Rhino 7 Features
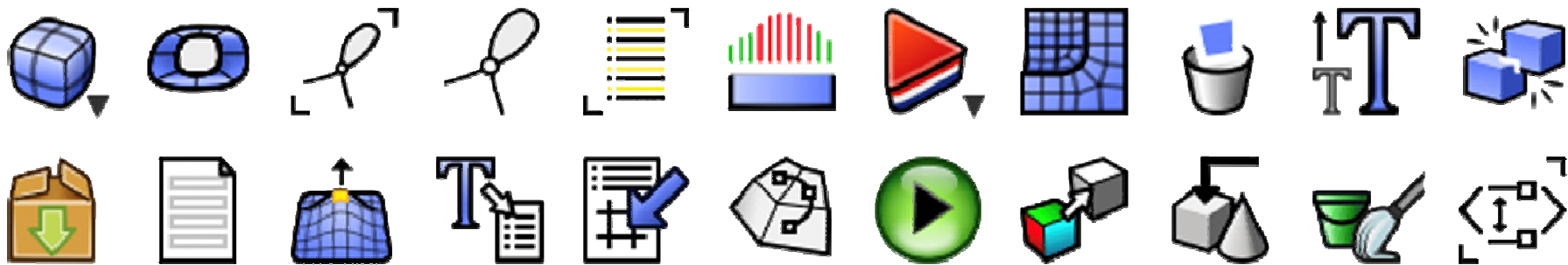
Overview

Rhino can create, edit, analyze, document, render, animate, and translate NURBS curves, surfaces and solids, subdivision geometry (SubD), point clouds, and polygon meshes. There are no limits on complexity, degree, or size beyond those of your hardware.

Special features include:

- Uninhibited free-form 3D modeling tools like those found only in products costing 20 to 50 times more. Model any shape you can imagine.
- Accuracy needed to design, prototype, engineer, analyze, and manufacture anything from an airplane to jewelry.
- Compatibility with all your other design, drafting, CAM, engineering, analysis, rendering, animation, and illustration software.
- Read and repair meshes and extremely challenging IGES files.
- Accessible. So easy to learn and use that you can focus on design and visualization without being distracted by the software.
- Fast, even on an ordinary laptop computer. No special hardware is needed.
- Development platform for hundreds of specialty 3D products.
- Affordable. Ordinary hardware. Short learning curve. Affordable purchase price. No maintenance fees.
- Rhino for Mac: The world's most versatile 3D modeler, available on macOS. *Learn more…*

New in Rhino 7

Rhino 7 is the most significant upgrade in our history. Create organic shapes with our new SubD tools. Run Rhino and Grasshopper as a Revit® Add-On with Rhino.Inside.Revit. Use the robust QuadRemesh algorithm to create a beautiful quad mesh from NURBS geometry or meshes. With this release, we've unlocked completely new modeling workflows and refined many steadfast features.

Thanks to thousands of prerelease users, we were able to field test and refine Rhino 7, making it the fastest and most stable version ever.

More details…

Model Creation Tools
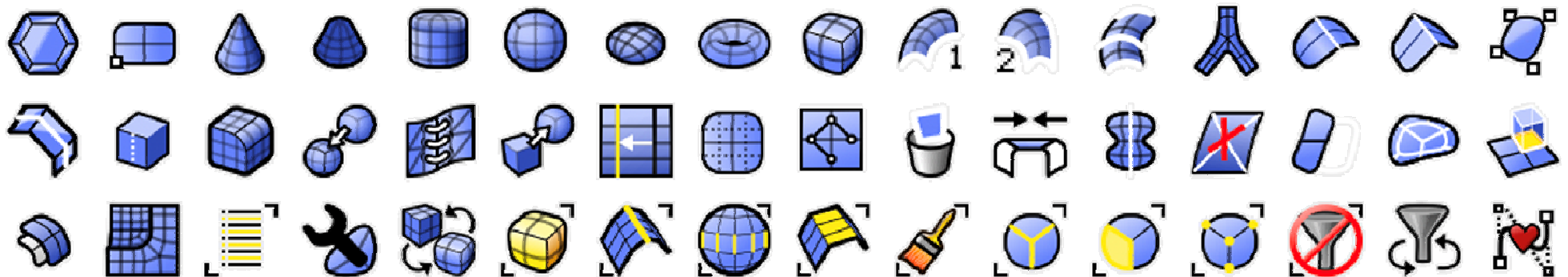
Points: Points, point clouds, point grid, extract from objects, mark (intersection, divide, draftangle, ends, closest, foci).

