

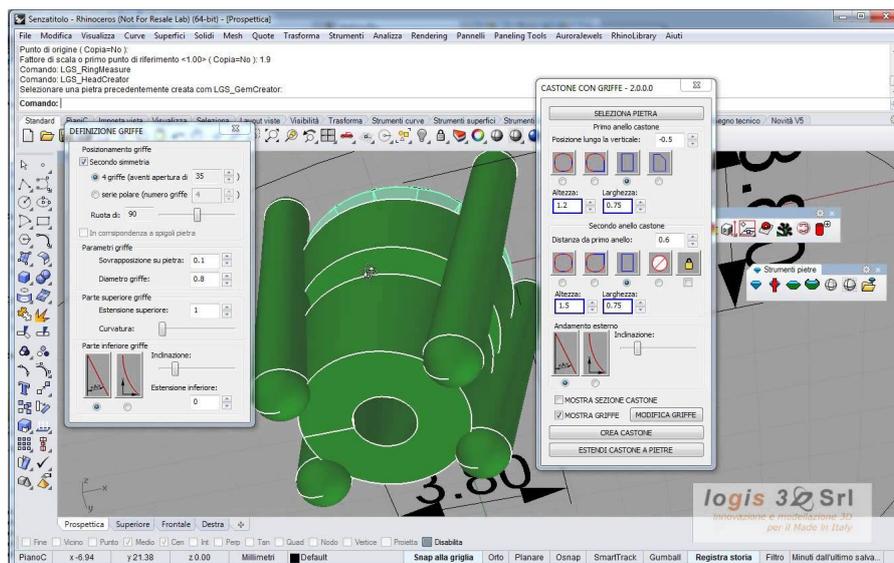
# Rhino PRO-J

SOFTWARE CAD/RP FOR JEWELRY  
SPECIALLY SUITABLE FOR THE DLP SYSTEM

## VERSION 6

**RHINOPRO-J** is a modern and complete **RHINOCEROS** plugin developed for the jewelry sector that allows to automate and apply complex modeling functions in a simple, fast and parametric way.

The program adds its working tools within the environment of **RHINOCEROS 6**, not altering in this way the work system of the jewelers who are already users of **RHINOCEROS**, and complementing the learning of computer design with **RHINOCEROS** to students of jewelry without accustoming them to an specific interface.



*Detalle de la pantalla de trabajo*

## Tool groups:

- **J-TOOLS:** Composed of tools specially indicated for jewelry, automating complex modeling functions, simplifying the design process and reducing the time needed to make a jewel.

It consists of different **RING WIZARDS**, **CREATORS OF GEMS AND BEZELS**, **EXTENDED PIPE CREATOR**, **ADVANCED SPLOP (CURVES ON SURFACES)**, **REALIZER OF SURFACES FROM A PICTURE (ART TOOLS)**, **STRINGS CREATOR**, etc...

- **PAVETOOL:** Formed by advanced tools to perform complex pave effectively on any polysurface, This group offers more advanced features than many more expensive software on the market.

- **GRABTOOLS:** Assists in the preparation of parts for 3D printing by **DLP** and **SLA** system. Creates complex supports especially indicated for jewelry, and performs the slicer of the different layers.

It allows making editable supports with different section thicknesses, avoiding that when they are removed they leave a hole in the piece, as well as tree-type supports to hold parts or claws from a single central column housed without contact with the piece, which reduces the finishing. Creates textured platforms to hold the pieces on the platform, facilitating the subsequent removal of the support, and exporting the images with an option to blur the border.



