User's Handbook

Mindesk for Rhinoceros 6
v 3.0.0

Last update August 2019

Contents

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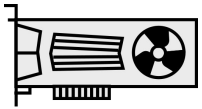
Getting Started

Getting Started | Minimum Equipment Requirements

Mindesk is the first VR/AR interface for desktop CAD software. Before diving into the matrix, you should have your computer ready for VR/AR. Please reference tech specs below,

Processor

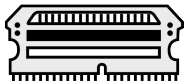
Intel Core i5-4590/AMD FX 8350 equivalent or better



GPU

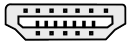
NVIDIA GeForce GTX 1060, AMD Radeon RX 480 equivalent or better

Note: See Nvidia's list of VR ready graphic cards. (Please scroll down to the Support section, click on supported GPUs)



Memory

4 GB RAM or more



Video Output

HDMI 1.4, DisplayPort 1.2 or newer

USB Port

1x USB 2.0 or newer

Operating System

Windows 7 SP1, Windows 8.1 or later,Windows 10

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Getting Started | Supported VR/AR Devices

To use Mindesk, you will then need a PC-based headset with two 6 degree-of-freedom controllers. Mindesk currently supports HTC Vive, Oculus Rift, and Windows Mixed Reality (WMR) to serve designing in VR. Choose your prefered VR device for Mindesk.

htc VIVE

oculus

Windows Mixed Reality

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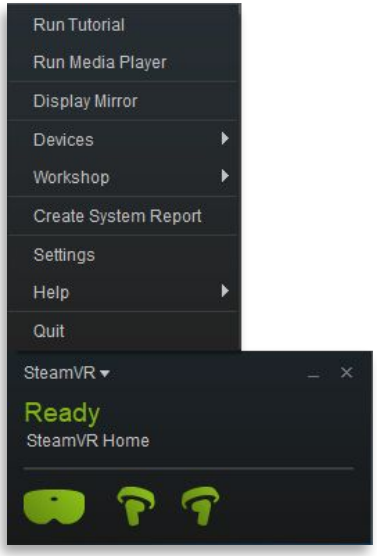
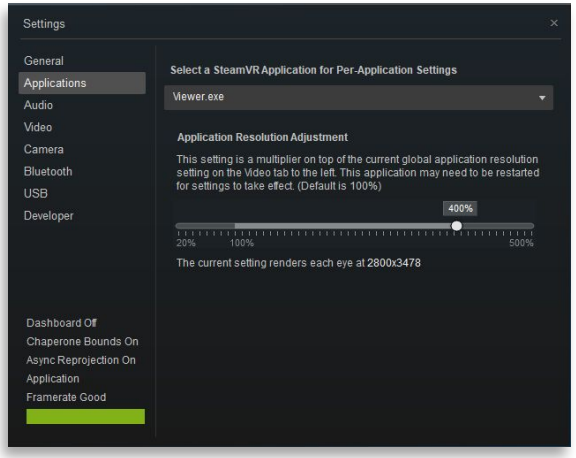
Getting Started | System Info and Options

Now, you have all hardware equipments ready to go. Let's set up the system before really jumping into Mindesk. Not matter what type of user (Vive/Rift/WMR) you are, SteamVR is required to be installed before hand. Note, if you are a WMR user, you need to install Mixed Reality Portal as well.To have better experiences with Mindesk, we recommend you to adjust SteamVR supersampling settings before entering VR.

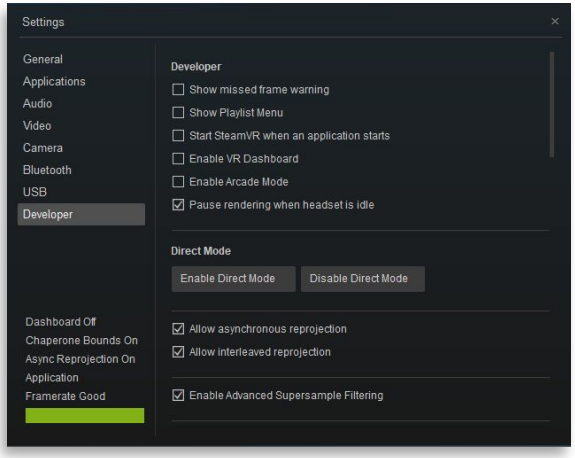
1. Go to SteamVR, open the menu and select "Settings".



2. On "Settings", click "Application" tab, when Mindesk is activated, select "Viewer.exe" for Per-Application Settings. Then, slide right to adjust the resolution to 200%.



3. Click the "Developer" tab, follow the below picture to check/uncheck the options.



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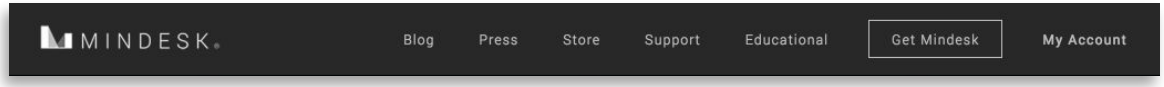
Downloading Mindesk

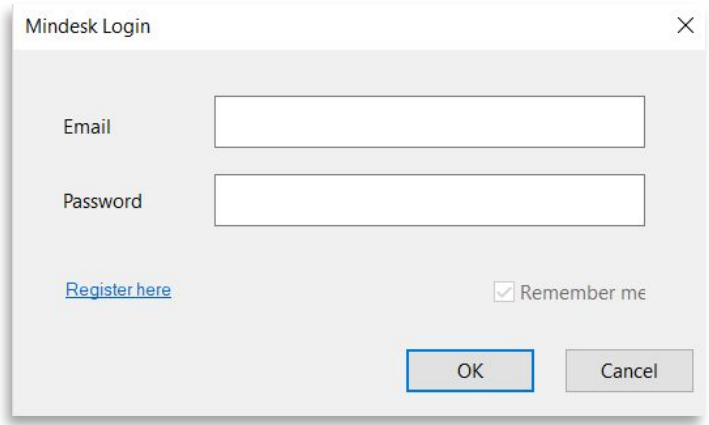
Go to mindeskvr.com/setup, sign up for a mindesk account.