Curves: Line, polyline, polyline on mesh, free-form curve, circle, arc, ellipse, rectangle, polygon, helix, spiral, conic, TrueType text, point interpolation, control points (vertices), sketch.

Curves from other objects: Through points, through polyline, extend, continue curve, fillet, chamfer, offset, blend, arc blend, from two views, tween, cross section profiles, intersection, contour on NURBS surface or mesh, section on NURBS surface or mesh, border, silhouette, extract isoparm, extract curvature graph, projection, pullback, sketch, wireframe, detach trim, 2D drawings with dimensions and text, flatten developable surfaces.

Surfaces: From 3 or 4 points, from 3 or 4 curves, from planar curves, from network of curves, rectangle, deformable plane, extrude, ribbon, rule, loft with tangency matching, developable, sweep along a path with edge matching, sweep along two rail curves with edge continuity, revolve, rail revolve, tween, blend, patch, drape, point grid, heightfield, fillet, chamfer, offset, plane through points, TrueType text, Unicode (double-byte) text.

Solids: Box, sphere, cylinder, tube, pipe, cone, truncated cone, pyramid, truncated pyramid, ellipsoid, torus, extrude planar curve, extrude surface, cap planar holes, join surfaces, region, nonmanifold merge, TrueType text, Unicode (double-byte) text.

Meshes: From NURBS surfaces, from closed polyline, mesh face, plane, box, cylinder, cone, and sphere.

Rhino 7 adds dozens of refinements to existing tools and some new commands:

SubD: For designers who need to explore organic shapes quickly, SubD is a new geometry type that can create editable, highly accurate shapes. Unlike other geometry types, SubD combines free-form accuracy while still allowing quick editing.

BlendSrf: New Refine checkbox avoids creating a simpler blend surface.

Revolve: Ends of the revolving axis can be attached to objects using object snaps when History is recorded.

MatchSrf: History locking allows editing control points of matched surfaces.

DupBorder: Added History support.

FilletSrf: Now has a G2 option.

New in Rhino 7…

Editing

Edge Tools   Select Surfaces   Lock

Point Edit   Extend

General Tools: Delete, delete duplicates, join, merge, trim, untrim, split, explode, extend, fillet, chamfer, object properties, history.

Transform Tools: Cut, copy, paste, move, rotate, mirror, scale, stretch, align, array, twist, bend, taper, shear, offset, orient, flow along curve, pull, project, boxedit, smash, squish.

Points and curves: Control points, edit points, handlebars, smooth, fair, change degree, add/remove knots, add kinks, rebuild, refit, match, simplify, change weight, make periodic, adjust end bulge, adjust seam, orient to edge, convert to arcs, a polyline, or line segments.

Surfaces: Control points, handlebars, change degree, add/remove knots, match, extend, merge, join, untrim, split surface by isoparms, rebuild, shrink, make periodic, Boolean (union, difference, intersection), unroll developable surfaces, array along curve on surface.

Solids: Fillet edges, extract surface, shell, Booleans (union, difference, intersection).

Meshes: Explode, join, weld, unify normals, apply to surface, reduce polygons.

Editing complex models in Rhino 7 is fast and easy:

Named Selections: For anyone who has a need to repeatedly select objects and sub-objects, Named Selections is a productivity enhancement which makes recalling selections simple.
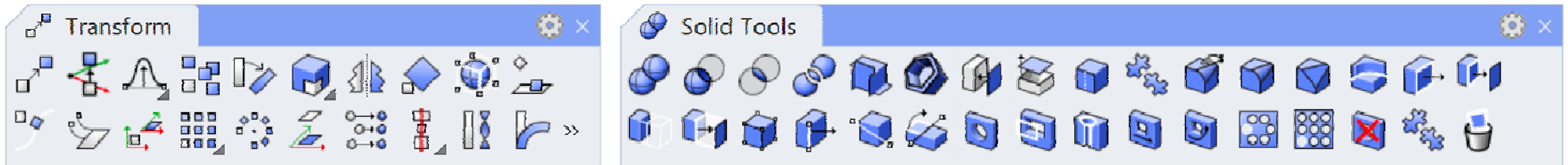
Curve Surface Intersections improves results for trims, splits, and Booleans. In our testing, this can be 4x faster in some cases.

