CAD PROJEKT K&A

Operation manual

Visualisation

CAD Kitchens 8.0, CAD Decor 4.0, CAD Decor PRO 4.0

INTRODUCTION

Instructions describe how to start working in the Visualization module.

We wish you a pleasant and fruitful work with our software!

CAD Projekt K&A team

Table of contents

Visualization - general information

1. Introductory remarks

CAD Decor PRO's visualization module, known as the rendering module, generates a realistic image of the project. This module focuses on the processes that are crucial for achieving a realistic room appearance. These include applying textures and paints, arranging ceramic tiles, adjusting object properties (such as colour scheme, transparency, reflections, etc.), setting light source parameters, and configuring rendering options and post-processing filters. During the initial design stages, the user primarily focused on the shapes and precise placement of models within the project.

In visualization, the most important factors are the colours and materials used, the proper selection of lighting, whose influence on the appearance and mood of the interior cannot be overestimated, as well as the selection of renderer functions in such a way as to achieve the best possible visual effects. The results of the work can be saved as plain, stereo and anaglyph pictures, as well as 3DE presentations (for use in the Export 3D module and in the CAD Share-it mobile application) and AVI movies. To switch to the visualization, select the icon **"Visualization"** or the **[F12]** key.

In the current chapter we present the options available in the **"Scene Settings"** tab on the right menu: ways to move the camera and its other options, preparing and saving selected views of the room, scene options, statistical data and diagnostic functions. A detailed discussion of the functions present in the other tabs of the left and right menus and the bottom panel can be found in the following sections of this manual.

2. Visualization Function Menu

There are four groups of functions in the visualization window:
- An icon bar on the top edge of the screen, containing basic functions such as selecting and hiding items, undoing and redoing operations;
- left panel - that is, the main menu, divided into five tabs: **"Materials"**, **"Tiles"**, **"Lights"** (Illustration 2),**"Render"** (in two variants: **"Radiosity"** and **"Path tracing"**) and **"Presentation"** (Illustration 3);
- right panel - that is, the place to change the properties of selected materials and light sources, as well as to manage scene settings (Illustration 4);
- bottom panel - a list of items, which, depending on the tab selected in the left menu, displays: texture previews (for tab **"Materials"**) (Illustration 5); tile previews and tiling functions (for tab **"Tiles"**) (Illustration 6); rendered views (for tab **"Render"**) (Illustration 7).

The visibility of the side and bottom panels can be controlled:
- to change the width of the panel, use the drag-and-drop method, that is, click the left mouse button in the middle of the panel, in the place marked by a small circle (after pointing the cursor at the circle, two vertical bars and arrows will appear), and then, holding down the button, move the mouse in the appropriate direction; when the panel reaches the desired width, release the button;
- to hide or redisplay the panel, right-click on the top icon bar and deselect or select the appropriate item from the pop-up menu(Illustration 1);
- In this context menu, you can also restore the default panel layout;
- icons are also used to hide and reopen panels , and , appearing when the cursor is positioned in the upper left, upper right and lower right corners of the scene preview.

Illustration 2 The top icon bar in the visualization with an expanded context menu on which the lower panel is hidden
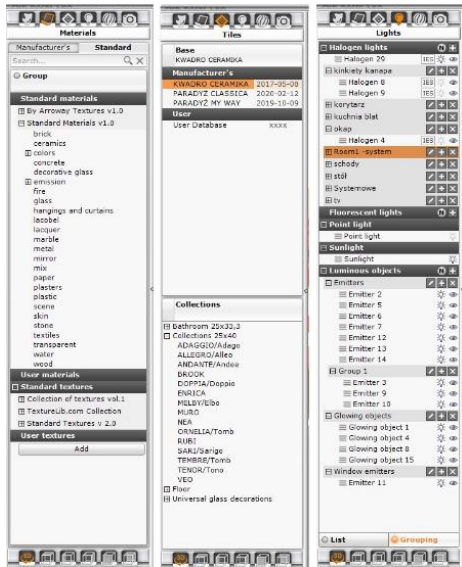