Follow the steps to download the latest version of Mindesk. If you already registered, log in to download.



Installing Mindesk

To install Mindesk, just open the .rhi package and follow the instructions.



Mindesk Options

Email
The current user's email is displayed here.

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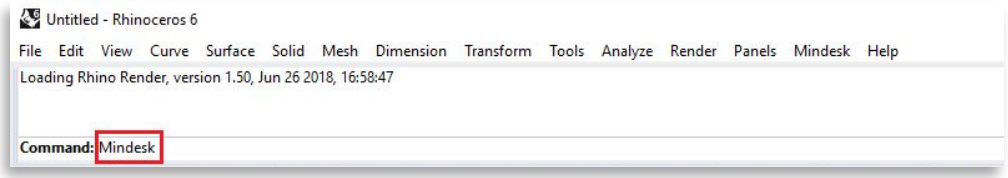
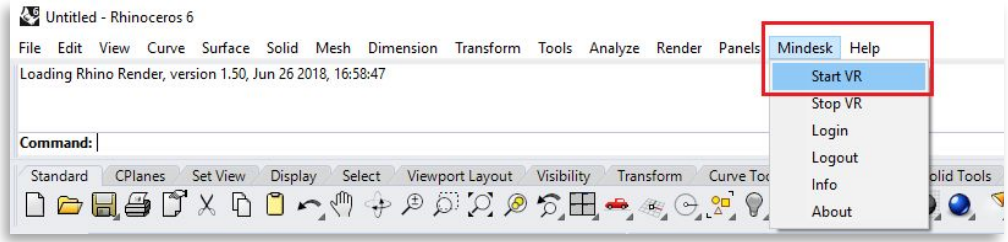
Booting/stopping Mindesk

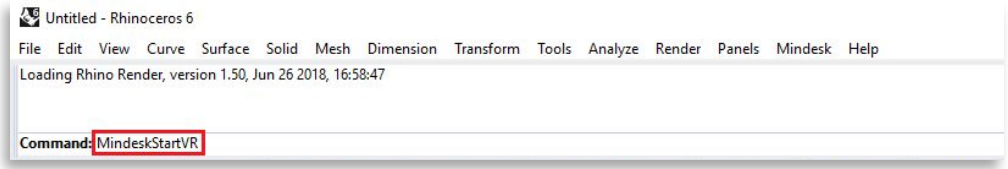
If this is your first boot, you need to log into Mindesk by entering your email address and password (the same used to register on www.mindeskvr.com).

Once installed, boot McNeel Rhinoceros and type “MindeskStartVR” on Rhino’s command line to boot Mindesk. You can check “Remember me” for your next session. Alternatively, you can select “Start VR” from the “Mindesk” sub-menu in Rhino top bar.

You can safely stop Mindesk by just closing the VR Viewer window, or by typing “MindeskStopVR” on the Rhino command bar, or by clicking “Stop VR” from the “Mindesk” sub-menu in Rhino top bar.







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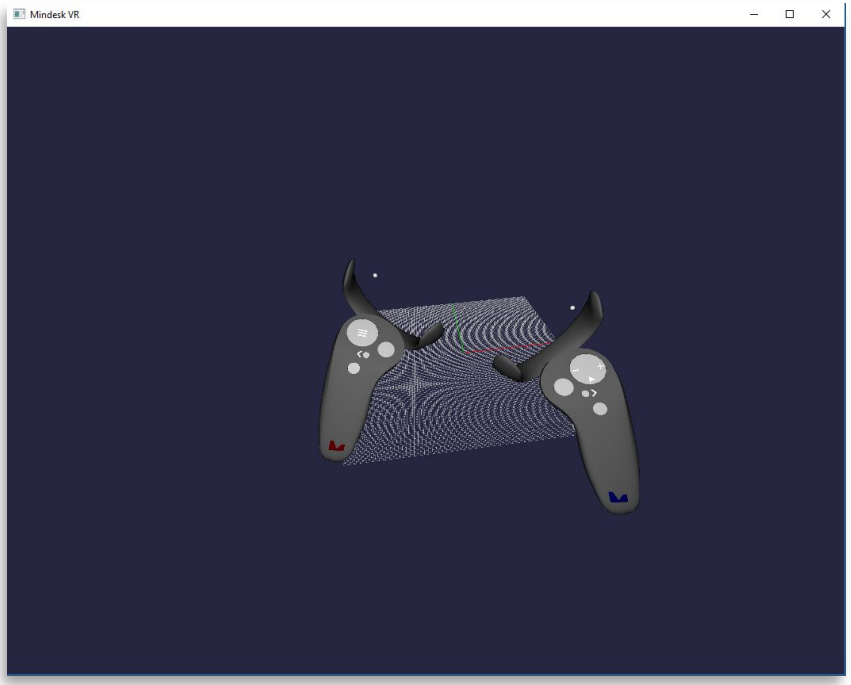
Mirror Window

For the desktop user, here are some quick commands on the keyboard to go.

M = toggle mirror camera, HMD point of view and Vive tracker (if connected) for mixed reality videos
I = invert controllers
F11 = fullscreen

You can record and share your sessions through an external screen recorder.

We recommend using OBS Studio, a free software.