BlendEdge: We changed the spacing of control points in BlendEdge based on customer feedback.

Boolean Operations have been improved to union, subtract or intersect coplanar surfaces.

Interface

User interface: Coordinate read-out, floating/dockable command area, pop-up recently-used commands, clickable command options, auto-complete command line, customizable pop-up commands, pop-up layer manager, synchronize views, camera-based view manipulation, perspective match image, configurable middle mouse button, customizable icons and user workspace, customizable pop-up toolbar, transparent toolbars, context-sensitive right-click menu, multiple monitor support, Alt key copy and OpenGL hardware support with antialiasing.

Construction aids: Unlimited undo and redo, undo and redo multiple, exact numeric input, units including feet and inches and fractions, .x, .y, .z point filters, object snaps with identifying tag, grid snaps, ortho, planar, named construction planes, next and previous construction planes, orient construction plane on curve, layers, layer filtering, groups, background bitmaps, object hide/show, show selected objects, select by layer, select front most, color, object type, last object, and previous selection set, swap hidden objects, object lock/unlock, unlock selected objects, control and edit points on/off, and points off for selected objects.

Rhino for Mac takes advantage of macOS user interface conventions.

Display
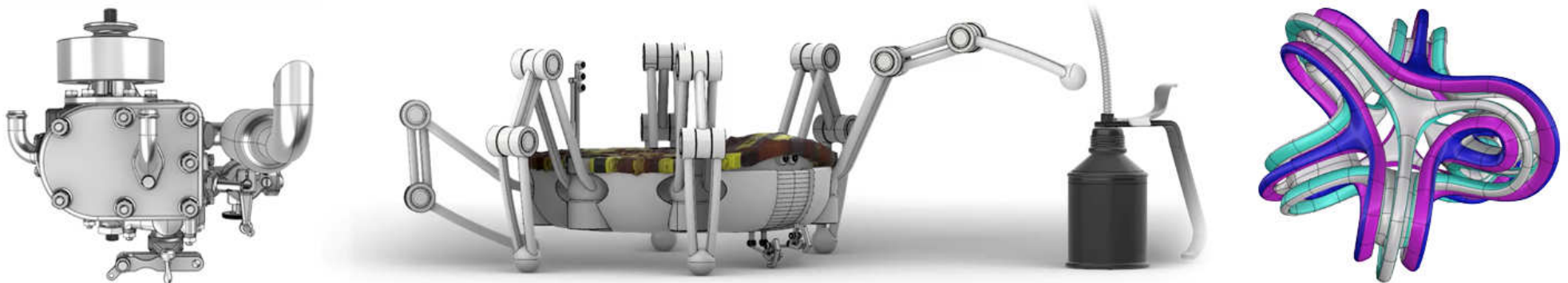
Features include extremely fast 3D graphics, unlimited viewports, shaded, working views, perspective working views, named views, floating views, full-screen display, 3D stereo view modes, draw order support, two-point perspective, clipping planes, and one-to-one scale to view models at full size.

New in Rhino 7:

Some models will display significantly faster, such as those with nested blocks, layouts with many detail views, and those with numerous text objects.

