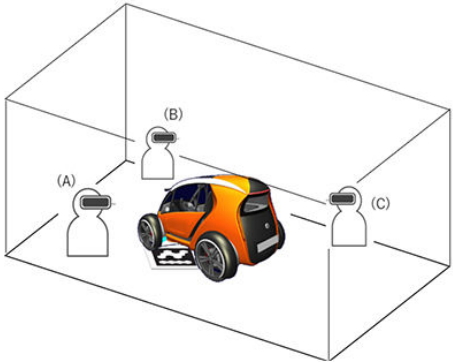
2. **Select the [VIVE Controller] tab.**



- [**Number of Controllers Used**] allows you to increase or decrease the number of VIVE controllers to be used.
- When the VIVE controller cannot be used with the initially set port number, enter a different port number in [**Port Number**]. For details, check with the administrator of the PC that has this application installed or the distributor of the VIVE controller.

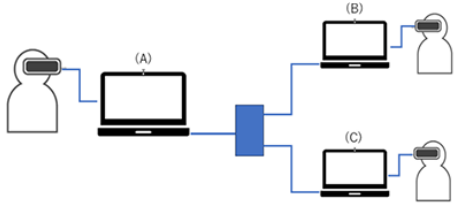
Experiencing MREAL with Multiple Users (Local Session)

A local session is an MREAL experience in which multiple users experience MREAL in the same MREAL space.
The members of the local session consist of the MREAL user who organizes the MREAL experience (organizer: A) and the other MREAL users (participants: B and C). Separate settings are required for the organizer and the participants.



Preparation

Connect the PCs of the participants (B and C) to the PC of the organizer (A).



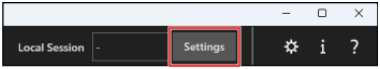
The organizer sets the items for sharing within the MREAL space.
The organizer's settings for [**Target**], [**Interpersonal Collision Warning Distance**], and [**Collision Warning Model**] are also applied to the participants.

Caution

- When using a camera device for which spatial features cannot be set when [**Spatial Feature**] is set for camera tracking, do not place a check mark in [**Camera Tracking Method**].

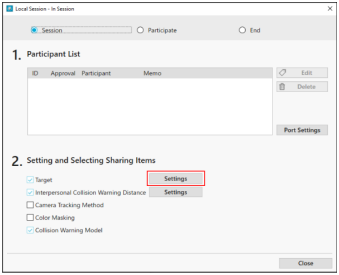
Sharing Item Setting Procedure

1. **Click [Settings] in the Tool menu.**

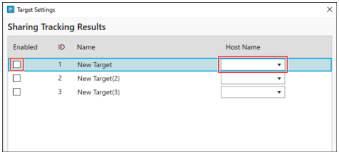


2. **Register the target.**

- Register the target to use in the MREAL space.
  - Click [**Settings**] of [**Target**].



  - Place a check mark in [**Enable**] of the ID of the target to be shared, and select [**Auto**] from the [**Host Name**] list.



3. **Set sharing of the camera tracking method and color masking.**

- Place check marks in the setting items to share with the participants.

4. Set the display of the interpersonal collision warning.

- Set the distance at which to display the warning so that MREAL users do not collide with each other.
  - Click [**Settings**] of [**Interpersonal Collision Warning Distance**].
  - Enter the distance in the displayed window, and click [**OK**].
  - Close the Local Session window.
  - Click [] in the Tool menu.
  - Place a check mark in [**Show Collision Warning Mark**].

Note

- The organizer's setting for [**Collision Warning Model**] is applied automatically.

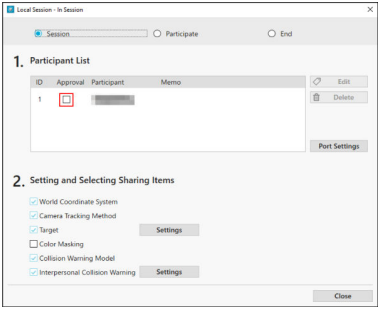
Starting a Local Session

Organizer

1. **Click [Settings] in the Tool menu.**

2. **Select [Session] in the Local Session window.**

3. **Place a check mark in [Approval] of the Participant list.**

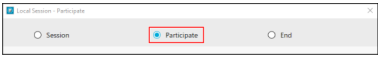


- [**Connected**] is displayed in the Local Session window of the participants, and the local session starts.

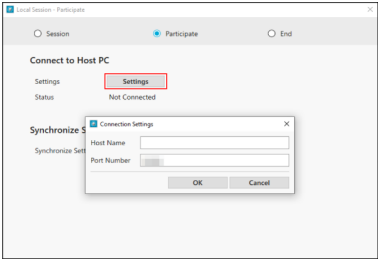
Participants

1. **Click [Settings] in the Tool menu.**

2. **Select [Participate] in the Local Session window.**



3. **Click [Settings].**



4. **Enter the host name (or IP address) and port number of the organizer's PC in the displayed window, and click [OK].**

5. **Click [Execute] of [Synchronize Settings].**

Ending a Local Session

Click [**End**] in the Local Session window.

Sharing MREAL Images in Microsoft Teams

Microsoft Teams can be used to share images during an MREAL experience in real time.

1. **Start the MREAL experience and launch the OpenXR compatible application.**

   - Check that the display from the OpenXR compatible application is added to the MREAL images in the MREAL Display.

2. **Start a call in Microsoft Teams.**

3. Select the camera name of the images to share from the [Camera] menu in Microsoft Teams.

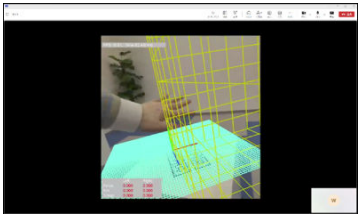
- Select the camera in reference to the following.

Camera Name	MREAL Images
MREAL Virtual Camera Right	Images of camera for right eye
MREAL Virtual Camera Left Right	Images of camera for left and right eyes
MREAL Virtual Camera Left	Images of camera for left eye

- When the MREAL images are shared, the following window appears.

Sender

Receiver



Note

- MREAL images are displayed with a resolution of 1920x1080 pixels and frame rate of 30 fps in Microsoft Teams.

Adjusting and Setting Various Functions

Set the functions required for the MREAL experience from “MREAL Configuration Tool Window”.

- In [**Basic Settings**], select the MREAL Display to be used and configure the MREAL space and other settings. For details, see “Basic Settings / Selecting the Camera Device”, “Basic Settings / Defining the World Coordinate System”, and “Basic Settings / Selecting the Camera Tracking Method”.
- In [**Option Settings**], configure the settings of the target to be used in the MREAL space, and the color masking and other settings. For details, see “Option Settings / Target Settings Window”, “Option Settings / Color Masking Settings Window”, “Option Settings / Interaction Settings Window”, and “Option Settings / Collision Warning Model Settings Window”.

- Configuring Detailed Settings of Basic Settings
- Saving and Editing Profiles

Configuring Detailed Settings of Basic Settings

If you select [**Basic Settings**] and click [**Detailed Settings**], the settings tabs are displayed. Switch the settings tabs to configure the MREAL Display, MREAL space, and other detailed settings

Note

- There are settings tabs that are not displayed depending on the settings of [**Basic Settings**].

Adjusting the Main Camera ([Main Camera] Tab)

When the MREAL images are too bright, adjust the white balance and exposure (brightness) of the main camera images.

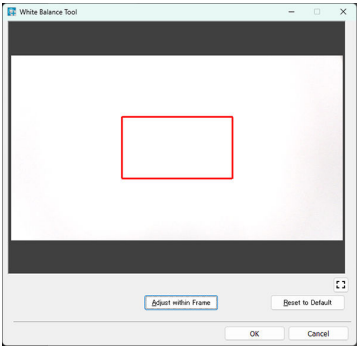
White Balance

When a white object in the real image does not appear white due to the influence of the lighting or other conditions, use this function to adjust the white balance.
With the MREAL S1/X1, the white balance is adjusted automatically if you select [**Auto Settings**].
To adjust the white balance by color temperature, move the slider. You can check the results of adjustment in the Preview window.
For a model with [**Use the White Balance Setting Tool**] displayed, you can adjust the white balance using a white reference with the following procedure (MREAL Display MD-10/20).

1. **Place white paper (white reference) within the MREAL space.**

2. **Click [Start Tool].**

   - White Balance Tool launches and the following window appears.



3. **Adjust the white reference so that it is within the red frame.**

4. **Click [Adjust within Frame].**

5. **Click [OK].**

Exposure

- To adjust the brightness automatically, select [**Auto Settings**]. If you move the slider of [**Auto Exposure Shift Quantity**], exposure correction is performed in the auto setting status.
- To configure the settings manually, select [**Manual Settings**] and make adjustments with the sliders of [**Shutter Speed**] and [**Gain**].
- For a model with [**Release the Upper Limit of Gain**] displayed (MD-10 or MD-20), if you place a check mark in the checkbox, a gain correction value upper limit of up to 30.00 dB is enabled and the gain is set automatically within the range of 0 to 30.00 dB.
- You can check the results of adjustment in the Preview window.

Adjusting the Registration Camera ([Registration Camera] Tab)

Exposure

Exposure

Adjust the brightness of the registration camera image of the MREAL Display.

- To adjust the brightness automatically, select [**Auto Settings**].
- For a model with [**Release the Upper Limit of Gain**] displayed, if you place a check mark in the checkbox, a gain correction value upper limit of up to 30.00 dB is enabled and the gain is adjusted automatically within the range of 0 to 30.00 dB.
- With the MD-20, if you move the slider of [**Auto Exposure Shift Quantity**], exposure correction is performed in the auto setting status.
- To configure the settings manually, select [**Manual Settings**] and make adjustments with the sliders of [**Shutter Speed**] and [**Gain**]. You can check the results of adjustment in the Preview window.

Improving the Camera Tracking Accuracy

With the MREAL X1, MREAL S1, MREAL Display MD-20, and RealSense, you may be able to improve the accuracy of camera tracking by adjusting the [**Exposure**] item.

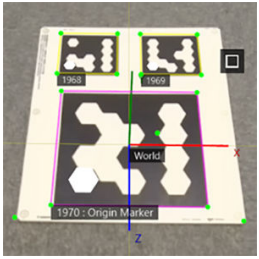
1. **Click [ ] in the Preview Tool window to display the image of the registration camera.**

- Slowly move the MREAL Display so that many feature points and other information are displayed in the MREAL image.

2. **Select [Manual Settings].**

3. Adjust the slider.

- Set [**Shutter Speed**] so that many feature points (green or blue points) are displayed in the Preview Tool window.