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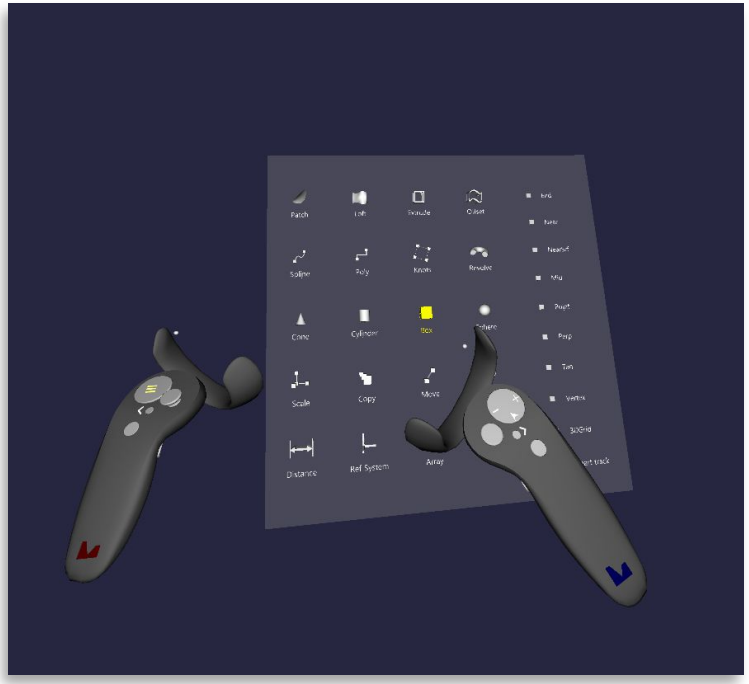
Learning the Basics

VR-CAD User Interface

Mindesk VR interface allows you to control McNeel Rhinoceros 6™ (“Rhino”) by using your VR controller instead of mouse and keyboard.

You can still use Rhino in the traditional way by just removing your headset. Once you start Mindesk, turn on your VR controllers and continue working immersed in the Rhino space.

Your controllers are replaced by two virtual controllers in the virtual world. The left one is marked with a red M, while the right one has a blue M engraved on it. This allows you to easily recognize controllers, since they’re used for different functions.



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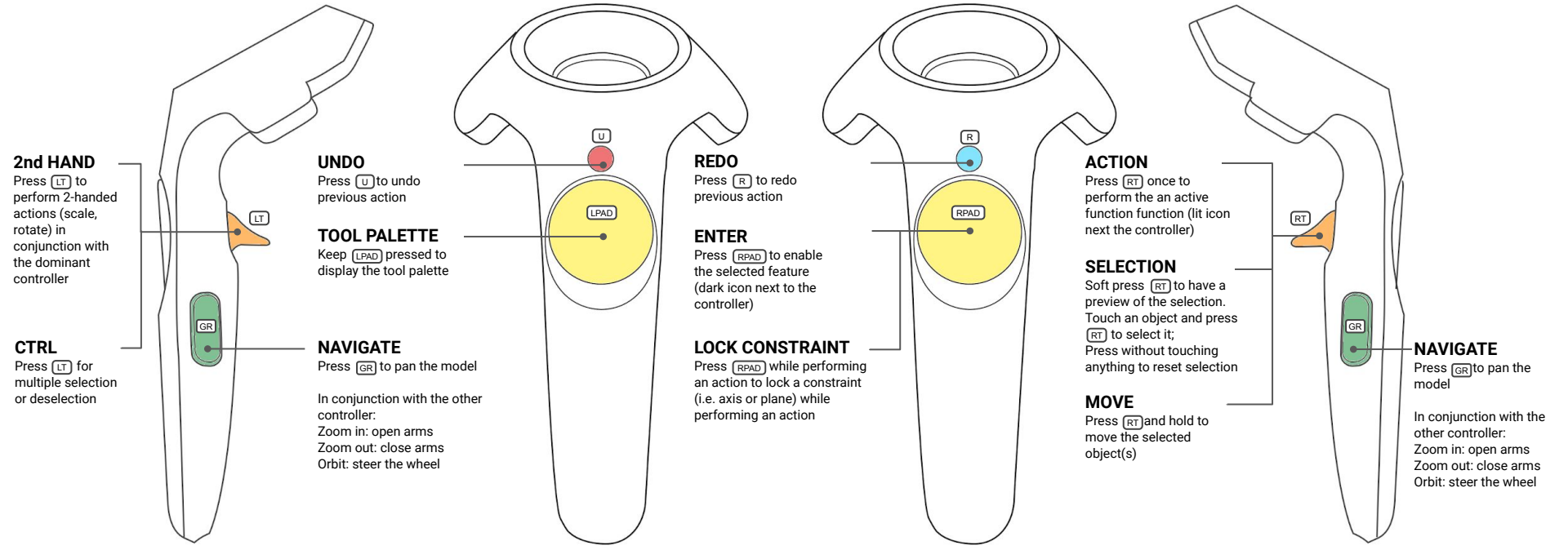
MINDESK