Illustration 3 Left panel, "Materials", "Tiles" and "Lights" tabs
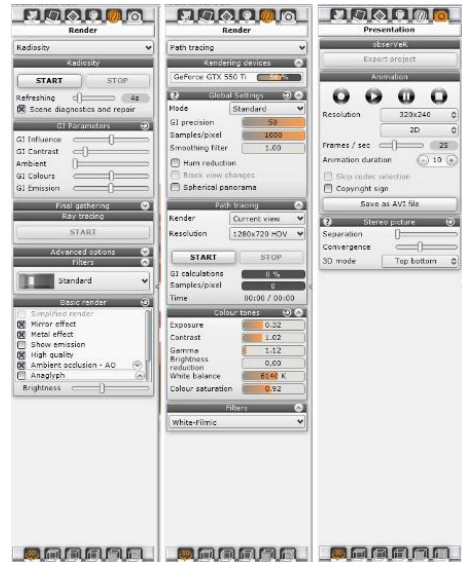
Illustration 1 Left panel, "Render" and "Presentation" tabs

Illustration 4 The appearance of the bottom bar after switching to the "Materials" tab - the bottom panel has been significantly expanded and the right panel closed

Illustration 5 Right panel, the ,,Object Properties "Scene Settings," "Material Properties" and "Light Properties" tabs
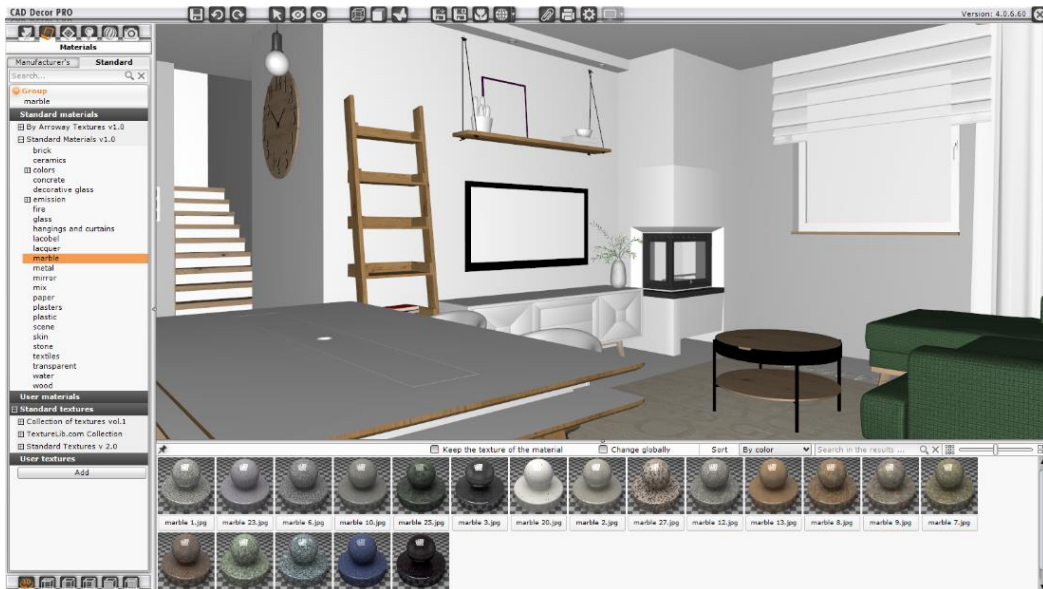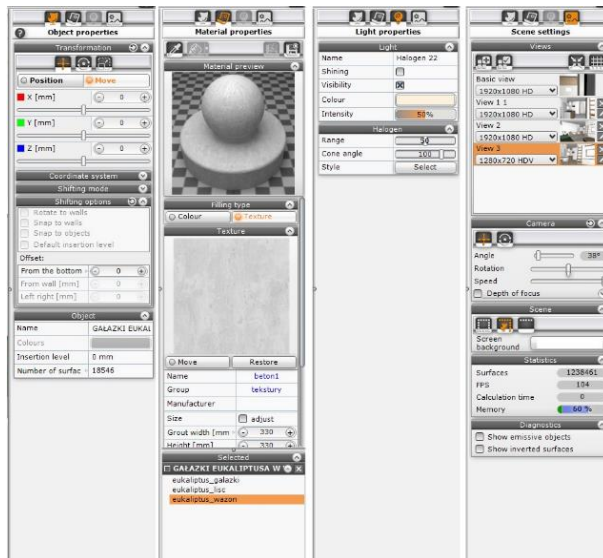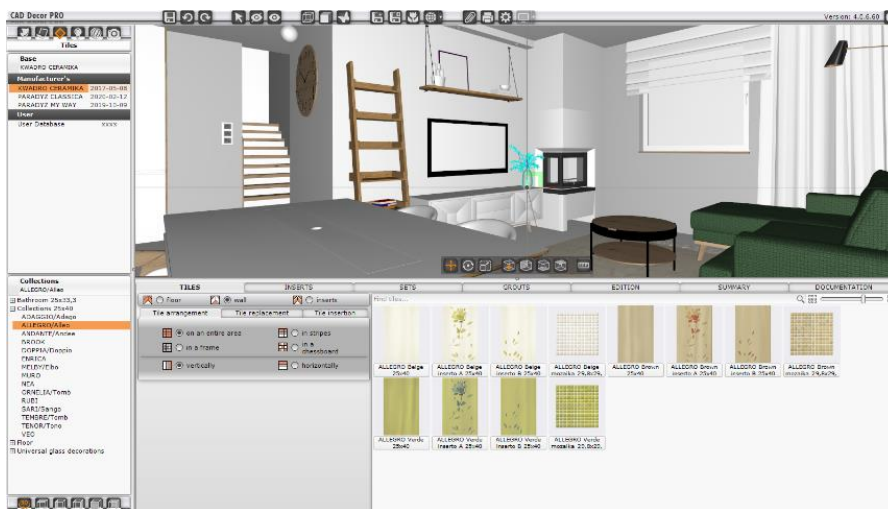