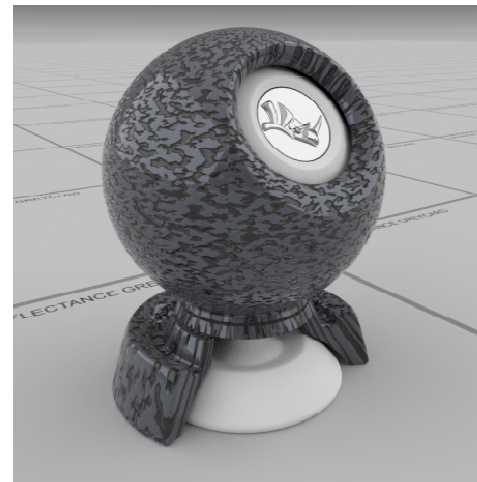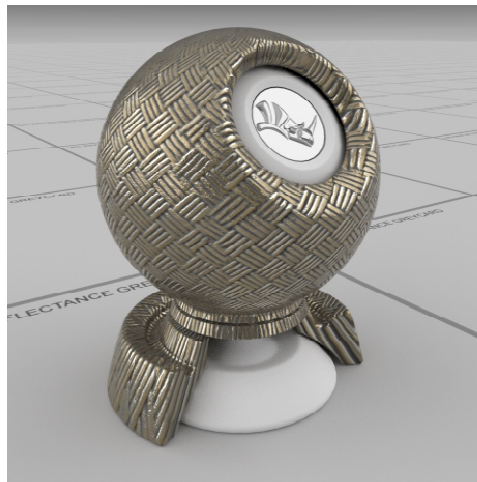Rendered Display mode captures more lighting in a realtime working mode.

Viewports and Rhino Render now use the same rendering settings.

Transparent color support on layers and objects.

Per face color support for polysurfaces and SubD.

New in Rhino 7…

Rendering and Presentation

High-quality presentations are critical to most design projects.

Features include: Rhino Render, a raytrace render with textures, bumps, highlights, transparency, spotlights with hotspot, angle and direction control, point lights, directional lights, rectangular lights, linear lights, and shadows, and customizable resolution, realtime render preview, realtime render preview selected objects, turntable, export to many common file formats used by renderers, rendering plugin support, settings saved in file.

New in Rhino 7:

Modern progressive rendering technology including advanced usage of both the CPU and GPU hardware.

Denoisers: Produce beautiful renderings in a fraction of the time using Denoisers in Rhino. These Post Effect filters use Artificial Intelligence techniques to remove the grainy "noise" from your draft renderings, dramatically reducing the time to reach a high-quality image.

Plugin extendable Post-effects, tone mapping, and final image filters.

Physically Based Rendering (PBR) Materials: PBR (Physically Based Rendering) materials are the best choice for renderings and presentations for rendering professionals who want realistic-looking materials. They are fast becoming *the* standard for material libraries, content authoring, scanning applications, and are supported in many modern applications. PBR materials are supported natively in Rhino's rendering engines and viewports.

New in Rhino 7…

Drafting

Every type of physical product design relies on technical illustration and 2D drawing to concisely communicate ideas, specifications, and instructions to people in design, development, and fabrication. Our goal for Rhino was to make it easier to create 2D drawings and illustrations for every discipline in every notation system and visual style used around the world.

Annotation objects include arrows, dots, dimensions (horizontal, vertical, aligned, rotated, radial, diameter, angle), text blocks, leaders, hidden line removal, Unicode (double-byte) support for text, dimensions, and notes. *Dimensions in perspective views are supported.*

In Rhino 7, we've added…

Layout Management: The vertical panel makes it easier to work on a model with layouts by adding a vertical panel for layout management.

Enhanced Text Fields: Text fields are special expressions within the text object that can dynamically update when a change to the linked property or attribute is detected.

Gradient and Transparent Hatches: Gradient and Transparent Hatches make your illustrations, diagrams, schematics and any 2D representation more beautiful.

Display Color Transparency on objects and by layer.

New in Rhino 7…

Digital Fabrication

The Rhino development project started nearly 20 years ago to provide marine designers with tools for building computer models that could be used to drive the digitally controlled fabrication equipment used in shipyards.

We continue to focus on the fact that designs are only useful once they are built and in the hands of consumers. With the cost of digital fabrication and 3D printing technology dropping quickly, more and more designers now have direct access to 3D digital fabrication equipment.

While we are not experts on all the many fabrication, manufacturing, or construction processes, we do focus on making sure that Rhino models can be accurate enough for and accessible to all the processes involved in a design becoming a reality.

In Rhino 7, we've added…

Single-Line Fonts: Single-Line Fonts help improve the speed and quality of your CNC engravings.

Mold Making tools: For mold makers and tool designers, Rhino's mold making tools assist in the model-test-revise workflow.