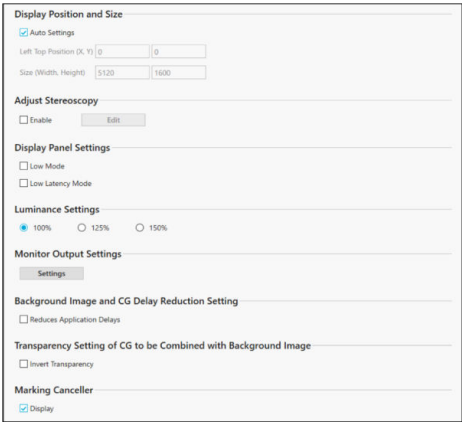
- Set [**Gain**] so that the brightness of the image is appropriate.
- When setting is finished, click [**OK**].

Adjusting the External Sensor ([Sensor] Tab)

Tracking Sensor Delay Settings

This is displayed when using an external sensor for the camera tracking method. Adjust the delay of the signal from the external sensor when, for example, the 3D CG is blurred or the target is not tracked. When the 3D CG is displayed late with respect to the movement in the image, move the slider in the + direction. When the 3D CG is displayed early, move the slider in the - direction.

Adjusting the MREAL Images ([Display] Tab)



Adjust how the MREAL image displayed in the MREAL Display appears.

Display Position and Size

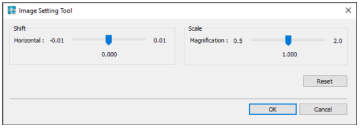
Adjust the size and position of the area in which the MREAL image is displayed. If you clear the check mark from [**Auto Settings**], you can make adjustments.

Adjust Stereoscopy

If you feel that the stereoscopic images appear larger or smaller than the actual size, adjust the size and position of the MREAL images.

1. **Place a check mark in [Enable], and click [Edit].**

   - Image Setting Tool launches and the following window appears.



2. **Make adjustments by moving the sliders.**

   - [**Display Position**] allows you to adjust the spacing between images on the left eye side and right eye side.
   - [**Scale**] allows you to adjust the size of the MREAL images.
   - To return to the status before adjustment, click [**Reset**].
   - When adjustment is finished, click [**OK**].

Display Panel Settings

Placing a check mark in [**Low Latency mode**] reduces the delay in image display.
Placing a check mark in [**Low Afterimage mode**] reduces the blurring caused by afterimages.
Placing a check mark in [**Video Smoothing Mode**] reduces the dropped frames in the MREAL images.

Caution

- When the dropped frames are noticeable, clear the check mark from [**Video Smoothing Mode**] and check the operating environment.
- [**Video Smoothing Mode**] does not affect external monitor output.

Luminance Settings

Adjust the luminance of the MREAL images according to the lighting, external light environment, and other conditions in the location of use.

Monitor Output Settings

Configure the settings for output to an external monitor (Full HD [1920×1080] or WQXGA [2560×1600]).

Other

Set the following as necessary when using an OpenXR compatible application.

Background Image and CG Delay Reduction Setting
When the delays in the movement of the 3D CG are noticeable relative to the background image, place a check mark in [**Reduces Application Delays**].

Transparency Setting of CG to be Combined with Background Image
If the relationship between the background image and CG transparency is unnatural, place a check mark in [**Invert Transparency**].

Marker Canceller
To use external monitors in the MREAL space, place a check mark in [**Display**]. This prevents markers displayed on external monitors from being detected erroneously by the MREAL Display.

Note

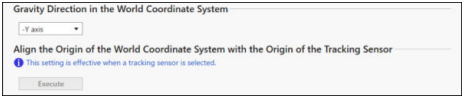
- The menus and items that are displayed differ depending on the model.

Setting a Registered Map ([Spatial Features] Tab)

This is displayed when using spatial features for the camera tracking method. With [**Registered Map Information**], you can create and register a registered map for camera tracking using spatial features. For details, see “Creating a Registered Map”.

Adjusting the World Coordinate System ([Coordinate System] Tab)

- Gravity Direction in the World Coordinate System
- Align the Origin of the World Coordinate System with the Origin of the Tracking Sensor



Configure the settings of the world coordinate system.

Gravity Direction in the World Coordinate System

Specify the gravity direction (downward).

Align the Origin of the World Coordinate System with the Origin of the Tracking Sensor

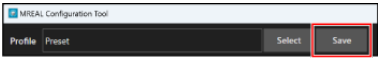
When using an external sensor for the camera tracking method, align the origin of the world coordinate system with the origin of the external sensor coordinate system.

Saving and Editing Profiles

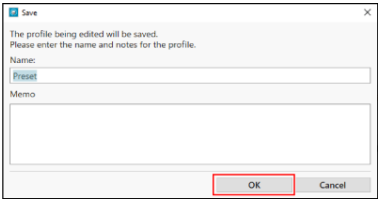
The settings configured in, for example, “Basic Settings (, , and)” and “Option Settings (, , , and)” can be saved as a profile.
The environment of the last MREAL experience can be reproduced by loading a saved profile.

Saving a Profile

1. **Click [Save] in the Tool menu.**



2. **Enter the name of the profile to be saved in the displayed window, and click [OK].**



- Enter information about the profile to be saved in [**Memo**] (optional)

Functions of the Edit Profile List Window

- [**Info**] allows you to edit the name and memo of a profile.
- [**Copy**] allows you to copy a profile.
- [**Delete**] allows you to delete a profile.
- [**Import**] allows you to import a profile.
- [**Export**] allows you to export a profile.

Note

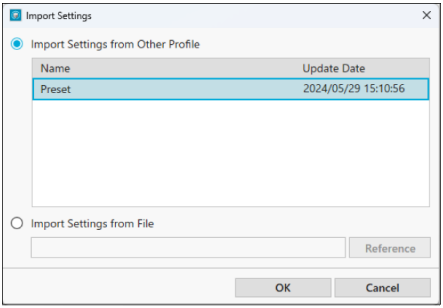
- When using a profile created in MREAL Platform 2024.x (hereinafter, MRP 8.1), see “Using the Profile of an Old Version”.

Writing a Profile

A saved profile can be written (exported) and then used for an MREAL experience in another environment. In addition, a profile created in another environment can be read (imported) and then used.

Importing

- Click [**Import**] in the Edit Profile List window or at the bottom of the MREAL Configuration Tool window.
- Select the profile to import in the following window. [**Import Settings from File**] allows you to import a profile saved to the PC.



- A profile can be imported for each setting item. The relationship between the setting items and extensions is as follows.

Setting Item	Extension
Overall Settings	.mprof
Basic Settings	.bprof
Target	.tprof
Color Masking	.cprof
Interaction	.iprof
Collision Warning Model	.oprof

Exporting

- Click [**Export**] in the Edit Profile List window or at the bottom of the MREAL Configuration Tool window.
- In the displayed screen, determine the profile items to export and save destination, and then export the profile.

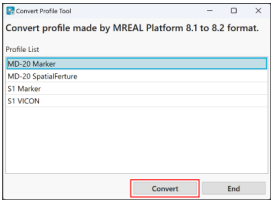
Using the Profile of an Old Version

A profile created in MREAL Platform 2024.x (hereinafter, MRP 8.1) cannot be used as-is in Platform 2025.x (hereinafter, MRP 8.2). Convert the profile to the format of MRP 8.2 with the following procedure.

1. **Launch Convert Profile Tool.**

   - In the drive with MREAL Platform installed, select [**Program Files**] > [**Canon MREAL Platform8.2**] > [**bin**] and double-click [**ConvertProfileTool.exe**].

2. **Select the profile to be converted from the [Profile List] list, and click [Convert].**



3. **Click [OK] in the displayed window.**

Caution

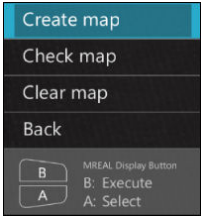
- The registered map of the spatial features created in MPR 8.1 are not inherited in the profile after conversion.

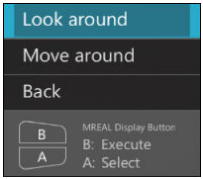
Explanation of Individual Functions

- Creating a Registered Map
- Setting a Collision Warning Model
- Camera Tracking Using Markers
- Registering Markers Captured with a Digital Camera
- Bird's Eye View Images
- Using an External Sensor
- Displaying Images on External Monitors
- Recording and Playing MREAL Video
- Setting the Monitor Output Resolution (MREAL Display MD-20)

Creating a Registered Map

When MREAL will be experienced in the same MREAL space repeatedly, you can increase the stability of camera tracking by creating a registered map.
Press button <A> of the MREAL Display, select [**Create map**] in the displayed menu, and select an item.

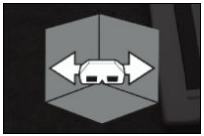




The menu displayed by pressing button <A> of the MREAL Display can also be displayed by clicking [ ].

- With [**Look around**], create a registered map centered on the MREAL user who looks around to observe the 3D CG.
- With [**Move around**], create a registered map for the MREAL user to move around to observe the 3D CG.

Looking Around

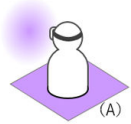


1. **When [Fix the position of the canvas.] appears, wait at the position (start point) to view the 3D CG.**

2. **Press button <A>, select [Start mapping], and press button <B>.**

3. **Map around the start point.**

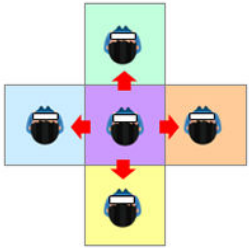
   - A purple square (A) to indicate the position of the “canvas” (the range in which mapping will occur) is displayed at the feet of the user.



   - Look around within the range of the square at your feet to perform mapping so that the entire canvas turns purple.

4. Map the area to the front, back, left, and right of the start point.

- Move forward, backward, leftward, and rightward from the mapping start point. When you move within the canvas, the color of the square at your feet changes.
- Look around within the range of the square at your feet to perform mapping so that the entire canvas becomes the color of the square.



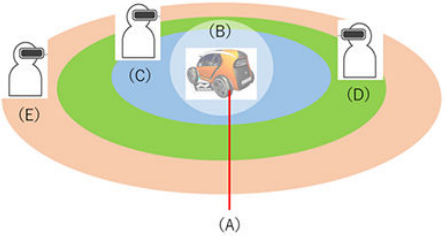
5. Register the map.

- When mapping is finished, press button <A>, select [**Complete mapping**], and press button <B>.
- When the [**Register map**] message appears, select [**Yes**] and press button <B>.
- Press button <B> on the MREAL Display or press the [**Esc**] key of the PC to end Spatial Feature Tool.