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# Rhino PRO-J

## SOFTWARE CAD/RP FOR JEWELRY SPECIALLY SUITABLE FOR THE DLP SYSTEM

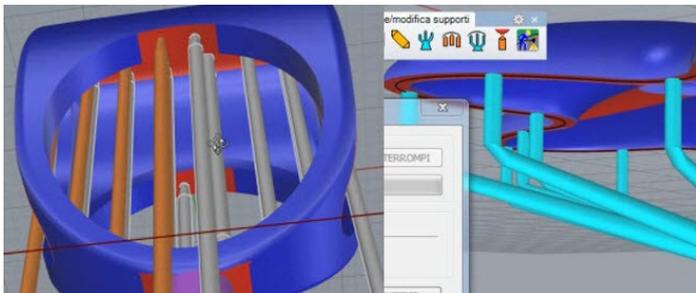
### Samples of some functions:



- **RING WIZARD:** Sample of a graduation ring, with a central stone defined from a curve in the shape of a heart, and with an automatic pavé limited by the bevel.



- **EXTENDED PIPE:** Sample of fantasy ring created from interlaced pipes creating an innovative texture.
- **ART TOOLS:** Sample of realization of a surface mesh from an image (.jpg, .bmp, .png).



- **GRABTOOLS:** Sample of creation of supports with different thicknesses of section and curvature.

The software shows in red the surfaces that need support, being able to configure different requirements depending on the resin used.



- **GRABTOOLS:** Sample of creation of layers (**SLICER**) with blurred edges to avoid to see steps in the parts.

# DLP - : Reverse projection

## DLP 3D PRINTING SYSTEM

### BASES OF THE SYSTEM

The **DLP 3D PRINTING** System is the best for doing non metallic small objects with the highest definition surface, recommending it for applications as **Jewellery, Dental, Hearing aids, Miniatures, Design of Consumer Goods** of small sizes, **Engineering, Bioengineering, Medical Devices** and **Laboratory Processes of Research and Development**.

The system use a **PROFESSIONAL LED DLP PROJECTOR** (projecting directly to the resin tank) for the selective photocuring of a photosensitive liquid resin, just projecting images optimized for the process.

The parts created with the projections are fixed in an inverted platform, decreasing a lot the quantity of liquid necessary for the construction of the parts, because the parts can stand out of the volume of liquid of the basement.

The process basically is:



- 1- Positioning in Z<sup>-</sup> of the construction platform
- 2- Flow of liquid resin
- 3- Projection
- 4- Positioning in Z<sup>+</sup> for the separation

The system is very fast, because can generate each layer simultaneously, regardless of the number of parts done at the same time.

The parts done can be used not only for prototyping, also for rapid manufacturing.

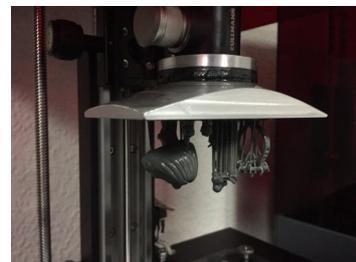
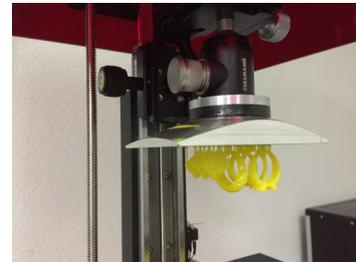
In jewellery for example we can do waxes for casting using a material that can burn-out in the oven, as well as a patterns for vulcanizing.

Also we can do patterns for vulcanizing and subsequent injection of white metal or plastic, for doing miniatures or fashion jewellery.

In hearing aids we can do real bio-compatible parts for introducing hearing mechanisms in a variety of colours, opaque and clear. We can do moulds, headphones, shells, soft tips, etc...

In dental we can do models, casting parts (copings, crowns, bridges, partials, frameworks...), orthodontic appliances, surgical guides, night guards, denture bases, temporaries, gingivas, trays, etc...

And many more...



*Samples of printig*



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# DLP - : Reverse projection

## DLP 3D PRINTING SYSTEM

### CHARACTERISTICS OF THE SYSTEM

- Superior quality finish. Depending of the used precision and material can not show layering.
- Very fast building time, thanks for the simultaneous building of the layers.
- Perfect precision in the sizes, in the symmetry and in the replication.
- Easy alternation of materials with different characteristics for different applications and finishing. The system can use also high density resins with two compounds, because no need to move the material inside tubes.
- Very low consumption of material because the system has very small loss, helped for using supports of the same that forms the parts (no need to do a negative box of the part with a second material).
- Very low maintenance cost. No need often settings and periodical revisions, because do not use injectors, extruders or a laser unit, and the spare parts and resins are not expensive.