Mesh Tools
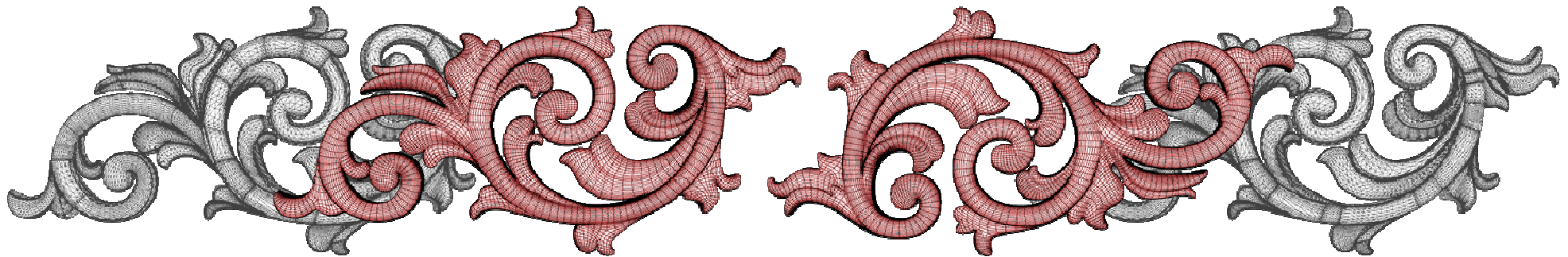
Robust mesh import, export, creation, and editing tools are critical to all phases of design, including:

- Transferring captured 3D data from digitizing and scanning into Rhino as mesh models.
- Exchanging mesh data with many applications such as SketchUp® and Modo®.
- Exporting meshes for analysis and rendering.
- Exporting meshes for prototyping and fabrication.
- Converting NURBS to meshes for display and rendering.

QuadRemesh: Quickly create a quad mesh from existing surfaces, solids, meshes, or SubDs—ideal for rendering, animation, CFD, FEA, and reverse-engineering.

Improved mesh intersection results.

Both new and enhanced mesh tools, plus support for double-precision meshes, accurately represent and display ground forms such as the 3D topography of a large city.

New in Rhino 7…

3D Capture
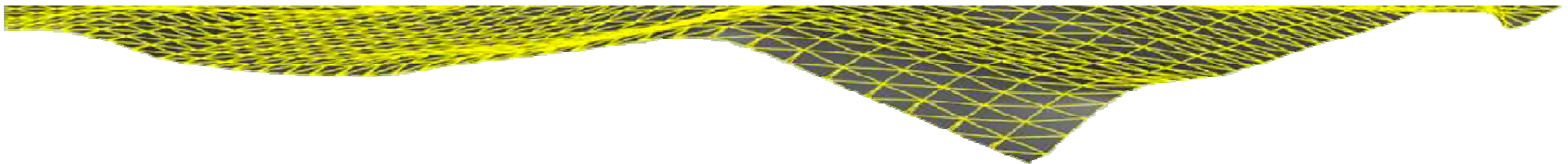
Capturing existing 3D data is often one of the first steps in a design project. Rhino has always directly supported both 3D digitizing hardware and 3D scanned point cloud data. Rhino now supports:

- Large point clouds. 3D scanners have become faster and cheaper, making huge scan files more common.
- Rhino's 64-bit support and enhanced support for graphic co-processors have made it possible to work with these large point clouds.
- LiDAR captures 3D terrain data for agriculture, archaeology, conservation, geology, land use planning, surveying, transportation, plus wind farm, solar farm, and cell tower deployment optimization. Rhino for Windows has robust support for plugins, such as RhinoTerrain™, that provide specialty tools for these new Rhino users.

3D digitizing support: MicroScribe®, FaroArm®, and ROMER - Windows only.