Note

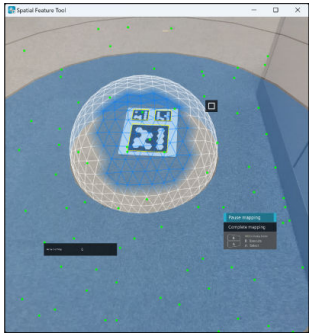
- Perform mapping of areas other than the starting point as necessary.

Moving Around



1. **Map the close range (C).**

- When [**Fix the position of the canvas.**] appears, align the center of the sphere indicating the canvas (position to display the 3D CG: B) with the position to display the 3D CG (A).
- Move to the front/back of the sphere to determine the size of the canvas, and press button <B>. The area seen in the MREAL Display is recognized as the mapping data and displayed in blue in the image.



- Perform mapping so that the entire canvas turns blue while moving the range of the canvas.

2. **Map the medium range (D).**

- Move away from the canvas until green is displayed. Perform mapping so that the entire canvas turns green while moving the range of the canvas.

3. **Map the far range (E).**

- Move away from the canvas until orange is displayed. Perform mapping so that the entire canvas turns orange while moving the range of the canvas.

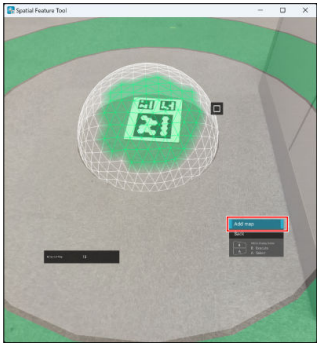
4. Register the map.

- When mapping is finished, press button <A>, select [**Complete mapping**], and press button <B>.
- When the [**Register map**] message appears, select [**Yes**] and press button <B>.
- Press button <B> on the MREAL Display or press the [**Esc**] key of the PC to end Spatial Feature Tool.

Checking the Registered Map

If you press button <A> on the MREAL Display, select [**Check map**], and press button <B>, you can check the status of the registered map.

- If there is an unmapped area, select [**Add map**] and press button <B>.



- Add feature points, etc. and then perform mapping.
- When mapping is finished, press button <A>, select [**Complete mapping**], and press button <B>.

When to Delete the Registered Map

In the following cases, delete the registered map and then create a new registered map.

- When the position of the world coordinate system has been changed
- When there is a map that was created in another environment
- When the features in the space have changed significantly

1. **Select [Spatial Feature] in [Basic Settings] of the MREAL Configuration Tool window.**
2. **Click [Detailed Settings].**
3. **Select [Delete] in [Registered Map Information] on the [Spatial Features] tab.**
4. **Select [Yes] in the displayed window.**
5. **Click [OK] at the bottom of the [Spatial Features] tab.**

Setting a Collision Warning Model

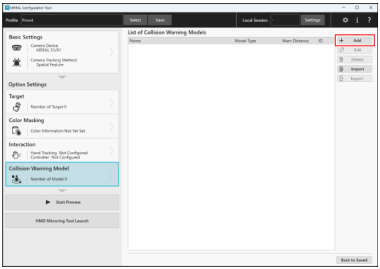
You can display a warning on an obstacle shown in viewpoint images by setting a mask model called a “collision warning model” on the surface of the obstacle so that the MREAL user does not collide with an obstacle such as a wall, step, or desk.

Preparation

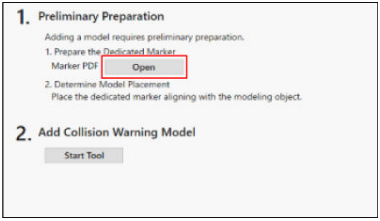
A dedicated modeling marker is required to set a mask model. If you do not have a modeling marker, print a modeling marker with the following procedure.

1. **Select [Collision Warning Model] in [Option Settings] of the MREAL Configuration Tool window.**

2. **Click [Add] in the following window.**



3. **Click [Open] of [1. Preliminary Preparation].**



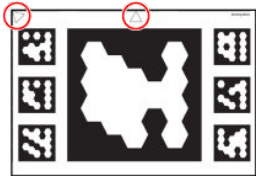
- The modeling marker (PDF file) is displayed.

4. **Print the modeling marker.**

- After printing, affix cardboard or similar material to the back.

5. Place the modeling marker.

- Place the modeling marker with its indicators aligned with the front of the obstacle.



Mask Model Settings

1. **Click [Start Tool] of [2. Add Collision Warning Model].**

   - The Object Modeling Tool window appears. For details on the Object Modeling Tool window (Preview window / Settings panel), see “Object Modeling Tool Window”.

2. **Set a new mask model.**

   - Select [**Warning Model**] in [**Attributes**] on the Settings panel.
     Select [**Shape**] and [**Size**] to match the shape and size of the obstacle.

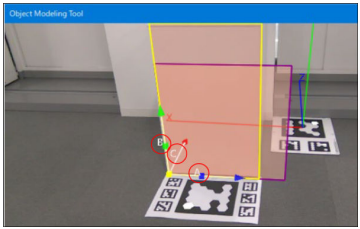
3. Capture an image for configuration.

- While checking the MREAL Display image in the Preview window, ensure that both the obstacle and modeling marker are shown within the window at the same time.

- Click [**Grab**] on the Settings panel to capture an image. We recommend capturing multiple images while changing the direction.
- Click [◀][▶] in [**Display Grabbed Images**] to select the image for which to configure the settings of the mask model. The selected image is displayed in the Preview window.
- Capture the image while camera tracking is in a stable state.

4. Adjust the mask model.

- If you click [**New**] on the Settings panel, a mask is displayed on a surface of the obstacle.
- Move (A), (B), and (C) (in the clicked state) in the following window to adjust the size of the mask so that it covers the obstacle.



- If the mask needs to be rotated, operate [**Orientation**] on the Settings panel.
- You can adjust the position and size of the mask by entering numerical values in [**Edit Model**].
- Enter the distance at which to display a warning in [**Display Distance Setting**].
- Click [**Apply**] then [**OK**].

5. Click [OK] in the MREAL Configuration Tool window.

- To add a mask model, repeat the work from step 2.

Caution

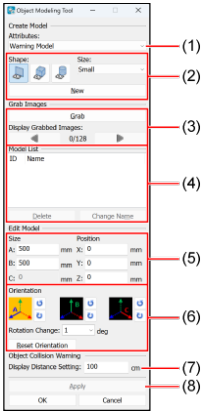
- In the following cases, delete and create new mask models.
  - When the tracking method has been changed
  - When the position, size, or other attribute of the obstacle has been changed
  - When marker or sensor calibration has been performed
- Rename or delete a collision warning model in the window of step 2 in “Preparation”.

Object Modeling Tool Window

Preview window

- You can enlarge/reduce the image by operating the icons at the bottom of the window. Clicking [⛶] switches to full screen display. Pressing the [**Esc**] key on the keyboard returns the image to its original size.

Settings panel



(1) Select the attributes of the mask model.

- Warning model: Display a warning when the MREAL user approaches the obstacle (display color is red).
- Masking model: Correctly display the front-back relationship between the object for which the mask model is set and the 3D CG (display color is blue).
- Warning + masking model: Set the front-back relationship of the CG image and set the warning mark at the same time (display color is green).

(2) When starting creation of a mask model, click [**New**] and select the shape (plane/cuboid/cylinder) and size of the mask model.

(3) Click [**Grab**] to capture images to use for creating the mask model. If you operate [**Display Grabbed Images**], the captured images are displayed in the Preview window.

(4) Display a list of the placed mask models, and delete or rename them.

(5) Set the size and position of the mask model by entering numerical values.

(6) Operate this when you need to rotate the mask model.

(7) Set the distance at which to display a warning.

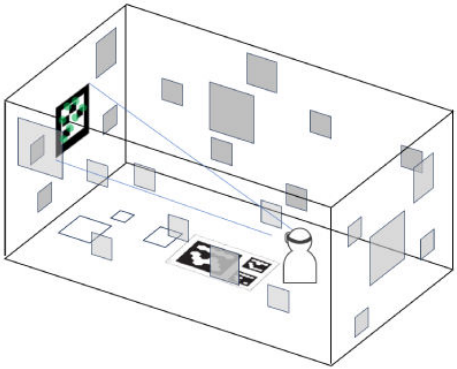
(8) Apply the settings to the mask model being edited.

Camera Tracking Using Markers

You can print the markers provided for MREAL Platform and then use them for camera tracking.

Overview

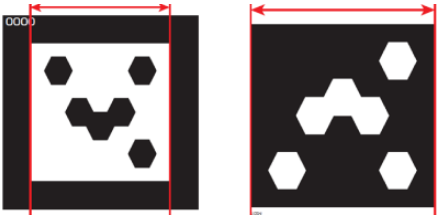
Camera tracking can be performed by capturing placed markers with the MREAL Display. This is effective when there are few structures that can serve as feature points in the space. This facilitates an MREAL experience with higher accuracy than with spatial features ( ).



Points to Consider when Using Markers

Marker size

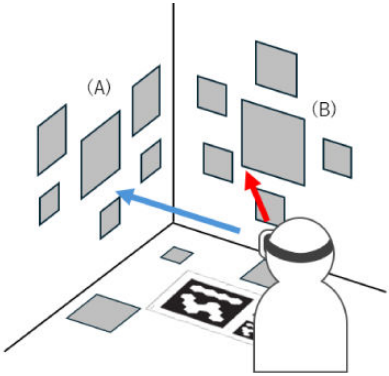
- The marker size (the length of one side inside the frame) is based on the usage range of the marker (the distance from the MREAL user to the marker).



- The usage range of a marker is 10 to 25 times the size of the marker (10 to 20 times with the A1 series). For example, when the marker size is 150 mm, the usage range will be approximately 1.5 to 3.75 m (approximately 1.5 to 3 m with the A1 series).
- If the MREAL experience area is large, determine the size of the main markers to be used based on the position where you want MREAL to be experienced with the most stable camera tracking.
- Determine the size of the other markers also according to the position of the MREAL experience.

Number of markers and placement

- Place the markers so that there are at least three markers displayed in the images of the MREAL Display (A). When doing so, place the markers so that they appear at an angle (B).



- Place the markers in locations close to where the 3D CG will be displayed.
- When an operation such as changing the position of a marker or deleting a marker has been performed, display the [**Calibration Mode**] tab in the Marker Tool window, and recapture the markers. For details, see "Registering Markers".

Caution

- Affix cardboard or similar material to the back of the markers so that they do not bend, warp, or otherwise become deformed. If a bent or warped marker is used, the precision of camera tracking may deteriorate.
- Do not use multiple markers with the same ID.
- The images of markers may become small and camera tracking may become unstable depending on the position of the MREAL user. Placing markers of different sizes according to the area of the MREAL experience can help improve camera tracking stability.