### SPECIAL FEATURES OF OUR MACHINES

- We have special care in the quality of our projectors and the used lens, because are the heart of the system.

Our projectors use a led array instead of a bulb lamp. This kind of light is very constant, doesn't need to be calibrated usually and is guaranteed or 10.000 hours of continuous work.

The led light is not only non expensive, constant and precise, it practically doesn't heat, simplifying the cooling system of the machine and extending the life of the electronics and informatics installed.

Our projectors can be delivered for working at two different wavelengths depending of the needs of the used resins: **405nm** and **385nm**.

We always install in our projectors precision optical lens with fixed focus point, because it avoids the distortion and deformation of the projection

- We have selected also very precise Z axis linear guides, for having the best positioning precision layer by layer and avoiding the breakdown for the continuous use.

- One of the critical aspects for obtaining the best precision with a DLP System is the control of the coplanarity between the building platform and the vat. We are the first company that use a professional ball joint that guarantees having always a perfect coplanarity.

- One of the important characteristics for obtaining the best results with a **DLP 3D PRINTER** is the control of the temperature of the resin during the job, that is different depending of the resin used and the kind of parts done. That's why our high-end machines include a heating element in the material vat with an accurate control of the temperature. The heating of the material also allows to maintain a good mix in resins with two elements of different densities, and for breaking bubbles created during the mixing of the resin.



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### VERSION 1.0

The software solution that comes a professional 3D printing machine is as important as the quality and precision of the machine itself.

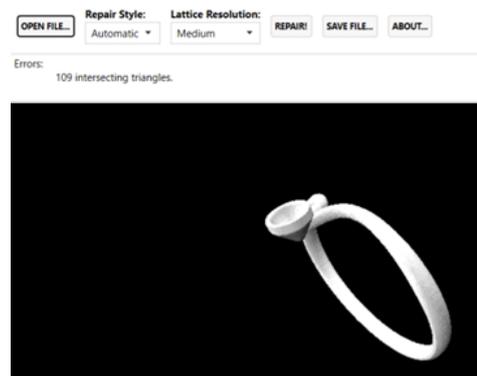
**UVISION**, the software solution developed to assist in the preparation of files to be printed on **UVITAL** machines, is the result of more than a decade of experience in the DLP 3D printing system.

### MORE IMPORTANT FUNCTIONS

#### • ANALYSIS AND FIXING OF THE FILES TO PRINT

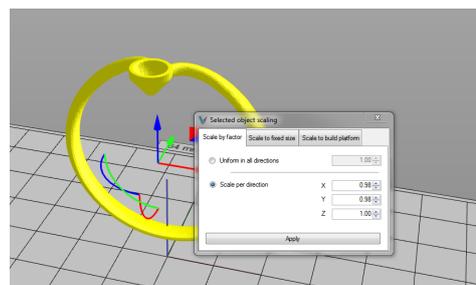
Many problems of printing come from failures in the STL meshes of the files to print, which is especially difficult to appreciate and avoid when we work with third-party designs.

The **EMENDO™ (AVANTE ©)** application, which is part of the **UVISION** package, allows to detect triangulation errors, overlays, holes in the meshes, etc ..., as well as to repair them automatically with different strategies. In addition, the application, if necessary, also allows reconstructing the mesh.