Inspection and Analysis
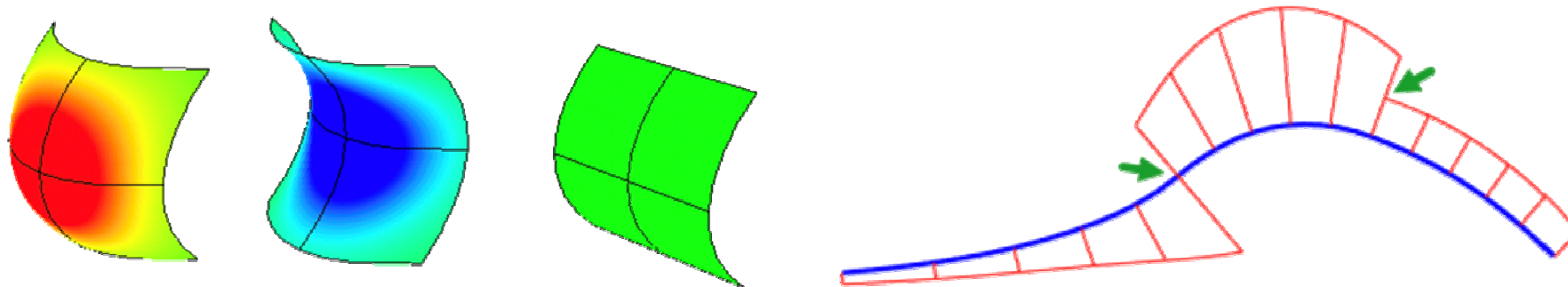
Design realization requires high-quality 3D models in every phase of design, presentation, analysis, and fabrication. Rhino includes tools to help ensure that the 3D models used throughout your process are the highest possible quality.

Analysis: point, length, distance, angle, radius, bounding box, normal direction, area, area centroid, area moments, volume, volume centroid, volume moments, hydrostatics, surface curvature, geometric continuity, deviation, nearest point, curvature graph on curves and surfaces, naked edges, working surface analysis viewport modes (draft angle, zebra stripe, environment map with surface color blend, show edges, show naked edges, Gaussian curvature, mean curvature, and minimum or maximum radius of curvature).
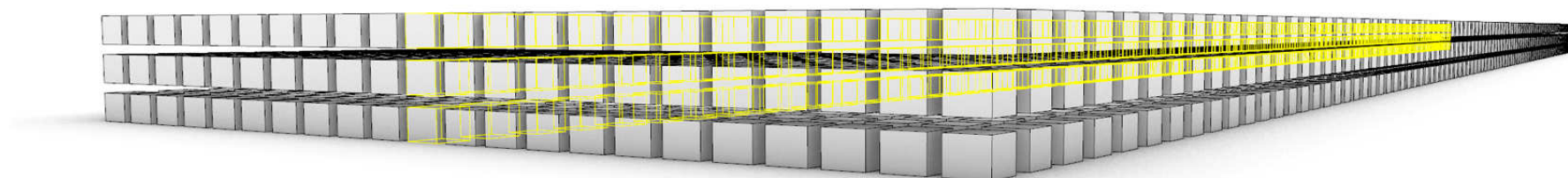
New in Rhino 7:

EdgeContinuity now uses line hairs to visualize distance, tangency, and curvature between an edge pair.

PointDeviation: Added Maximum distance and minimum distance statistics.

Clash Detection: a new Grasshopper component.

New in Rhino 7…

Large Projects

File management tools for managing large projects and teams include: Notes, templates, merge files, export selected objects, save small, incremental save, bitmap file preview, Rhino file preview, export with origin point, worksessions (Windows only), blocks, file compression for meshes and preview image, send file via email.

Compatibility

.3dm .3ds .sat .ai .amf **.dwg** .dxf .cd .iges
.sat **.dgn** .m **.pdf** .ply **.sldprt** .x .pts **.svg** .dae
.skp **.stl .step** .stp **.obj** .rib .xgl .x_t .zpr **.fbx**

Rhino is compatible with hundreds of different CAD, CAM, CAE, rendering, and animation products. The openNURBS libraries allow hundreds of other applications to read and write Rhino's native 3DM files.