HTC Vive controllers configuration



Non-dominant hand
Tool palette

Dominant hand
Modeling

GR Grip
PAD Pad
T Trigger
U Undo
R Redo

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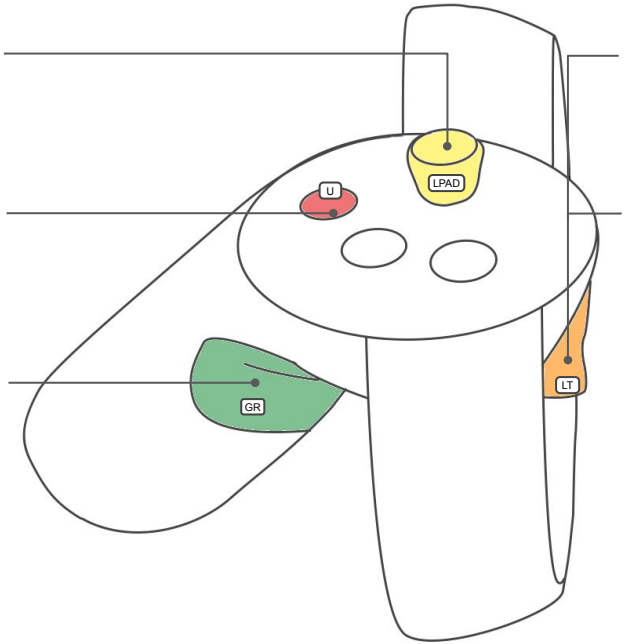
MINDESK

Oculus Rift controllers configuration



TOOL PALETTE
Keep [LPAD] pressed to display the tool palette

UNDO
Press [U] to undo previous action

NAVIGATE
Press [GR] to pan the model

In conjunction with the other controller:
Zoom in: open arms
Zoom out: close arms
Orbit: steer the wheel

2nd HAND
Press [LT] to perform 2-handed actions (scale, rotate) in conjunction with the dominant controller

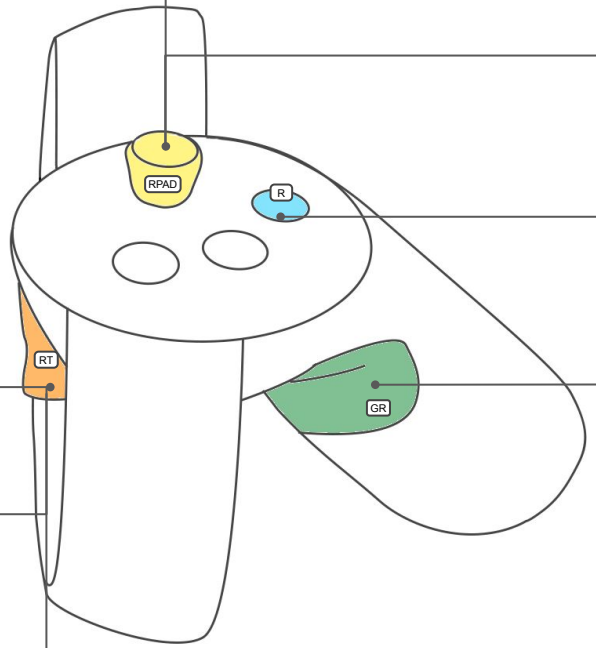
CTRL
Press [LT] for multiple selection or deselection

ACTION
Press [RT] once to perform the an active function function (lit icon next the controller)

SELECTION
Soft press [RT] to have a preview of the selection. Touch an object and press [RT] to select it; press without touching anything to reset selection

MOVE
Press [RT] and hold to move the selected object(s)

Non-dominant hand
Tool palette



ENTER
Press [RPAD] to enable the selected feature (dark icon next to the controller)

LOCK CONSTRAINT
Press [RPAD] while performing an action to lock a constraint (i.e. axis or plane) while performing an action

REDO
Press [R] to redo previous action

NAVIGATE
Press [GR] to pan the model

In conjunction with the other controller:
Zoom in: open arms
Zoom out: close arms
Orbit: steer the wheel

Dominant hand
Modeling

[GR] Grip
[PAD] Pad
[T] Trigger
[U] Undo
[R] Redo

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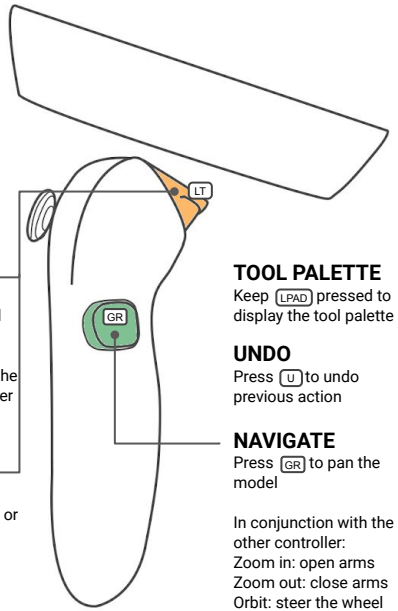
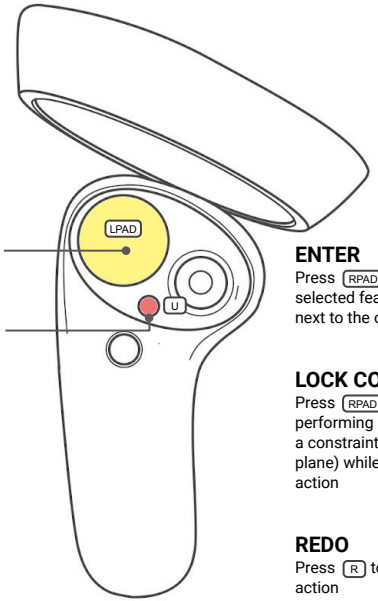
MINDESK

Windows Mixed Reality controllers configuration



2nd HAND
Press LT to perform 2-handed actions (scale, rotate) in conjunction with the dominant controller

CTRL
Press LT for Multiple selection or deselection



TOOL PALETTE
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NAVIGATE
Press GR to pan the model