#### • COMPENSATION OF THE SHRINKAGE OF THE RESIN USED

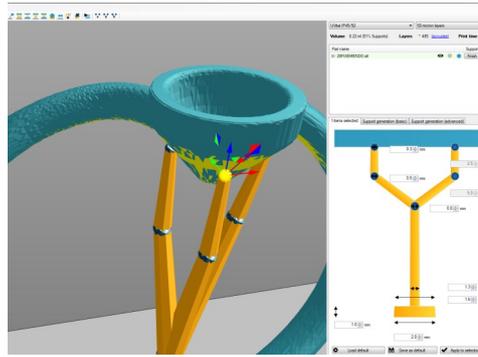
There are many photosensitive resins that when going from liquid to solid state undergo a small shrinkage (usually between 1 and 3%). The fact that in the 3D DLP printing system the height Z is regulated by a physical stop causes that generally that shrinkage manifests exclusively on the X and Y axis, deforming the parts. **UVISION** allows to scale the parts in a relative and absolute way, controlling the scaling process of the X, Y and Z axis independently and with total precision.



## • POSITIONING THE PART AND CONFIGURING THE SUPPORT

Choosing the most appropriate position to build a part is not simple and requires some experience, a perfect vision and precision of movements in three-dimensional space, and the precise simulation of how the stratified construction will be. Unfortunately there is no a minimally effective automatic solution to make it, but no software on the market allows to do it in a simpler, more efficient and re-editable way than **UVISION**.

The program offers a powerful, configurable and re-editable system to generate automatic and manual supports, possibly the most advanced on the market. Not only allows to create external and internal supports, in the form of a column, tree and lattice, but you can also choose the parameters that guide the automatic creation of supports, being able to quickly evaluate different alternatives.



## • CONFIGURING THE PRINTING PLATFORM

Is important positioning in an agile and effective way the different pieces to be built inside the printing space.

**UVISION** not only allows you to positioning automatically and manually the parts inside the printing space, easily creating several copies of the same piece, but also advise if any part is too close to the limits of the working area.

Once the platform is configured, **UVISION** also allows to establish with precision the costs of manufacturing, both at the level of resin consumption and at the level of building time. What is very important to be able to prepare budgets.

## • SLICING

One of the crucial steps in the DLP system is the generation of layers, which are .png images that will be projected to selectively photopolymerize the resin that makes up each layer of the pieces to be made. **UVITAL EDITOR**, an application of the **UVISION** software package, is an advanced layer generator for DLP 3D printing (**SLICING**) that offers a very precise control of the process.

The generation of layers is done through a virtual filter called "**MASK**", which is a cloud of grays that compensates for the differences in light of the different points of the workspace at a specific light intensity.

**ANTI-ALIASING:** The application allows to blur, in a very subtle and configurable way, the edges of the generated images to avoid that the layer height of the built pieces is appreciated.

**PIXEL DIMMING:** To prevent the interference of light between simultaneously illuminated pixels, creating a different shrinkage on the outer edge of a solid object and small internal holes, this function allows different combinations of shutdown of pixels of the mass of the object.

## • PROFILES

**UVISION** allows to create **PROFILES** of the machines, materials, parameters of the supports and styles of generation of layers used. The **PROFILES** can be exported and imported from one computer to another and from one user to another. The **UVITAL** materials or recommended by the brand have pre-configured optimized **PROFILES**, available to the users of the machines.



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# DLP - : Reverse projection

## DLP 3D PRINTING SYSTEM

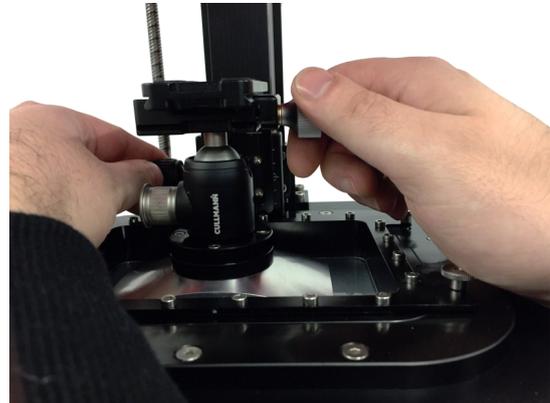
### PREMIUM SERIES

The new **PREMIUM SERIES** of the **UVITAL** range incorporates the following improvements:

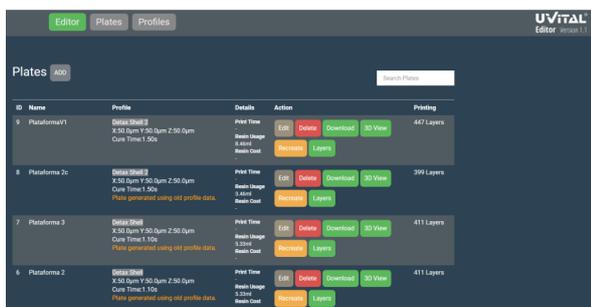
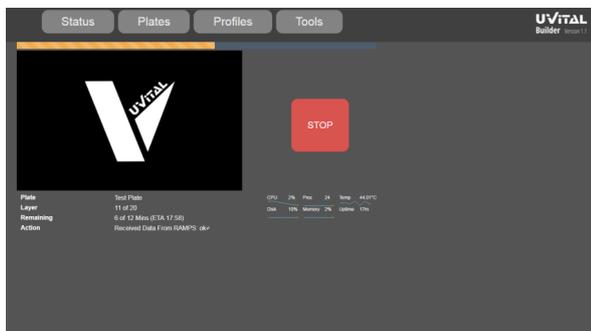
- Adjustment of the temperature of the resin.
- Work hours counter.
- Auto-off system.
- Protection against splashes in linear guides.
- 7" high sensitivity touch creen.
- Version 2.0 of the software **UVITAL BUILDER+ EDITOR**.
- New **UVISION** software package (see leaflet U00252).

As the previous models of the range incorporates:

- **LED UV** professional projectors adjusted at **405nm** o a **385nm**.
- Linear guides THK of maximum precision.
- Ball joint system for adjusting the coplanarity.
- Control panel inclined to protect it from possible splashes.
- Photo- protective cover of maximum visibility and with electrical opening.



Although our system is very static (only Z axis movement) and minimalizes the possibilities of losing the coplanarity and the Zero point, we can adjust these easily and with highest precision thanks to our exclusive ball joint system.



New version of the control software **UVITAL BUILDER 2.0:**

- Complete control of all working parameters, both in the Burning layers and in the Building layers.
- Possibility of choosing the desired light mask before each job
- Open to work with resins from other manufacturers.
- Supports the following file formats: STL, SLC, SVG and ZIP (of PNG files).
- Adjusted to work by WIFI from any computer, tablet or mobile phone that is networked.
- Accurate estimation of building time and resin consumption.

NEW **UVITAL EDITOR:**

- Possibility to create the layers from any computer and send the work via Ethernet to the machine
- Advanced functions such as **ANTI-ALIASING** and **PIXEL DIMMING** (see leaflet U00252).



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# DLP - : Reverse projection

## DLP 3D PRINTING SYSTEM

### IP45/92 PREMIUM EDITION

#### Characteristics:

- Professional UV LED projector with a **DMD** of the **SERIAL 4500** of TEXAS INSTRUMENTS.
- **FIXED OPTICS** of high quality and of 92mm.
- LED array with an estimated life of 20.000 working hours.

Once the projector is turned on, it is not necessary to wait to send a job, you only have to choose the mask configured to the desired light power.

By having auto-off, in addition, we can leave a job printing at night without this supposes an additional cost of light.

With a working area of 64x40mm this model can make a complete platform of pieces of jewellery (between 6 and 10 rings) in 3 hour (50 microns), or a platform with 6 bridges in material for provisionals in 1 hour (50 microns).

As we can adjust the temperature of the resin, thereby decreasing its density, we can work with resins with a high load of wax, much more similar to the conventional wax that is used in casting.