Printing Markers

1. **Launch Marker Print Tool.**

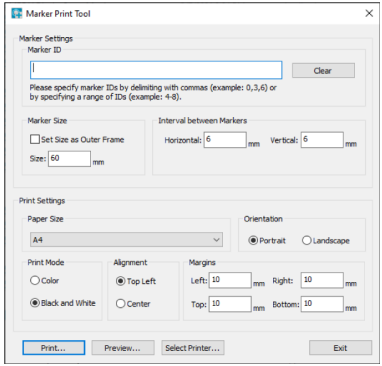
   Windows 11

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**Utility**] > [**MarkerPrintTool_x64**].
   - Select [**MarkerPrintTool_x64**] in Explorer.

   Windows 10

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**Utility**].
   - Select [**MarkerPrintTool_x64**] in Explorer.

2. Set the marker specifications.



- Select the IDs of the required markers in [**Marker ID**]. 0 to 1023 are white, and 1024 to 2047 are black.
- Specify a marker size suitable for the purpose of use in [**Marker Size**]. The specified size is applied to all markers that were selected in [**Marker ID**].
- Specify the interval when multiple markers will be printed on one sheet of paper in [**Interval between Markers**]. Check the print layout in [**Preview**].

3. Set the print specifications and then print.

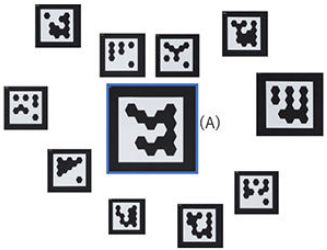
- Set the specifications in the items of [**Print Settings**].
- Click [**Print**] to print.

Registering Markers

Register the printed markers to the system.

Preparation

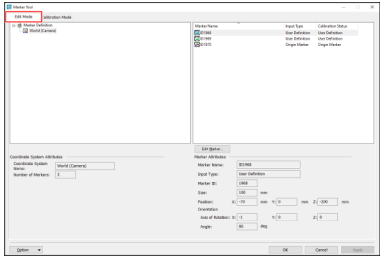
Fix the markers to the floor in the MREAL space. When doing so, place markers of different sizes with marker (A) that will serve as the origin marker at the center.



Registration Procedure

1. **Select [Basic Settings] in the MREAL Configuration Tool window.**
2. **Select [Use Marker Tool] in [Define World Coordinate System], and click [Start Tool].**
3. **Select [Capture by Camera Device] and click [OK] in the displayed window.**

4. **Select the [Edit Mode] tab in the Marker Tool window.**



5. **Delete the marker information.**

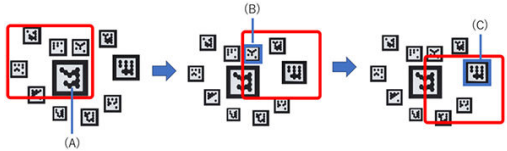
- Select all of the markers displayed in the list, then right-click and select [**Delete from Marker Definition**].

6. **Register the origin marker.**

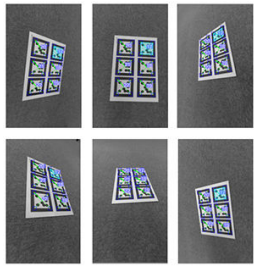
- Right-click in the [**Marker Name**] list and select [**Add MREAL Marker**].
- Enter the ID and size of the marker you decided to use as the origin marker in the [**Add MREAL Marker**] window.
- Select [**Origin Marker**] from the [**Input Type**] list, and click [**OK**].

7. Register the other markers.

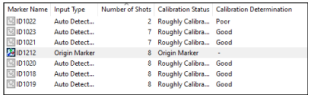
- Select the [**Calibration Mode**] tab in the Marker Tool window.
- Click [**Start**] of [**Auto-Capture**] to capture the markers.
  As shown below, capture all of the markers so that first the origin marker (A) is placed in the screen, and then a marker placed in the screen in the last capture is placed in the screen as with (B) and (C).



In addition, you can expect to improve the reading accuracy for camera tracking by repeatedly capturing while changing the direction as shown below.



- When the markers are distinguished, the marker names and information are displayed in the list as shown below.



Marker Name	Input Type	Number of Shots	Calibration Status	Calibration Determination
ID1022	Auto Detect...	2	Roughly Calibra...	Poor
ID1023	Auto Detect...	7	Roughly Calibra...	Good
ID1021	Auto Detect...	7	Roughly Calibra...	Good
ID1212	Origin Marker	8	Origin Marker	-
ID1020	Auto Detect...	8	Roughly Calibra...	Good
ID1018	Auto Detect...	8	Roughly Calibra...	Good
ID1019	Auto Detect...	8	Roughly Calibra...	Good

- When [**Excellent**] or [**Good**] is displayed for [**Calibration Determination**], click [**Stop**] of [**Auto-Capture**].
- Click [**Calculate**] in the displayed window.
- When [**Calculation is finished.**] appears, click [**Close**].
- Click [**Apply**] → [**OK**] on the [**Calibration Mode**] tab of the Marker Tool window.

Option Menu of Calibration Mode

The functions of the [**Options**] menu of the [**Calibration Mode**] tab in the Marker Tool window are as follows.

- [**Image**] allows you to load and save images captured in the calibration mode.
- Clearing the check mark from [**Add Auto Detected Markers**] allows you to set only the markers added in edit mode as the target for calibration.
- [**Detection Parameters...**] displays the Adjust Detection Parameters window so that you can adjust the various thresholds.
  [**Adjust Performance**] allows you to adjust the performance of marker recognition.
  [**Binarization Threshold**] allows you to adjust the threshold for distinguishing black and white when recognizing markers.
  [**Minimum Marker Area**] allows you to set the minimum area for recognizing markers.
  If you place a check mark in [**Automatic Detection Threshold**], the above thresholds will be adjusted automatically.
  If you place a check mark in [**Render the processed image**], image display is switched between binarization and multivalued.

Registering Markers Captured with a Digital Camera

You can use images captured with a digital camera to register markers.

Recommended Conditions for Capturing Markers

- Number of pixels to capture: Approx. 2000 megapixels (5760×3840 pixels) / File format: JPEG / Focal length (35 mm equivalent): 20–28 mm (X–X in)
- Shooting mode: Aperture Priority AE (Av) / Image stabilizer: Off / Focus mode: Manual focus
- Aperture value: F8 / ISO speed: ISO 1600 / White balance: Auto

Printing and Capturing a Calibration Pattern

When using this function, print and capture a calibration pattern with the following procedure in advance.

1. **Select the calibration pattern.**

   Windows 11

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**Utility**].

   Windows 10

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**Utility**].

2. **Select the calibration pattern.**

   - Select [**Calibration Pattern(MB-3B)**] or [**Calibration Pattern(MB-4)**].

3. **Print on paper that matches the size of the calibration pattern.**

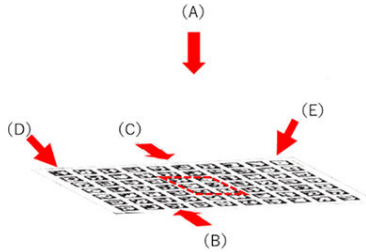
   Note

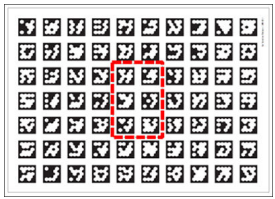
   - Affix cardboard or similar material to the back so that the calibration pattern does not warp.
   - Printing is not necessary if you have an MREAL marker board.

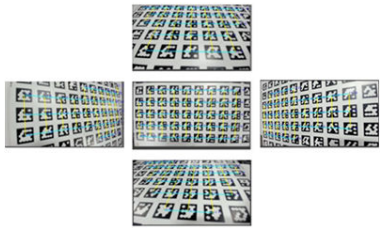
4. **Place the calibration patterns on the floor.**

5. Capture the calibration patterns.

- From directly above (A), make adjustments so that all of the calibration patterns fit in the screen and then capture them.
- From the directions of (B) to (E), make adjustments so that the screen is full of calibration patterns centered on the six patterns at the center and then capture them.





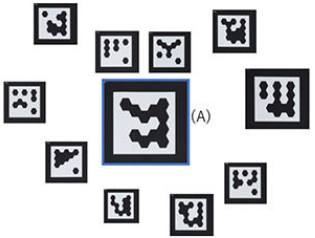


- Capture at least three images in one direction, and up to a total of 24 images.

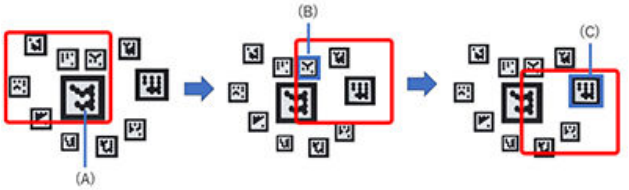
Capturing Markers

After capturing the calibration patterns, capture the markers.

- Place the markers to register with the origin marker (A) at the center.



- Capture all of the markers so that first the origin marker (A) is placed in the screen, and then a marker placed in the screen in the last capture is placed in the screen as with (B) and (C).



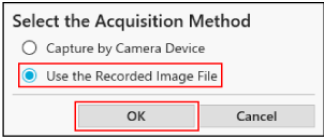
- You can expect to improve the reading accuracy for camera tracking by repeatedly capturing while changing the capture angle as shown below.

- When capturing is finished, save the captured images on the PC.

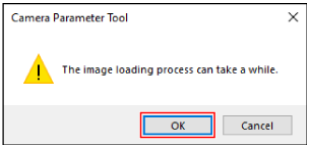
1. **Select [Basic Settings] in the MREAL Configuration Tool window.**

2. **Select [Use Marker Tool] in [Define World Coordinate System], and click [Start Tool].**

3. **Select [Use the Recorded Image File] and click [OK] in the following window.**

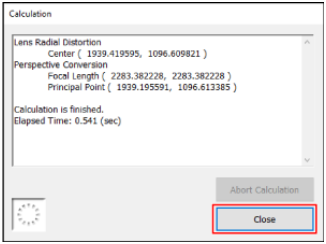


- Camera Parameter Tool launches and a window for selecting a marker image appears.
- Select multiple images from the calibration patterns captured in “Printing and Capturing a Calibration Pattern”, and click [**Open**]. Do not select the images of “markers” captured in “Capturing Markers”.
- Click [**OK**] in the following window.



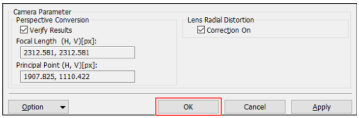
4. **Click [Calculate] in the displayed window.**

5. **When the following window appears, click [Close].**

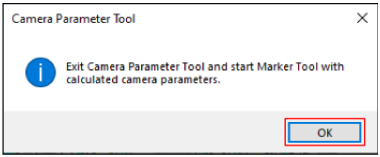


6. **Check the calculation results and click [Apply] if there is no problem.**

- For the check method, see “Configuring Detailed Settings of Logicool Brio” in “Bird's Eye View Images”.
- If there is no problem with the check results, click [**OK**] in the following window.