In Rhino 7, we've improved fidelity for existing formats and support for SubD where possible. In addition, you can now…

Copy/Paste between Rhino and Illustrator®, Inkscape™, and Affinity Designer® (Windows only)

File formats supported…

Grasshopper
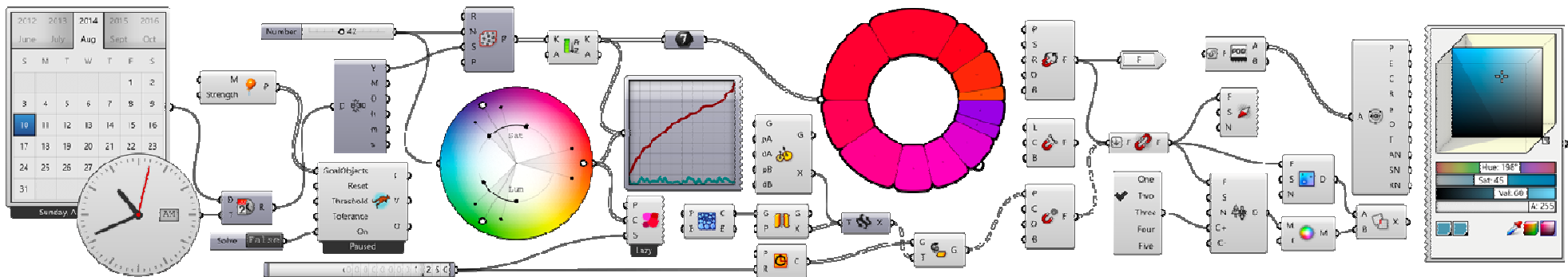
[Grasshopper](#) is a graphical algorithm editor included with Rhino.

Unlike RhinoScript, Rhino.Python, or other programming languages, Grasshopper requires no knowledge of programming or scripting, but still allows developers and designers to develop form generation algorithms without writing code.

New in Rhino 7:

[Grasshopper Player](#): Turn your Grasshopper definitions into Rhino commands.

[Clash Detection](#): Quickly search a large number of objects to find points of intersection between pairs of clashing objects.

[Component placeholders](#): Placeholder component for missing plugins.

[Package Manager](#) installs missing components without a restart.

New components for Hatch, Rhino.Inside.Revit, and more.

New in Rhino 7…

Developer Tools

The world's most robust 3D development platform for specialty modeling, rendering, analysis, and fabrication tools across a wide variety of disciplines.

- More accessible development tools: [RhinoCommon](#) (.NET), [Grasshopper](#), [Rhino.Python](#), [RhinoScript](#), [the Zoo license manager for plugins](#), and the [Rhino Installer Engine](#) are key ingredients.
- Comprehensive [documentation](#).
- An active [developer community](#).
- [Open source](#) more of the Rhino development tools, including [Rhino.Python](#), [RhinoCommon](#), and the [3DM viewer on iOS.](#)
- Free developer tools, including technical support, marketing support, and training. All of our development tools are available to everyone with a valid Rhino license. No special program registration, contracts, license agreement, or approval is needed.
- Localization and translation services are available. *[Details…](#)*
- Plugins: The Rhino SDK exposes most of Rhino's internal workings, making it possible for third-party developers to create powerful plugins and add-ons. A programmer's I/O tool kit with source code is available on [openNURBS](#) web site.
- Scripting: [RhinoScript](#) (VBScript) and [Rhino.Python](#) support exposes most of the internal workings of Rhino, making it possible to develop powerful scripts.

RhinoScript

Features include:

- Multi-document script editor
- Online help system
- [Documentation and examples](#)

RhinoScript is Windows only
Note: While RhinoScript is still widely used and supported on Windows, we recommend that users and developers move to Rhino.Python for both Windows and Mac. See below.

Rhino.Python

Rhino.Python is a powerful scripting language in Rhino on both Windows and Mac. Rhino.Python is built for flexibility and clear syntax.

If you would like to give Rhino.Python a try, explore some of the links on the [Rhino.Python site](#).