### TECHNICAL CHARACTERISTICS

UVITAL IP45/92 PREMIUM	
<b>Model</b>	<b>IP45/92 PREMIUM</b>
<b>Available Wavelength</b>	<b>405nm - 385 nm</b>
<b>Lens</b>	<b>92 mm</b>
<b>Build Envelope</b>	<b>64 x 40 x 130 mm</b>
<b>XY Precision (pixel)</b>	<b>50 µm (0,050mm)</b>
<b>Resin Temperatura Control</b>	<b>Yes</b>
<b>Heating Power</b>	<b>45W</b>
<b>Z Precision Grade</b>	<b>-0,004 mm</b>
<b>Layer Thickness</b>	<b>10 µm - 150 µm *</b>
<b>Build Speed</b>	<b>10 mm/hour at 50 µm *</b>
<b>Projector Resolution</b>	<b>WXGA 1280 x 800 px - Aspect 16:10</b>
<b>Native DLP resolution</b>	<b>912 x 1140 px</b>
<b>Electrical Requirements</b>	<b>220 - 240 V / 6 A</b>
<b>Sizes / Packing Sizes</b>	<b>300 x 280 x 700 mm / 760 x 480 x 960 mm</b>
<b>Net Weight / Gross Weight</b>	<b>15 Kg / 50 Kg</b>
* Depending of the material and desired finishing we can have limitations	



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# DLP - : Materials for Jewellery

## DLP 3D PRINTING SYSTEM

### RECOMMENDED MATERIALS FOR CASTING

#### CW-10



- Photo-sensitive material specially designed to achieve an ash-free casting even with conventional burnout oven cycles.
- Suitable for practically all types of jewellery: solid and heavy pieces, pieces with plans, filigree, etc ...
- Does not require UV post-curing.

#### CW-20



- Photo-sensitive material with wax load designed to present characteristics very similar to the injection wax used in casting.
- Recommended for casting with settled stones, presenting characteristics of memory and flexibility ideal for this application.
- Does not require UV post-curing.

#### CE-20



- Photo-sensitive material specially formulated for casting purposes that generates a high precise, flexible (allows wax-setting) and robust model.
- This material does not boil during the burn-out, avoiding many of the problems in the casting of resins with conventional furnace cycles.

# DLP - : Materials for Jewellery

## DLP 3D PRINTING SYSTEM

### RECOMMENDED MATERIALS FOR VULCANIZING

#### MH-10



- Photosensitive material with ceramic load that generates a robust, precise and rigid model.
- Models made with this material withstand moderate vulcanization temperatures (we recommend a maximum of 90°C), and are also good for galvanic plating. In the parts made in this material practically no layer lines are appreciated, which makes it ideal for organic designs that can not be polished. Can be machined as modeling waxes.

#### VE-20



- Photo-sensitive material that generates a robust, precise and rigid model.
- The models made with this material resist high temperatures such as vulcanization (we recommend maximum 110°C), and are also good for galvanic plating. This material practically does not expand when heating and has a high resistance to impact and fracture. Can be machined as carving waxes.

### JEWELLERY MATERIALS CHART

MATERIAL	COLOR	CURING WAVELENGTH	SPECIAL	SHORE	VISCOSITY A 25°C	TEAR STRENGTH	DENSITY	SHRINKAGE	BURN-OUT START	BURN-OUT FINISH
CW-10	Green	385-405 nm	CASTING	A 70	~300 cps	400 MPa	1.14 g/cm <sup>3</sup>	0 %	± 100°C	± 700°C
CW-20	Blue	385-405 nm	STONES	A 40	~300 cps	500 MPa	1.14 g/cm <sup>3</sup>	0 %	± 100°C	± 700°C
CE-20	Black	385-405 nm	CASTING	A 50	~200 cps	550 MPa	0.9 g/cm <sup>3</sup>	0 %	± 150°C	± 750°C
PERFORMANCE: General purpose lost wax casting.										
MH-10	Orange	405nm	ORGANIC	D 88	~350 cps	52 MPa		0 %	-	-
VE-20	Black	385-405 nm	HEAT RESIS.	D 85	~700 cps	133 MPa	1.0 g/cm <sup>3</sup>	0 %	-	-
PERFORMANCE: Rubber and silicone vulcanizing. Parts for galvanic plating. Models that can also be machined as carving waxes										



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