7. **Click [OK] in the following window.**



8. **Select the [Edit Mode] tab in the Marker Tool window.**

9. **Delete the unused marker information.**

- When the world coordinate system (camera) is selected, select a marker displayed in the [**Marker Name**] list, then right-click and select [**Delete from Marker Definition**].

10. **Register the origin marker.**

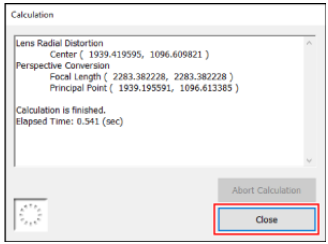
- Right-click in the [**Marker Name**] list area and select [**Add MREAL Marker**].
- Enter the ID and size of the marker you decided to use as the origin marker in the [**Add MREAL Marker**] window.
- Select [**Origin Marker**] from the [**Input Type**] list, and click [**OK**].

11. **Select the [Calibration Mode] tab in the Marker Tool window.**

- The window for selecting the marker image appears.
- Select the marker image, and click [**Open**].

12. **Click [Calculate] in the displayed window.**

13. **When the following window appears, click [Close].**

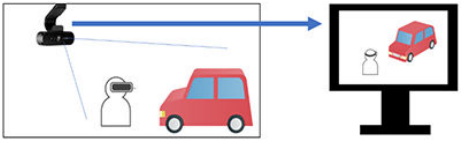


14. **Click [Apply] then [OK] in the Marker Tool window.**

Bird's Eye View Images

Selecting Bird's Eye View Camera and Configuring Detailed Settings

Installing a bird's eye view camera on the ceiling or other place in the MREAL space allows you to display, for example, the positional relationship between the MREAL user and 3D CG on an external monitor as bird's eye view images.



Note

- For details on how to install a bird's eye view camera and connect it to a PC, refer to the instruction manual of the bird's eye view camera.

Selecting Bird's Eye View Camera and Configuring Detailed Settings

Configuring Detailed Settings of Logicool Brio

Configuring Detailed Settings of RealSense

1. **Select [Basic Settings] in the MREAL Configuration Tool window.**
2. **Select [Other] in [Select Camera Device].**
3. **Select the model of the bird's eye view camera from the [Model] list.**
4. **Click [Detailed Settings].**

   - Configure the detailed settings for the selected bird's eye view camera.

Configuring Detailed Settings of Logicool Brio

Executing Calibration

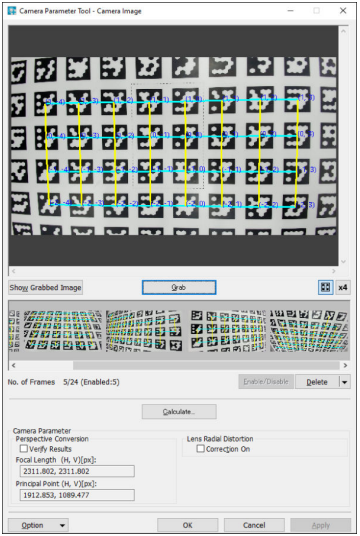
Execute calibration before installing the Logicool Brio.

1. **Place the calibration patterns on the floor.**

   - For details on printing the calibration patterns, see “Printing and Capturing a Calibration Pattern”.

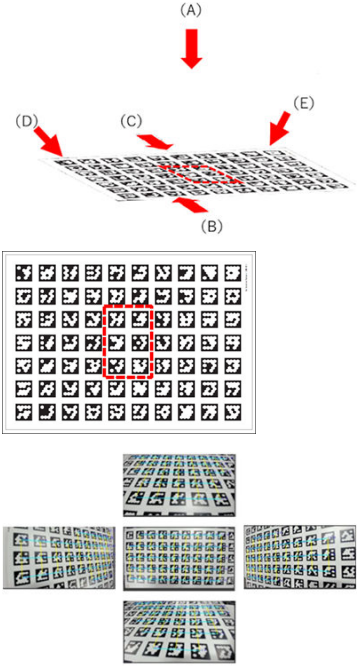
2. **Click [Start Tool] in the [Camera Parameter Setting] area on the [Camera] tab.**

   - The Camera Parameter Tool window appears.



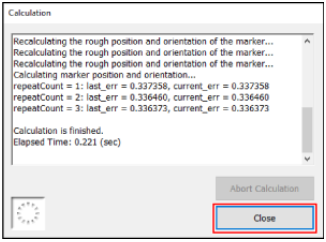
3. Capture the calibration patterns with the Logicool Brio.

- From directly above (A), make adjustments so that all of the calibration patterns fit in the screen and then click [**Grab**].
- From the directions of (B) to (E), make adjustments so that the screen is full of calibration patterns centered on the six patterns at the center and then capture them.



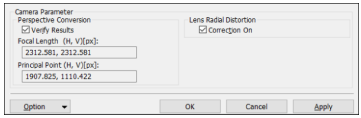
- Capture at least three images in one direction, and up to a total of 24 images.
- When capturing in all directions is completed, click [**Calculate**].

4. **When the following window appears, click [Close].**

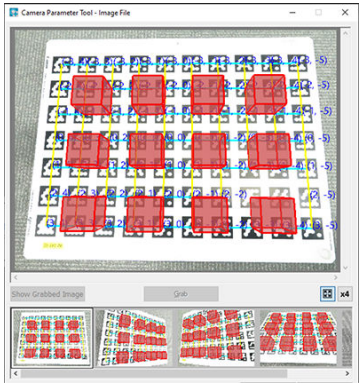


5. Check the calculation results (calibration results) and click [Apply] if there is no problem.

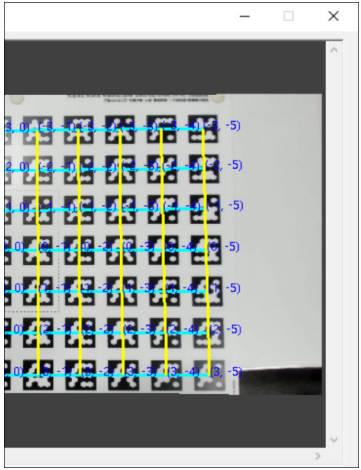
- The calculation results can be checked by placing check marks in [**Verify Results**] of [**Perspective Conversion**] and [**Correction On**] of [**Lens Radial Distortion**].



- If perspective conversion is performed properly, cube frames such as the following are displayed on the calibration patterns in the Camera Parameter Tool window.



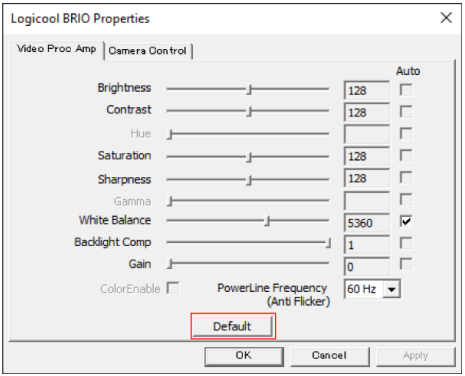
- If lens radial distortion is corrected properly, the lines (yellow and blue) on the calibration patterns are displayed straight.

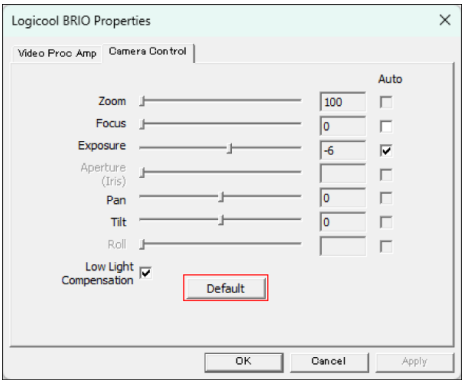


- If the checked results are not appropriate, click [**Delete**] to delete the captured images and then perform the procedure again from step 3.

Various Parameter Settings

Click [**Settings**] in the [**Image Adjustment/Camera Control**] area on the [**Camera**] tab. If you click [**Default Value**] in the following window, the default values of Logicool are reflected.





Other Settings

For details on the settings of the [**Display**] tab and [**Coordinate System**] tab, see the items of the corresponding tab in “Configuring Detailed Settings of Basic Settings”.

Configuring Detailed Settings of RealSense

For details on the settings of each tab, see the items of the corresponding tab in “Configuring Detailed Settings of Basic Settings”.

Using an External Sensor

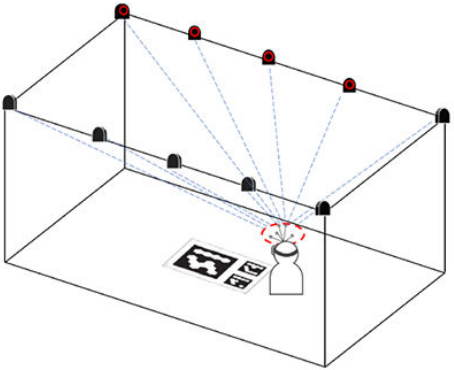
When using an external sensor for the camera tracking method, configure the settings with the following procedure.

Caution

- For details on how to use an external sensor, refer to the instruction manual of the external sensor.
- The camera tracking method using an external sensor requires a separately sold MREAL Optical Sensor Attachment to be mounted to the MREAL Display. For details, refer to the instruction manual of the MREAL Display.

Overview

Track an attachment (sold separately) mounted to the MREAL Display with VICON, OptiTrack, or VRPN compatible optical sensor. This facilitates an MREAL experience with higher accuracy than with spatial features or markers.



When Using VICON or OptiTrack

1. **Select [Basic Settings] in the MREAL Configuration Tool window.**

2. **Select [MREAL Display] in [1. Select Camera Device].**

3. **Select [Unuse] in [Tracking Using Indicator] of [3. Select Camera Tracking Method].**

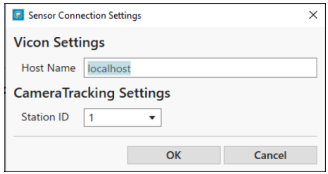
4. **Select [VICON] or [OptiTrack] in [Tracking Using Sensor].**

5. **Click [Settings].**

   - The [**Sensor Connection Settings**] corresponding to the external sensor appears.

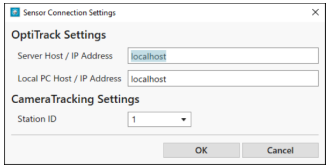
6. Enter the setting items.

VICON



- Enter the host name or IP address of the PC with the system of the external sensor installed in [**Host Name**].
- Select the station ID set for the tracker name in [**Station ID**], and click [**OK**].