Illustration 6 The appearance of the bottom bar after switching to the "Plates" tab - the bottom panel has been widened, and the right panel has been closed

Illustration 7 Appearance of the bottom bar after switching to the "Render" tab - all panels expanded

3. Basic functions - top icon menu

The functions of the various icons of the top bar (Illustration 8) are presented in the following table.

Illustration 8 Top icon bar in visualization; from left: program name, icons of basic functions, operation progress bar, program version, cross to close visualization module

Icon	Description
	„**Select element**" - is used to select objects, for example, to select more than one area to be edited. When this icon is selected, the indicator displays in red. This function does not work for areas covered with tiles.
	„**Hide element**" - is used to hide elements obscuring the view. The icon changes color when selected. Hiding involves selecting an icon and clicking one by one on the items you want to make invisible. To end hiding, disable the button by clicking again.
	„**Show hidden**" - is used to reveal previously hidden elements (all at once).
	„**Undo**" - Undoes operations performed in the visualization; also available under **"Ctrl + Z"**.
	„**Redo**" - Repeats the operations performed in the visualization; also under the **"Ctrl + Y"** keys.

	„ **Save the visualisation**" – design saving option, associated with the **"Save the visualisation as…"** function as follows:
	− saves the current view to disk as an image file with most of the settings that were last selected in the **"Save Visualization"** window, which opens when you click on the **"Save visualisation as..."** icon (the exceptions are the "mode" and "format" options, which may automatically change in certain situations, described below);
	− the save location, resolution, author mark settings or post-process filters of the saved image will be those last selected by the user in the **"Save visualization as..."** window (the available options are described in the next section of this table and in the instructions for the presentation of the project);
	− the image storage mode and format may automatically change under the following circumstances:
	   − when changing the rendering algorithm (in the case of **Radiosity** it is possible to save normal, stereo and anaglyph images, while **Path tracing** relatives can only be saved in **"Path tracing"** mode);
	   − when switching from **Radiosity** to **Path tracing** in the **"Render"** tab, the picture saving mode is automatically changed to **"Path tracing"**(regardless of whether **"Regular image"** ,**"Stereo image"** or **"Anaglyph image"** mode was selected);
	   − when switching from **Path tracing** to **Radiosity**, if the **"Save visualisation"** window was set to **"Path tracing"** mode, there will be an automatic switch to **"Regular image**.**"**;
	− if at the time of selecting the **"Save visualisation"** icon in the visualization save window, the **"3DE Presentation"** (Export 3D application format) mode was selected, then the mode will also be automatically changed to the appropriate one for the currently used renderer (the file format will also change - from 3DE to JPG);
	− after clicking on the icon **"Save visualisation"** a message appears confirming the saving of the file with the given information about its name (**Błąd! Nie można odnaleźć źródła odwołania.** 9).
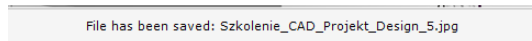	
	Illustration 9 Message after saving the picture
	
	Note: If the user switches from Radiosity renderer to Path tracing, but has not yet run Path tracing calculations even once in a given project, the illustration saving mode will not switch on its own. To activate the illustration saving mode, Path tracing calculations must be run. The illustration saving mode will automatically switch each time you switch to the second rendering algorithm.