In conjunction with the other controller:
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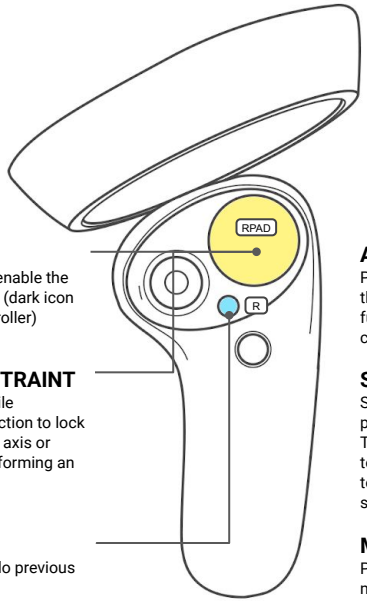
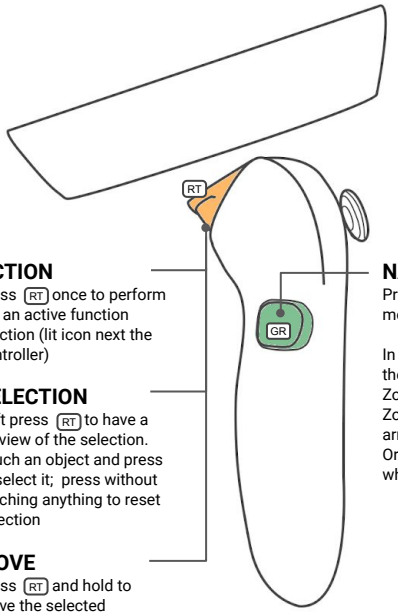
Non-dominant hand
Tool palette



ENTER
Press RPAD to enable the selected feature (dark icon next to the controller)

LOCK CONSTRAINT
Press RPAD while performing an action to lock a constraint (i.e. axis or plane) while performing an action

REDO
Press R to redo previous action



ACTION
Press RT once to perform the an active function function (lit icon next the controller)

SELECTION
Soft press RT to have a preview of the selection. Touch an object and press to select it; press without touching anything to reset selection

MOVE
Press RT and hold to move the selected object(s)

NAVIGATE
Press GR to pan the model

In conjunction with the other controller:
Zoom in: open arms
Zoom out: close arms
Orbit: steer the wheel

Dominant hand
Modeling

GR Grip
PAD Pad
T Trigger
U Undo
R Redo

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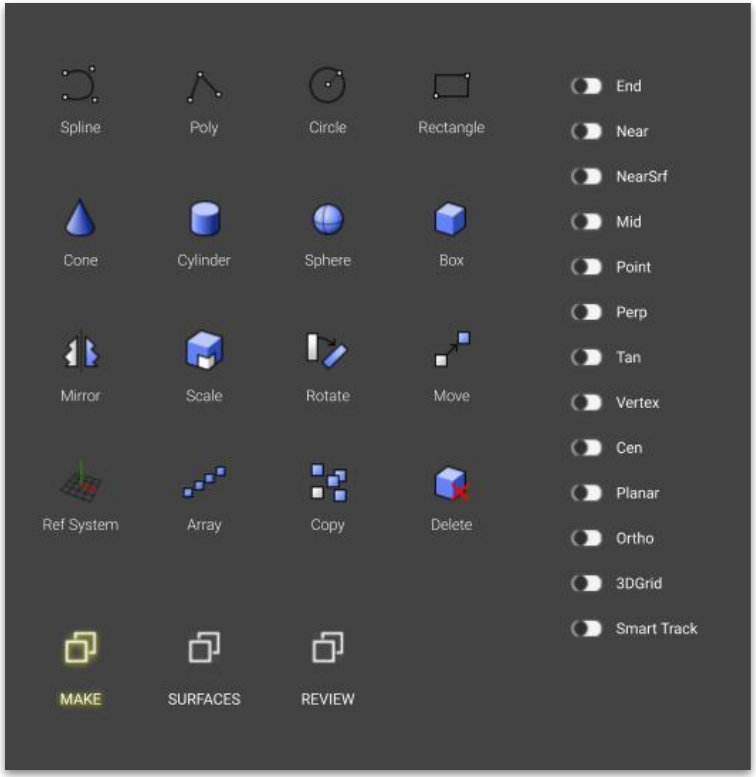
Make

The Make section of the tool palette contains all main design tools used in Mindesk. You can select design tool from the palette before start working on your project.

Press the Pad button on the left controller to open the tool palette. While the palette is open, hover the right controller to select the desired tool and press the right trigger button to activate it. Once successfully picked, the tool should appear on the side of each controller.

In the tool palette you can activate and deactivate VR SNAP tools as well.

The tool palette is divided into two areas: design tools are listed on the left as 3D icons, while VR SNAP functions are listed to the right as text.



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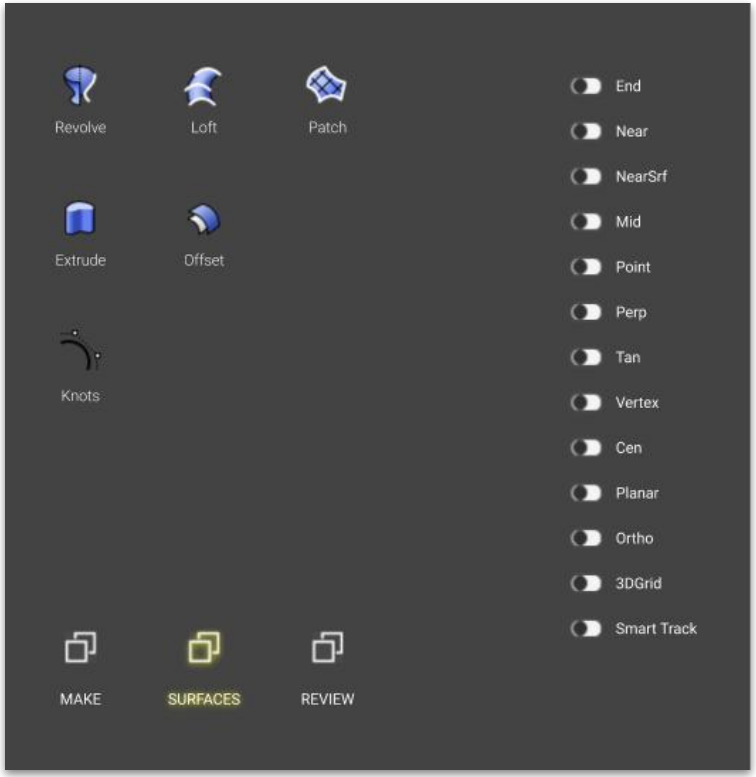
Surfaces

The Surfaces section contains the main surfacing tools used in Rhinoceros. With these features you can create surfaces starting from Rhino curves or edit existing ones.