RhinoCommon

- RhinoCommon is the cross-platform .NET plugin SDK for Rhino.
- Available for Rhino for Windows, Rhino for Mac, Rhino.Python, and Grasshopper.
- A true .NET style SDK, well organized, and easy to learn.
- [Improved documentation](#). *[Details…](#)*

C++ plugins

- Microsoft Visual C++ 2017 for 64-bit Rhino
- Plugin wizard creates multi-targeted projects for easy project and platform support
- Dozens of SDK additions and enhancements to help create more powerful plugins
- Renderer Development Kit (RDK) now integrated with SDK
- [Documentation](#)
- [Samples](#)

Renderer Development Kit

Available in Rhino for Windows, the RDK includes a rich set of functionality for renderer developers, including:

- Support for C++, RhinoCommon and RhinoScript.
- Materials: Define custom material types that fully integrate into the Rhino material editor.
- Environments: Define custom environment types that fully integrate into the Rhino environment editor.
- Textures: Define custom texture types that fully integrate into the Rhino material, environment, and texture editors.
- Built-in Render Window: Rhino Render Window complete with tone operators, post-effects, multiple channel support, recall of recent renders, built-in zooming, support for HDR output, and window cloning.
- Sun: Automate the new Rhino sun control with full access to the sun position calculation tools for your plugins.
- Custom render meshes: Plugin system for defining render-time custom render meshes that can be used by any render plugin or exported to mesh formats.
- Post-effects: Plugin system for defining post-render frame buffer effects that can be used by any render plugin.
- Many minor renderer tools.

Rhino Skins

You can completely wrap your plugin application around Rhino. Here is how using C++ or RhinoCommon (.NET)

License Management for plugins

The Zoo features:

- Supports third-party Rhino plugins.
- Runs as a service - automatically restarts when the server reboots.
- Uses Standard Internet Protocol Support. Firewall friendly. Now runs across WANs, routers, and VPN.
- Troubleshooting tools.
- License checkout duration control.
- Updated installation and administration details.
- Third-party plugin developer details.

The Rhino Installer Engine

The Rhino Installer Engine simplifies distribution. The Rhino Installer Engine is compatible with the McNeel Update System - a system that keeps Rhino and Rhino plugins current.

openNURBS

The openNURBS developer toolkit now supports Rhino 7 (and earlier) native 3DM files. Other 2D and 3D CAD/CAM/CAE and graphic applications can read and write Rhino 3DM files directly. These development tools are free to all software developers.

Localization Services

Our regional office in Europe provides a translation and localization service for third-party developers and anyone else interested in translating their products to French, German, Italian, Spanish, etc. *Details…*

Marketing Support

If you have developed a Rhino plugin that you would like to make available to other Rhino users, food4Rhino is the place to post the details about your plugins for Rhino and Grasshopper. *It is free. Details…*

Administration

The major goal for each new Rhino release is to make it easier for managers and system administrators:

- Easy to share (float) licenses in a workgroup and company using The Zoo or Cloud Zoo license manager.
- Tools for easy license deployment in larger installations.
- Take more advantage of current hardware.
- Automatic notification and download of current bug fix service releases.
- Provide more training and support options.

In Rhino 7, we've added…

Package Manager: Discover, install, and manage your resources.

More Info…

System Requirements and Recommendations

Rhino runs on ordinary Windows and Mac desktop and laptop computers. More details…

License Management, Sharing, and Deployment

Rhino offers flexible licensing options. *More details…*

Plugin Manager

It is easy to disable plugins. This is important for users who are testing new plugins or having a problem and suspect the problem is caused by a particular plugin.

Service Releases Automatically Update

After the first release of every major new version, there are bug fix releases that download automatically. The users are prompted to install them.

Service releases do not install automatically.
You are prompted to install. You can also turn off the automatic download service.

Splash and About

The splash screen shows the thumbnails of the most recent files along with details about the Rhino version, event news, and tech tips. It also notifies users when a service release has been downloaded and is ready to be installed.

Training, Support, and Community

Since your team's productivity and frustration are at stake, we want to make sure help is available when you need it.

As with all versions of Rhino, support is included in the purchase price. There are no maintenance or subscription fees.

Support resources for Rhino include:

- Support forums, telephone, email, and live chat worldwide.
- Communities including Rhino, Rhino in Education, Grasshopper, Rhino FabStudio, Generative Jewelry Design, Generative Furniture Design, and food4Rhino.
- Video tutorials and tech tips on Rhino3D.TV, YouTube, Vimeo, etc.
- Blogs, Facebook, Twitter, LinkedIn, etc.
- Live online training classes

https://www.rhino3d.com/   https://www.rhino3d.com/download/