OptiTrack



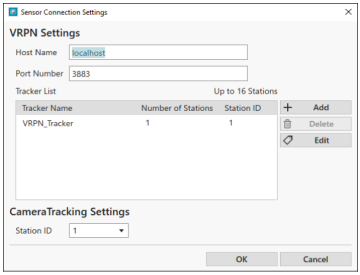
- For details on the information to enter in [**Server Host / IP Address**] and [**Local PC Host / IP Address**], see “Setting OptiTrack” ( ).
- Select the station ID set for the tracker name in [**Station ID**], and click [**OK**].

7. Execute calibration of the external sensor.

- See “Calibrating the External Sensor”.

1. **Select [VRPN] in [Tracking Using Sensor], and click [Settings].**

   - The [**Sensor Connection Settings**] window appears.



2. **Enter the host name and port number.**

   - Enter the host name or IP address of the PC with the software for the VRPN compatible sensor installed in [**Host Name**].
   - Enter the specified port number in [**Port Number**].

3. **Select [VRPN_Tracker] in [Tracker List], and click [Edit].**

   - The [**Edit Tracker**] window appears.

4. **Enter [Tracker Name] and [Number of Stations], and click [OK].**

5. **Select the station ID set for the tracker name in [CameraTracking Settings] of the [Sensor Connection Settings] window, and click [OK].**

6. **Click [Detailed Settings] in the MREAL Configuration Tool window.**

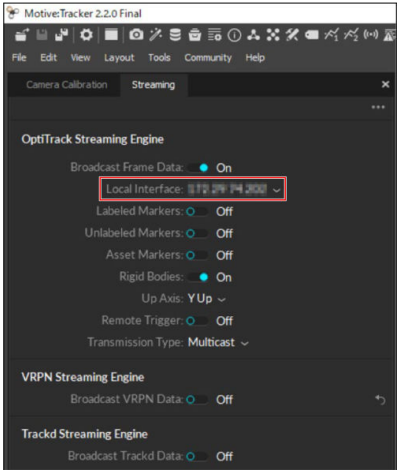
- Select the items of [**Unit for Entering Tracker Position**] and [**Unit Coordsys**] on the [**VRPN**] tab. For details, refer to the user's manual of the VRPN compatible sensor to be used.

7. **Execute calibration of the sensor.**

- See “Calibrating the External Sensor”.

Setting OptiTrack

When you use OptiTrack for the external sensor of the camera tracking method, the information to enter in the Sensor Connection Settings window differs depending on the settings of Motive: Tracker (platform software of OptiTrack system).



[Local Interface] Setting	Information to Enter in [Server Host / IP Address]	Information to Enter in [Local PC Host / IP Address]
Loopback	localhost	localhost
IP address of the PC with the OptiTrack system installed	IP address of the PC with the OptiTrack system installed	IP address of the PC with MREAL Platform installed

Note

- For details on the Motive: Tracker and [**Local Interface**] settings, contact the distributor.

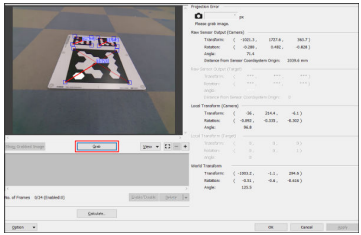
Calibrating the External Sensor

1. **Click [Start Tool] in [Calibration of Sensor] of [3. Camera Tracking Method].**

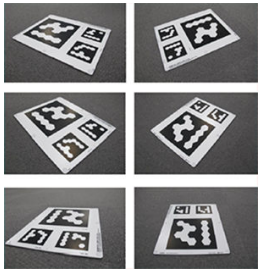
   - 6DOF Sensor Tool starts.

2. Capture the Default Marker with the external sensor.

- Fit the Default Marker in the 6DOF Sensor Tool window, and click [**Grab**] to capture an image.
- If you click the [⛶] icon beside [**View**], the display area of the image is displayed in full screen mode. Press the [**Esc**] key of the PC to return to the original size.



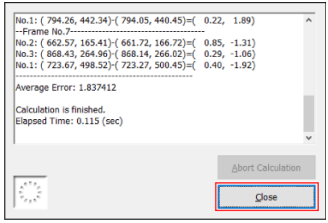
- Capture 10 or more images from different directions in reference to the following.



3. Click [Calculate].

- When the image display area is displayed in full-screen mode, press the [**Esc**] key of the PC to return the image display area to the original size.

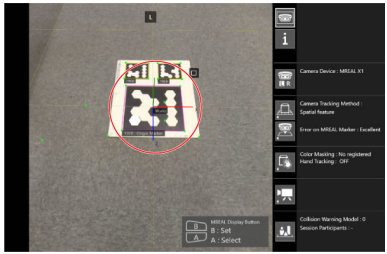
4. **When the following window appears, click [Close].**



5. **Click [Apply] then [OK] in the 6DOF Sensor Tool window.**

6. **Check the calibration results.**

- If calibration finishes normally, a three-axis diagram showing the world coordinate system is displayed on the Default Marker in the Preview Tool window.

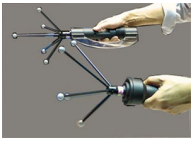


Registering the Target Using a Sensor

When tracking using an external sensor, you can use a target using a sensor.

Preparation

- Attach the reflective markers for an optical sensor to the mock-up or other object to be manipulated.



- When tracking using VICON, preregister a name for the combination of reflective markers to the VICON system as “MRStation001” to “MRStation016”. Note that the number (001 to 016) at the end of the registered name will be the station ID.
- When tracking using OptiTrack, preregister the combination of reflective markers to the OptiTrack system. Note that the ID assigned to the combination of reflective markers will be the station ID.

Registering the Target

1. **Select [Target] in [Option Settings] of the MREAL Configuration Tool window.**

2. **Select [Add] in [List of Targets].**

3. **Select the ID number and enter the name of the target to be registered in [1. Information Input].**

4. **Select [On] in [Tracking Using Sensor] of [2. Select Tracking Method].**

5. **Select the station ID registered to the VICON or OptiTrack system in [Station ID] of [3. Calibration of Coordinate System]/[2. Tracking Using Sensor].**

Adjusting the 3D CG Superimposed on the Target

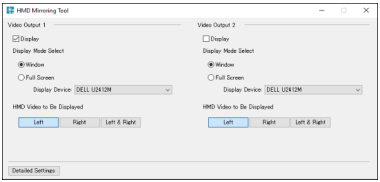
Click [**Start Tool**] in [**Move and Rotate the Target Coordinate System**] to launch Model Alignment Tool.
For details on adjusting the 3D CG in Model Alignment Tool, see “Adjusting the 3D CG Orientation” ().

Displaying Images on External Monitors

The images of the MREAL Display can be displayed on up to two external monitors.

1. **Launch HMD Mirroring Tool.**
   Click [**HMD Mirroring Tool Launch**] in the Basic Settings window of MREAL Configuration Tool.

2. **Set the output specifications.**



- The image being displayed by the MREAL Display is displayed on the external monitors with a check mark placed in [**Display**].
- Select [Window] or [Full Screen] in [**Display Mode Select**].
- Select the model names of the monitors to use for display in [**Display Device**].
- Select which of the images of the MREAL Display to display in [**HMD Video to Be Displayed**].
- When, for example, displaying 3D CG of a large size, we recommend clicking [**Detailed Settings**] and then placing a check mark in [**Set Frame Rate Limit to 30 FPS**] in the displayed window. By reducing the load on the PC, it may be possible to prevent a decrease in display frame rate.

Note

- In the screen of the image output destination, you can use the right-click menu of the PC. With the right-click menu, you can perform tasks such as changing the display mode and ending HMD Mirroring Tool.

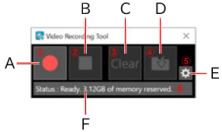
Recording and Playing MREAL Video

You can record the MREAL experience as a video (MREAL video) then play back the video.

Recording Video

1. **Click [ ] in the Preview Tool window.**

2. **Click (E) in the following window.**



- Set the save location, number of frames, and number of seconds of the self timer in the displayed window, and click [**OK**].

3. **Click (A) to start recording.**

- To stop recording, click (B).
- Click (D) to save the MREAL video.
- To delete the MREAL video, click (C).

Playing Back Video

1. **Select [MREAL Video] in [Basic Settings] of the MREAL Configuration Tool window.**

2. **Click [Reference].**

   - Select the folder containing the MREAL video.
   - Click [**Detailed Settings**], and set the display position and size for the playback images.

3. **Click [Start Preview].**

   - The MREAL video is played back in the Preview Tool window.

Setting the Monitor Output Resolution (MREAL Display MD-20)

Set the resolution when displaying the images of the MREAL Display MD-20 on a PC monitor.

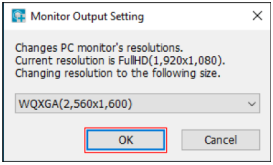
Note

- The output resolutions of Full HD (1920×1080) and WQXGA (2560×1600) are supported for the images of the MREAL Display MD-20.

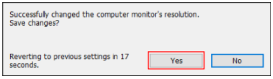
1. **Select [Basic Settings] in the MREAL Configuration Tool window, and click [Detailed Settings].**

2. **Select the [Display] tab, and click [Settings] of [Monitor Output Settings].**

3. **Select the resolution for output to the PC monitor, and click [OK].**



4. **Select [Yes].**



Troubleshooting

Unavailable Functions

- Functions with [🔒] displayed required license activation. For details, contact the distributor.

Camera Tracking Becomes Unstable when Using Spatial Features

If there are no feature points in the MREAL space (walls are a single color, no distinctive structures, etc.), camera tracking using spatial features becomes unstable and issues such as misalignment in the display of the 3D CG occurs. In such a case, see “Camera Tracking Becomes Unstable and 3D CG Display Misaligned Occurs”and then add feature points to the MREAL space.
Furthermore, if camera tracking becomes unstable due to, for example, changes in the MREAL space (such as a desk is removed or moved), see “Clearing the Map” and then clear the map.

[Lost] Appears during an MREAL Experience Using Spatial Features

Look at the Default Marker and then move your gaze away from the Default Marker and check that [**Lost**] disappears.
If [**Lost**] is displayed even doing the above, clear the map. For the procedure to clear the map, see “Clearing the Map”.

[Clear] Appears during an MREAL Experience Using Spatial Features

[**Clear**] may appear if you look at the Default Marker after the [**Lost**] indication has continued to be displayed for a certain period of time. The [**Clear**] indication will disappear after several seconds.

Message Appears during an MREAL Experience Using Spatial Features

If the [**The amount of the map has \nreached its limit.**] message appears, clear the map. For the procedure to clear the map, see “Clearing the Map”.