To use a tool just follow the same procedure as for the features in the Make section.



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Review

The Review section contains inspection and markup tools used in design reviews. You can select design tool from the palette before start working on your project.

To use a tool just follow the same procedure as for the features in the Make section.

The right area of this section hosts a list of the main view scale. Use the switches to lock the VR navigation on a particular view scale.

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Object Selection

Selection:
Approach the right controller to the target object and press RT to select it. Within a certain distance, Mindesk would select the nearest object.
If your model has many objects, soft press RT for a selection preview.

Additive selection:
Keep LT pressed and select the objects with the right controller. The selected objects will stay so even if you stop pressing the left trigger.

Object Deselection

Subtractive selection:
Keep LT pressed and deselect the objects with RT. The rest of objects will stay selected.

Deselect all:
Point the right controller in an empty space and press RT.

Navigation

Pan:
press and hold either left or right GR

Orbit:
press both GR and "steer the wheel" (pretty much like Google Maps)

Zoom:
press both GR and "pinch to zoom" (pretty much like Google Maps)

Undo action:
press U on the left controller

Redo action:
press R on the right controller

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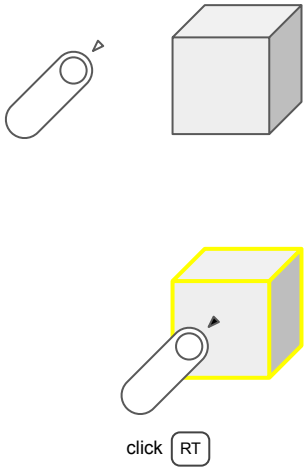
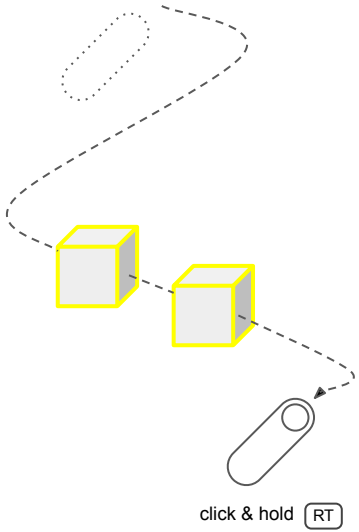
Learning the Basics | Selection and Navigation

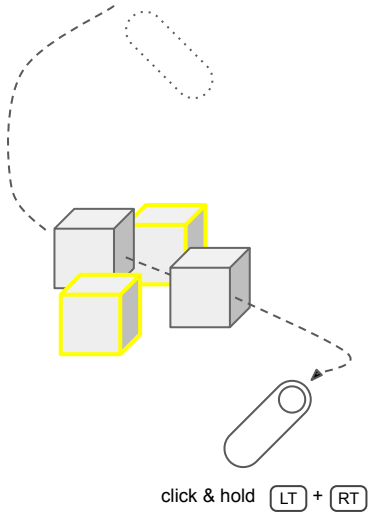
Simple selection



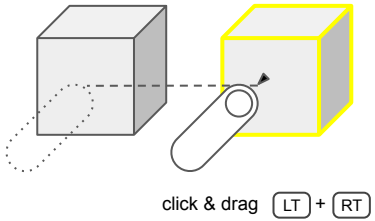
Multiple additive



Multiple subtractive



Copy



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Design Tools

Design Tools | Make


Spline


Poly

Click RT to start drawing a 3D spline / poly and add control points.
Click RT on the latest control point or RPAD anywhere to end drawing an open spline / poly.
Click RT on the first control point to close the spline / poly.


Circle


Rectangle

Click and drag RT to create a circle / rectangle. While dragging RT you can change the size, release RT to complete the action.
(or) Click RT to define the center / first point and click RT again to define the radius / second point. The plane of the curve is defined by the position of the second point with respect to the first point and is generally aligned with the Ref Sys.


Cone


Cylinder


Sphere


Box

Click and drag RT to create the bidimensional base shape. While dragging RT you can change the size, release RT to complete the base, click RT again to set the third dimension of the solid.

(or) Click RT to define the first dimension, click RT again to define the second dimension and a third time to define the third dimension of the solid.

The sphere needs two input points only: center and diameter.

The plane of the base is defined by the position of the second point with respect to the first point and is generally aligned with the Ref Sys.

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Design Tools | Make

Mirror

Select the target objects, click RT to define an anchor point, click RT again to define a mirror vector. The target objects are mirrored with respect to the plane normal to the mirror vector.
(or) Click RT to define the anchor point, then click RT and drag to define the mirror vector.

Move

Copy

Select the target objects, click RT to set the origin and click RT to set the destination point. The target objects are moved / copied from the origin to the destination point.
(or) Press RT and drag to move the target objects.

Scale

Rotate

Select the target objects, click RT to define an anchor point, click RT to define a scale / rotation reference point, then click RT again to define the measure and complete the operation with respect to the anchor point.
(or) Click RT to define the anchor point, then click RT and drag to define the direction and magnitude of the transformation.