Note: When saving an image in 'Path tracing' mode, it will be saved with the resolution set in the 'Path tracing' panel in the left menu, rather than the resolution set in the 'Save visualization' window".

Please note that it is not possible to save a file in 3DE format (3DE Presentation) by using the Save visualisation' icon. This option is only intended for saving image files in JPG or PNG format.

„**Save visualistion as…**" - allows you to save the scene as an image or 3DE presentation. It opens a window where you can:

– indicate the place where the files are saved (this will also be the place where the images are saved, saved using the **"Save visualisation"** function);

– Select the recording mode - the following are available: **"Plain image"**, **"Stereo image"**, **"Anaglyph image"** (for saving the results of the base renderer or **Radiosity**), **"3DE presentation"** (for use in the Export 3D module), and **"Path tracing"**(obtained using the algorithm);

– set the resolution (from 1024 x 768 to 5760 x 3240) (**note:** option not available for **"Path tracing"** mode, as in this case the resolution is set in the **"Render"** panel.➔ **"Path tracing"** in the left menu or **"Scene Settings"**➔**"Views"** in the right menu);

– select file format: JPG or PNG for illustrations and 3DE for 3DE presentations;

– add an author's mark and set its parameters (in the **"Advanced"** tab);

– add a post-process filter (sharpen, crayon, etc.) and its gradient (Illustration 10) (under the **"Advanced"** tab);

– for stereo files in the **"Advanced"** tab, there are also options for **"Stereo sidebyside"**, i.e. placing the images side by side, instead of the default "top-down" setting (this is the mode most viewing devices operate in), and **"Separated stereo"** (two separate files are saved - annotated with _L for the left eye and _R for the right eye);

– To approve the operation, click **"Save."**;

– the functions of the visualization recording window are described in more detail in the manual on project presentation.
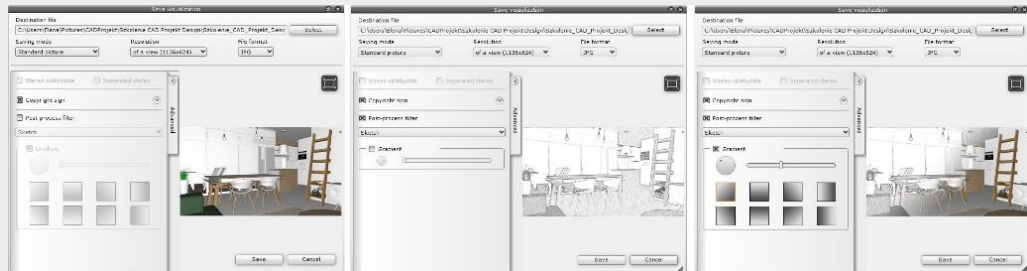

Illustration 10 An example of the use of a post-process filter ("Sketch") and its transitions

Note: To achieve a photorealistic look of the interior, save visualizations as image files or 3DE presentations after turning on the lights in the project.

„**Gallery of completed designs**" - opens a viewer for picture files and videos (Illustration 11). In it you can present previously made illustrations of the project and AVI videos shot in it, while making further changes to the visualization on the fly at the client's side.
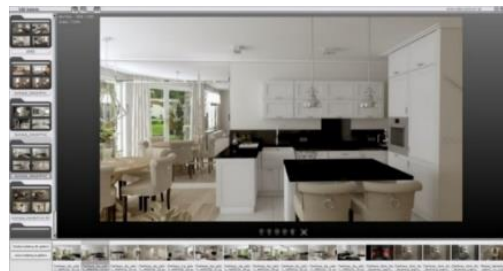

Illustration 11 Gallery launched

„**Print current view**" – Prints directly from the program the current view of the room.