Connection Error Occurs during Local Session

Check whether the host name (or IP address) and port number set by a participant are the same as those in the settings of the organizer's PC.
Check whether MREAL Configuration Server is being blocked by a firewall. Check the settings of the firewall with the following procedure, then take the necessary measure.

1. **Select the [Start] button > [Settings] > [Update & Security] > [Windows Security].**

2. **Select [Firewall & network protection].**

   - Check that [**(active)**] is displayed in any of [**Domain network**], [**Private network**], and [**Public network**].

3. **Select [Allow an app through firewall], and check the [MREAL Configuration Server] setting in the [Allowed apps and features] list.**

   - If there is no check mark in [**MREAL Configuration Server**], place a check mark.
   - Place a check in the item that has [**(active)**] displayed in step 2 out of [**Domain**], [**Private**], and [**Public**].
   - Click [**OK**] to close the window.

Noticeable Frame Dropping Occurs in MREAL Display Images

Check [**Display Panel Settings**] on the [**Display**] tab of the Detailed Settings window of the MREAL Display.

- If a check mark is placed in [**Video Smoothing Mode**], clear the check mark.
- If a check mark is not placed in [**Video Smoothing Mode**], place a check mark.
- For details on the [**Display**] tab, see “Configuring Detailed Settings of Basic Settings” in “Adjusting and Setting Various Functions”.

Error Message Appears when [HMD Mirroring Tool Launch] Is Clicked

When HMD Mirroring Tool is launched, an external monitor for displaying MREAL images must be connected. Connect an external monitor to the PC with the MREAL Display connected.

MREAL Images Are Difficult to See

In the event that the MREAL image does not look three dimensional, the 3D CG is displayed misaligned, the marker images and yellow lines do not match, or another phenomenon occurs, the MREAL image may become easier to see if you perform the following procedure.

1. **Prepare a separately sold marker board (MREAL Marker Board [MB-3B]/[MB-4]).**

2. **Turn on the power of the MREAL Display, and wait for 30 minutes.**

3. **Launch Camera Check Tool.**

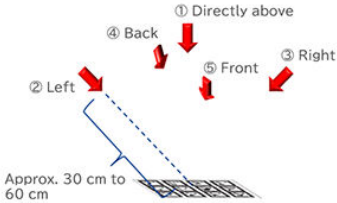
   - Click [**All apps**], and select [**Canon MREAL Platform 2025. x**] > [**MREAL Display Tools**].
   - Select [**CameraCheckTool_x64**] in Explorer.

4. **Press button <A> on the MREAL Display.**

5. Capture the marker board with the MREAL Display.

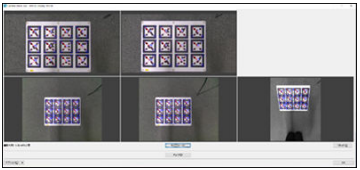
- Hold the MREAL Display with two hands as shown below.

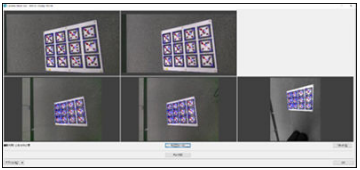
- Capture the marker board from directions (1) to (5).

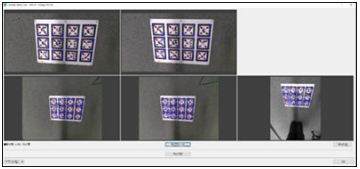


- Adjust the position of the MREAL Display so that the image of the marker board becomes a size such as the following in the capture screen, then click [**Grab**] of the Camera Check Tool window to capture an image.

- Capture at least five images per direction.

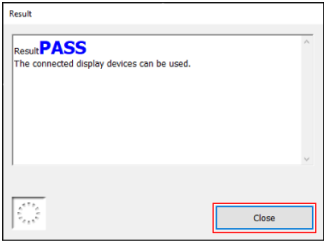






- When capturing is finished, click [**Check**].

6. **When the following window appears, click [Close].**



Caution

- If [**WARNING**] is displayed in the results screen, calibrate the MREAL Display or return the settings to the factory shipment state. For details, see “Calibrating the MREAL Display MD-10”.
- If [**FAIL**] is displayed in the results screen, contact the distributor.

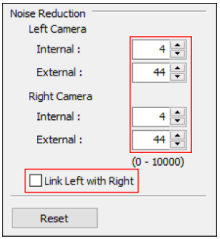
Screen Flickers when Using Color Masking

Performing noise reduction adjustment with the following procedure may solve the problem of the screen flickering when using color masking.

1. **Click [Detailed Settings] in the Color Masking Tool window.**

   - For details on displaying the Color Masking Tool window, see “Setting Color Masking”.

2. **Set the noise reduction value in the Detailed Settings window to 0, and place a check mark in [Link Left with Right].**



3. **Register the masking colors again.**

   - See “Masking [Other]” in “Setting Color Masking”.

4. **Click [Detailed Settings] in the Color Masking Tool window.**

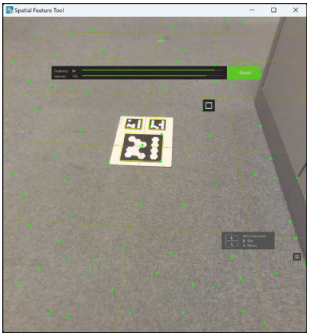
5. **Click [Reset] in the [Noise Reduction] area of the Detailed Settings window.**

Camera Tracking Becomes Unstable and 3D CG Display Misaligned Occurs

If the feature points are insufficient, tracking becomes unstable and a phenomenon such as the 3D CG becoming misaligned occurs. If that happens, add feature points to the MREAL space with the following procedure.

1. **Launch Spatial Feature Tool.**

   - When launching the tool from the MREAL Display, press button <A>, select [**Spatial Feature Tool**] in the displayed menu, and press button <B>.
   - When launching the tool from the Preview Tool window, click [ ] then select [**Spatial Feature Tool**] in the displayed menu.
   - When launching Spatial Feature Tool from the MREAL Configuration Tool window, select [**Spatial Feature**] from [**Basic Settings**], and click [**Detailed Settings**]. Select the [**Spatial Features**] tab in the displayed window, and click [**Register**].



2. **Add a spatial feature.**

- Add the object (desk, cabinet, etc.) that will be recognized as a feature point in the MREAL space.
- The added feature point is displayed in the Spatial Feature Tool window. When the feature point is recognized, the display of the indicator in the window changes from [**Poor**] to [**Good**]. Note that [**Dispersity**] is the distribution of feature points, and [**Features**] is the number of feature points (green points).

- If [**Good**] is not displayed, add more feature points.

3. **End Spatial Feature Tool.**

- Press button <B> on the MREAL Display or press the [**Alt**] and [**F4**] keys of the PC at the same time and select [**Yes**] from the displayed window.

4. **Check the stability of camera tracking.**

- Display a 3D CG in the MREAL image, and check that a phenomenon such as misalignment does not occur.

Clearing the Map

When camera tracking using spatial features is performed, data (map) for performing camera tracking is generated. When experiencing MREAL several times and a phenomenon such as 3D CG misalignment occurs, see “Clearing the Map” and then clear the map.

References

- Camera Tracking Methods Other Than Spatial Features
- Deactivating License and Uninstallation
- Calibrating the MREAL Display MD-10
- Adjusting Eye Width for the MREAL Display
- Precautions for Using MREAL Display MD-20 or MD-10
- Adjusting the 3D CG Orientation
- Printing the Default Marker
- Clearing the Map

Camera Tracking Methods Other Than Spatial Features

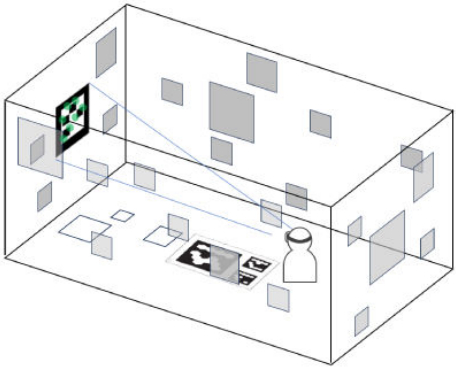
MREAL Platform supports the following camera tracking methods in addition to spatial features.

- Using Markers
- Using a Tracking Sensor

Each camera tracking method requires placing a Default Marker on a horizontal surface as the origin of the world coordinate system.

Using Markers

Use markers affixed to, for example, a wall or floor as tracking indicators. This is effective when there are few structures that can serve as feature points in the space. This facilitates an MREAL experience with higher accuracy than with spatial features ( ).



Using a Tracking Sensor

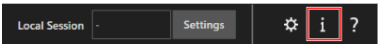
Track an attachment (sold separately) mounted to the MREAL Display with VICON, OptiTrack, or VRPN compatible optical sensor. This facilitates an MREAL experience with higher accuracy than using spatial features or markers ( ).

Deactivating License and Uninstallation

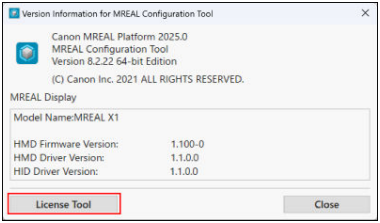
When you wish to, for example, use MREAL Platform on another PC, deactivate the license. For both online and offline license deactivation, launch License Management Tool with the following procedure to perform the work.

1. **Launch MREAL Configuration Tool.**

2. **Click [i] in the Tool menu.**



3. **Click [License Tool].**



- License Management Tool launches.

Online Deactivation of Single License

1. **Select the product name for which to activate the license in the Product name list, and click [Deactivate].**

2. **Click [Deactivate by Internet].**

3. **When the [Application has been deactivated.] message appears, click [OK].**

Offline Deactivation of Single License

1. **Select the product name for which to activate the license in the Product name list, and click [Deactivate].**

2. **Click [Deactivate by Phone].**

3. **Obtain a confirmation key.**

   - If you provide the product key and claim key to the activation support staff, a confirmation key will be issued.

4. **Enter the obtained confirmation key, and click [Deactivate by Phone].**

   - Make a note of [**Accession Number**] shown in the displayed screen, and contact the activation support staff.
   - Click [**OK**] to close the window.

Online Deactivation of Multiple Licenses Simultaneously

1. **Right-click the title bar of the License Management Tool window, and select [Deactivate multiple licenses].**

2. **Select [Deactivate multiple licenses by Internet].**

3. **Enter the product key in the [Product Key] field, and click [Deactivate].**

4. **When the Deactivate multiple licenses window appears, click [OK].**

Offline Deactivation of Multiple Licenses Simultaneously

1. **Right-click the title bar of the License Management Tool window, and select [Deactivate multiple licenses].**

2. **Select [Deactivate multiple licenses by Phone].**

3. **Enter the product key in the [Product Key] field, and click [Get Claim key].**

   - Make a note of the claim key displayed in the [**Claim Key**] field.