While scaling, transformation (1D, 2D, or 3D) and the scale factors are determined by the second and third point.

While rotating, the rotation plane and angle are determined by the second and third point

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Design Tools | Make

Ref System

Press and drag RT to move the reference system. While moving the reference system, use LT to grab the handlers on the axis and rotate the reference system around its origin.
The rotation plane is defined by the handler grabbed and the direction in which the hadler is moved.

Delete

Select the target objects and click RT to delete them.

Array

Select the target objects, click RT to define an anchor point, move the controller in the direction of the array and click RT to generate the first copy, then move the controller in the same direction and click RT again to define the number of instances.
(or) Press RT and drag to define the anchor point and generate the first copy, then move the controller in the same direction and click RT again to define the number of instances.

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Design Tools | Surfaces

Revolve

Select the profile curve, click RT to define an anchor point, click RT to define the revolve reference point, then click RT again to define the angle and complete the operation with respect to the anchor point.
(or) Click RT to define the anchor point, then click RT and drag to define the angle and plane of revolution.

Loft

Patch

Select the generating curve/s, click RT to generate a lofted / patched surface from the generating curve/s.

Extrude

Offset

Select the source objects, click RT to define an anchor point, click RT to define the extrude / offset distance.
(or) Press RT and drag to extrude / offset the source curve / surface.

In case of extrusion the second click defines the direction of extrusion.

Knots

Select the target objects, click RT to activate its control points. Click RT in an empty point to turn off the control points.
Once active, control points can be grabbed with RT and moved around to deformate the object. Control points can be also rotated and scaled.

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Design Tools | Review

Brush

Press and hold RT to draw a mark in the space.

The mark is stored on the Rhino CAD file as a polyline on the _Mindesk brush layer and can be used to leave notes or suggest edits. The user can treat the mark as a normal Rhino object along with other commands like copy, move, and delete. It is possible to snap on the mark.

Distance

Click and drag RT to measure the distance between the start and end points.
(or) Click RT to define the start point, click RT again to define the end point.

Temporary quotes for X,Y, and Z axis as well as for direct distance will appear. Click RT again to reset the measure.

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Precision Options

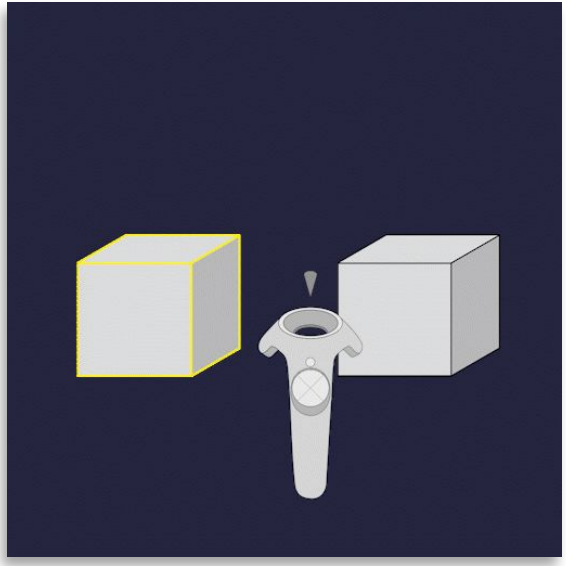
Precision Tools | VR SNAP Options

Geometric Constraints

Located on the right side of the tool palette, VR SNAP options can be activated to make super precise models. Like in Rhino, each snap enables a different geometric constraint:

End	snap to the end points of the nearest curve or edge
Near	snap to the closest point on the nearest curve
NearSrf	snap to the closest point on the nearest surface
Mid	snap to the middle point on the nearest curve or edge
Point	snap to points and knots
Perp	snap to any point on the nearest curve perpendicular to current curve in progress
Tan	snap to any point on the nearest curve tangent to current curve in progress
Vertex	snap on the closest vertex of a mesh
3D Grid	snap to the closest point on a 3D Grid which size is determined by the user
Smart Track	toggle smart tracking

When a snap point is detected, the cursor turns yellow.



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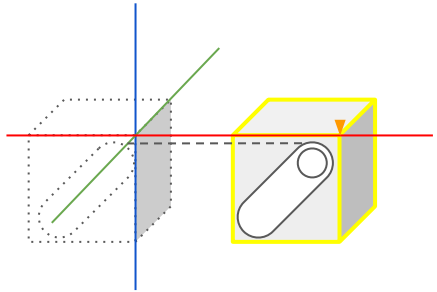
Precision Tools | Magnetic Guidelines, Smart Tracking

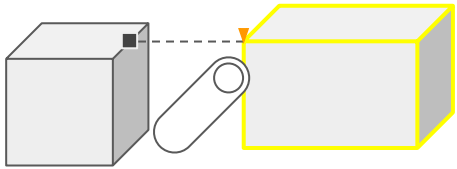
Magnetic Guidelines

While drawing a polyline, moving a solid, or copying an object, magnetic guidelines show up to help you aligning geometries along local X, Y, or Z axes. Also, magnetic guidelines helps aligning objects on XY, YZ, or ZX planes and the respective diagonal vectors.



Smart Tracking

Smart tracking helps to align an object with distant Reference Points which you snapped to. To activate the smart tracking on a Reference Point, hover the pointer on it once, hover again to deactivate it. You can activate up to 8 smartrack Reference Points. Active Reference Points are displayed in gray.