4. **Obtain a confirmation key.**

   - If you provide the product key and claim key to the activation support staff, a confirmation key will be issued.

5. **Enter the obtained confirmation key, and click [Deactivate].**

   - Make a note of [**Accession Number**] shown in the displayed screen, and contact the activation support staff.
   - Click [**OK**] to close the window.

Uninstallation

Windows 11

1. **Right-click the [Start] button, and select [Settings].**
2. **Click [Apps], and select [Installed apps].**
3. **Click […] on the right side of [Canon MREAL Platform20**] in the displayed list.**
4. **Click [Uninstall] and perform the uninstallation.**

Windows 10

1. **Right-click the [Start] button, and select [Settings].**
2. **Click [Apps], and select [Apps & features].**
3. **Select [Canon MREAL Platform20**] from the displayed list.**
4. **Click [Uninstall] on the right side and perform the uninstallation.**

Calibrating the MREAL Display MD-10

If MREAL images are still difficult to see after performing the operation of “MREAL Images Are Difficult to See” in “Troubleshooting” ( ) when using the MREAL Display MD-10, they may be improved by performing calibration with the following procedure.

Preparation

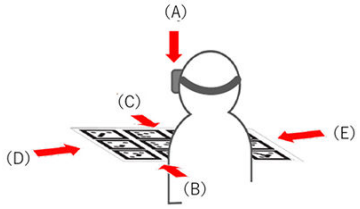
- Prepare a marker board (MREAL Marker Board [MB-3B]/[MB-4]). Place the marker board so that it will not move on a desktop or other surface.
- Launch Camera Realignment Tool by selecting Windows Start menu > [**Canon MREAL Platform 2025.x**] > [**MREAL Display Tools**] > [**CameraRealignmentTool_x64**].

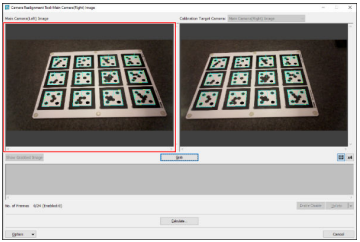
1. **Select [Execute calibration] in the Camera Realignment Tool window.**

2. **Click [OK] in the following window.**

3. Capture the marker board.

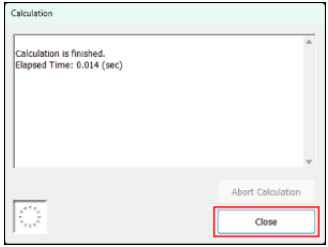
- From directly above (A), make adjustments so that the entire marker board fits inside the screen.



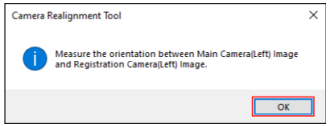


- Click [**Grab**] or press button <A> of the MREAL Display to capture images of the marker board.
- Capture images of the marker board also from the directions of (B) to (E).
- Capture at least three images in one direction, and up to a total of 24 images.
- When capturing in all directions is completed, click [**Calculate**] or press button <B> of the MREAL Display.

4. **When the following window appears, click [Close].**



5. **When the following window appears, click [OK].**



6. **Perform adjustment of the right main camera.**

- Perform the adjustment in reference to steps 3 to 5.

7. **Perform adjustment of the registration cameras.**

- Perform adjustment of the left and right registration cameras in reference to steps 3 to 5.

8. **Restart the MREAL Display.**

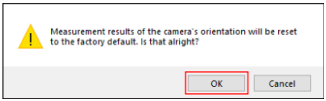
- When adjustment of all main cameras and registration cameras is finished, turn off the power of the MREAL Display. When you turn the power back on, the calibration work is complete.

Resetting to the Factory Shipment State

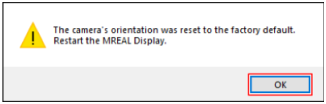
If the following window appears after calibration of the MREAL Display, reset the MREAL Display to the factory shipment state.

1. **Select [Reset to the factory shipment state] in the Camera Realignment Tool window.**

2. **Click [OK] in the following window.**



3. **Click [OK] in the following window.**



- When you turn off the power of the MREAL Display and then turn it back on, the MREAL Display is reset to the factory shipment state.

Adjusting Eye Width for the MREAL Display

If you feel that the images are difficult to see when wearing the MREAL Display, perform adjustment (eye width adjustment) with the following procedure.

1. **Launch Eye-width Measurement Tool.**

   Windows 11

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**MREAL Display Tools**] > [**EyeWidthMeasurementTool_x64**].

   Windows 10

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**MREAL Display Tools**] > [**EyeWidthMeasurementTool_x64**].

2. **Display your own face in the Eye-Width Measurement Tool window with the cameras of the MREAL Display.**

   - Follow the guidance on the screen to align the position of your face to capture guide frame (A).

3. **Capture images.**

- Click [**Image**] or press button <A> or <B> on the MREAL Display.

4. **Specify the positions of the pupils.**

- Images captured with the left camera and right camera are displayed.
- Select either of the images, and click the position of the left or right pupil. When you click, a yellow cross is displayed at the position of the pupil.
- When the position of the left or right pupil has been specified, click [**Next**].
- Click the position of the left or right pupil in the same way also in the next image to display a yellow cross.
- Click [**Next**] to end specification of the pupil positions.

5. **Check the eye-width distance.**

- The [**Your eye-width is XX mm.**] message appears. Make a note of the eye-width distance.

6. **Click [Done].**

7. **Adjust the eye width.**

- Operate the MREAL Display to adjust the eye width to the measured eye-width distance. For the eye-width distance adjustment method, refer to the instruction manual of the MREAL Display.

Note

- If you feel there is something wrong with the way images are displayed after eye width adjustment, see “Adjust Stereoscopy” on the [**Display**] tab (🔗).

Precautions for Using MREAL Display MD-20 or MD-10

- When using the MREAL Display MD-20 or the MREAL Display MD-10 with an MD motion sensor (sold separately) installed, launch MREAL Platform with the MREAL Display placed on a horizontal surface and in a stationary state.
- If [**Please keep MREAL Display stable.**] is displayed during use of the MREAL Display MD-20, place the MREAL Display MD-20 on a horizontal surface and keep it stationary for about 10 seconds.

Adjusting the 3D CG Orientation

When the position and angle of the 3D CG displayed in the MREAL space have deviated, launch Model Alignment Tool and make adjustments.
With [**Move and Rotate the World Coordinate System**], adjust the orientation and angle of the world coordinate system set for the 3D CG.
With [**Move and Rotate the Target Coordinate System**], adjust the position and orientation of the 3D CG assigned to the target.
Launch Model Alignment Tool with the following procedure.

When Adjusting the Orientation with [Move and Rotate the World Coordinate System]

1. **Select [Basic Settings] in the MREAL Configuration Tool window.**

2. **Click [Start Tool] of [Move and Rotate the World Coordinate System].**

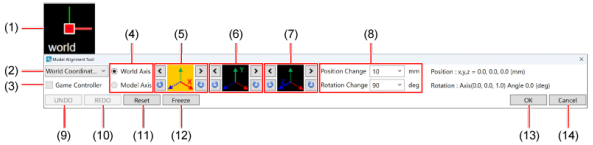
When Adjusting the Orientation with [Move and Rotate the Target Coordinate System]

1. **Select [Target] in [Option Settings] of the MREAL Configuration Tool window.**

2. **Select the target to adjust in [List of Targets], and click [Edit].**

3. **Click [Start Tool] of [Move and Rotate the Target Coordinate System].**

Model Alignment Tool Window



(1) Displays the coordinate axis of the coordinate system to be adjusted.

(2) Select the coordinate system (world coordinate system / target coordinate system) to be adjusted.

(3) Place a check mark in this checkbox when using a game controller for adjustment.

(4) Select the coordinate system to be the reference for movement and rotation.

(5) Move and rotate in the X-axis direction.

(6) Move and rotate in the Y-axis direction.

(7) Move and rotate in the Z-axis direction.

(8) Set the amount of change for adjustment with a single click.

(9) Undo the last operation.

(10) Redo the undone operation.

(11) Reset the adjustments.

(12) Freeze the position of the 3D CG, and adjust the positional relationship between the actual image and 3D CG.

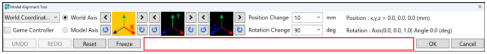
(13) Save the settings and close the Model Alignment Tool window.

(14) Close the Model Alignment Tool window without saving the settings.

When Using a Game Controller

1. **Place a check mark in [Game Controller].**

2. **Right-click in the following area, and select [Game Controller Setting...].**



3. **Assign the adjustment items to the controls of the game controller in the displayed window.**

Printing the Default Marker

1. **Open the folder containing the PDF of the Default Marker.**

   Windows 11

   - Click the [**Start**] button.
   - Click [**All apps**], and select [**Canon MREAL Platform 2025.x**] > [**Markers**].

   Windows 10

   - Click the [**Start**] button.
   - Select [**Canon MREAL Platform 2025.x**] > [**Markers**].

2. **Select the PDF (Default Marker(MB-**).pdf)of the Default Marker to print.**

File name	Defined MREAL marker	Paper size
Default Marker(MB-3A).pdf	ID1968 to ID1970	A3
Default Marker(MB-3B).pdf	ID0 to ID11	A3
Default Marker(MB-4).pdf	ID1018 to ID1023	A4

3. **Load paper of the set size into the printer, and print the Default Marker.**

Clearing the Map

When camera tracking using spatial features is performed, data (map) for performing camera tracking is generated.
When experiencing MREAL several times and a phenomenon such as 3D CG misalignment occurs, clear the map with one of the following procedures.

When Clearing Using Spatial Feature Tool

- Press button <A> on the MREAL Display, select [**Clear map**] from the displayed menu, and press button <B>.

When Clearing from Preview Tool Window

- Click [] in the Preview Tool window, and then select [**Clear map**] from the displayed menu.

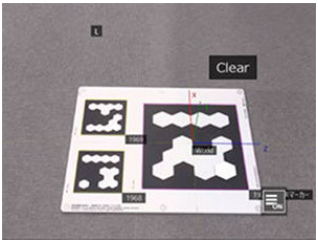
When Clearing by Operating MREAL Display

- Cover the front (either the left or right) of the MREAL Display with a hand.

- Cover it with a hand until [**Lost**] appears in the displayed image.

- Do not touch the front surface of the MREAL Display with your hand.

- When the map is cleared, [**Clear**] appears in the displayed image.



The [**Clear**] indication will disappear after several seconds. When you look at the Default Marker with the MREAL Display after that, camera tracking using spatial features starts again.

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