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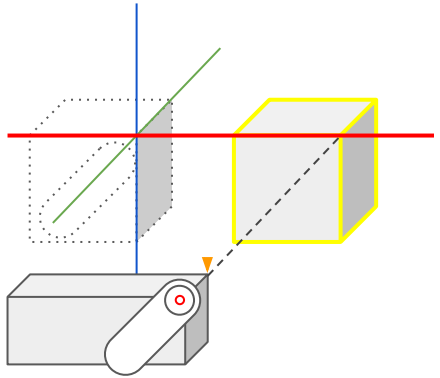
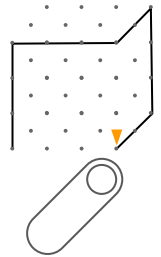
Lock Constraint

Lock Constraint help you constraint the move of an object onto an axis, a plane, or a surface. While the object is constrained you can snap on distant objects. This is particularly hady when it comes to aligning objects. In Rhino this operations is called "*snappy draggy*".
To constraint an object click the Right Pad button while moving an object on a magnetic axis or plane or surface. The icon on the right pad turns red when the object is constrained.



3D Grid

While drawing a polyline, moving a solid, or copying an object, if active, 3D Grid can help you inputting precise, modular mesures. The grid size depends on the zoom level and will dynamically adapt to it. If you need a finer grain, just zoom in. Zoom out for a thicker grain.



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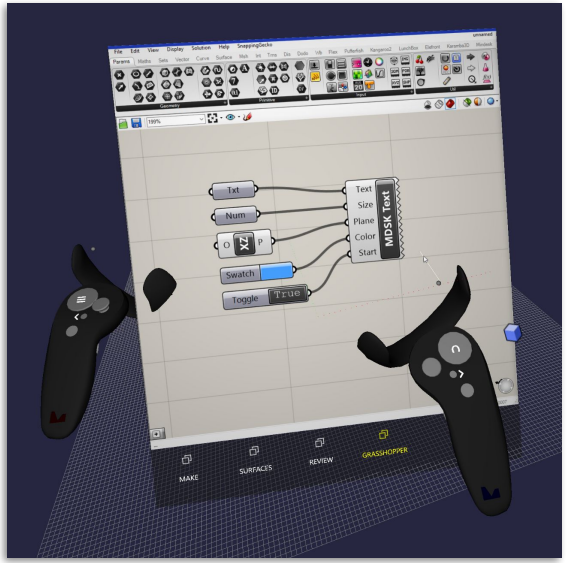
Grasshopper Component

NEW

Grasshopper VR | Immersive interface

While Mindesk and Grasshopper are running, it is possible to use the Grasshopper canvas from the last section in the Mindesk tool palette.

Note: it is important that the desktop Grasshopper window is on top to be properly displayed in VR



Interaction

Use the right controller to point and interact with the Grasshopper window in VR. While pointing the GH window, the controller will not interact with other objects in VR.

RT = Right mouse click (select, move and link GH components)

LT + RT = Left mouse click (open contextual menu)

RPAD = Canvas navigation (press to pan, slide up/down to zoom)

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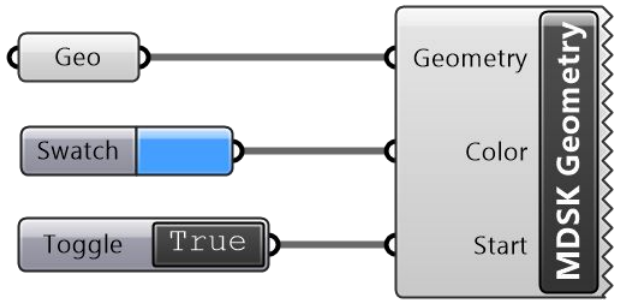
Geometry

Objects inputted in the Geometry connector are rendered in VR when Mindesk is running. The component can manage single items, lists and trees. The component accepts points, curves, surfaces, meshes and breps.



Color

The connector accepts Grasshopper Colors, including Alpha channels for transparency. In general, geometry and color trees should match. If geometries outnumber colors, “longest list” logic applies.

Start

This connector accept a boolean toggle. While Mindesk is running, set toggle to *“True”* to link Grasshopper and VR. Set toggle to *“False”* to unlink Grasshopper from your Mindesk VR session.

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NEW

Grasshopper VR | MDSK Text

Text

Strings inputted in the Text connector are rendered in VR when Mindesk is running. The component can manage single items, lists and trees.

Size

The connector accepts numbers, lists of numbers, and trees. The inputted numbers affect the related text sizes.

Plane

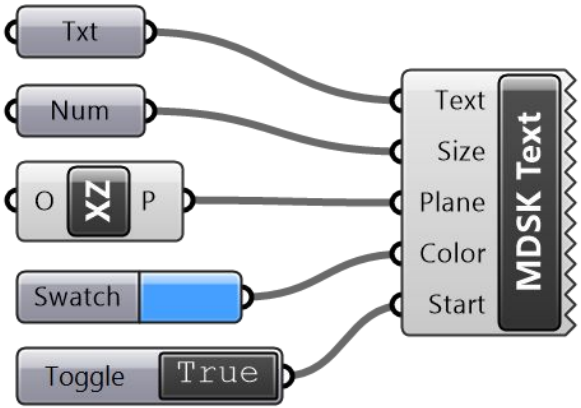
The connector accepts planes, lists of planes, and trees. The inputted plane affect the related text orientation.

Color

The connector accepts Grasshopper Colors, including Alpha channels for transparencies. In general, geometry and color trees should match. If geometries outnumber colors, "longest list" logic applies.

Start

This connector accept a boolean toggle. While Mindesk is running, set toggle to *"True"* to link Grasshopper and VR. Set toggle to *"False"* to unlink Grasshopper from your Mindesk VR session.



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Made with ♡ by Mindesk team

If you need to ask us anything, please post a question at https://www.mindeskvr.com/support/