	„Publish in Share-it" - opens the CAD Share-it mobile application, where your 3DE presentations can be viewed by customers anywhere and anytime, on computers, Android tablets and smartphones, and even in 3D goggles. For your convenience, we have added a second icon ("**Shere Share-it for the last used account and send**"), which immediately generates an e-mail with a QR code redirecting the client to the project animation, without firing up the application (just enter the recipient's address and the message content and click "**Send**"). The conditions for using the CAD Share-it application and its applications are outlined in the project presentation manual.
	„Documentation" – opens a new module of technical documentation of the project, which is presented in a separate manual.

Black and white contour view" – displays project in monochrome mode without **shading**, with only the outlines of solids and tiles visible (Illustration 12). To return to the realistic view, click the icon again.
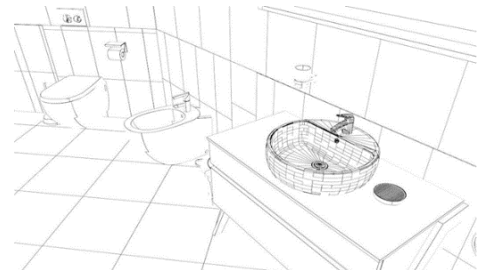
The illustrations opposite (Illustration 12 - Illustration 15) show different views of the scene - sequentially from the top: hidden grid lines, visible lines, hidden lines with shading, lights on (view photorealistic view).
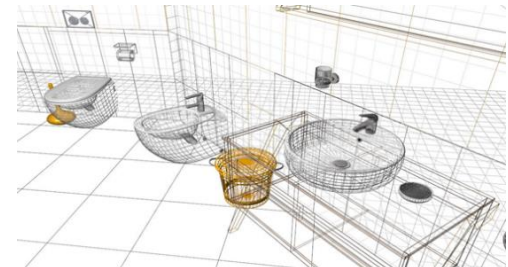
The design in the visualization can also be shown in a linear view - with all the lines of the design grid visible(Illustration 13). This function is available under the [Ctrl + L] key combination. To return to the standard view, again **select** the [Ctrl + L] shortcut

Illustration 12 Black and white contour view

Illustration 13 Linear view

„Greyscale contour view" - works similarly to the icon described above, except that it displays the view in grayscale, making planes and shadows invisible in the unlit view visible(Illustration 14). To return to realistic mode, select the icon again

Illustration 14 Greyscale contour view

„Show lights" – allows you to call up a photorealistic image of your design showing lights, reflections and other defined properties and effects(Illustration 15). This function is also available-available under the **[F1]** key. The lights turn off when you click on any point in the project space

Illustration 15 Photorealistic view

Three options are available here, described below. The configuration of the monitors is described in the instructions for the presentation of the project:

- **„Display the view on the second screen"** – allows to display visualization in 2D (without interface) on a second screen, TV or projector (connected in extended screen mode);
- **„View 3D view on second screen"** – Displays visualization with 3D effect on a second screen, TV or projector in 3D mode (only on equipment with 3D mode);
- **„Turn on/off surface smoothing"** – causes a smoothing of the second screen (option enabled by default, can be disabled).

4. Navigating in visualization

Navigating through the project in the visualization is done using the mouse and keyboard. The following table describes the use of perspective options.

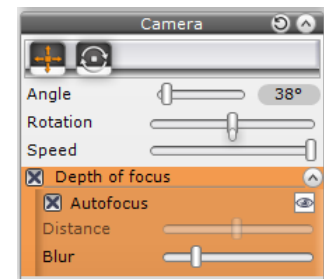| Type of movement	Required activities
Moving	- occurs when holding down the <u>right</u> mouse button and moving it in any direction (the view will move in the same direction); - with active icon **"Arrow keys move the scene"** the camera can be moved sideways and forward/backward also using the arrow keys on the keyboard: ↑↓ and ←→.
Rotation	- occurs when holding down the left mouse button and moving the mouse right or left and up or down; - can be done in two ways switching between them happens when you select the letter "H" on the keyboard (from word "head"); - around the point on which the viewer's gaze falls (allows, for example, to record an AVI video, showing a selected piece of equipment from different sides - the camera will circle around it) (global mode); - as if the viewer is turning his or her head or spinning around (it is used, for example, to record first-person shots, as if the viewer is in a room and looking around him or herself); - you can also rotate the camera using the arrow keys on the keyboard - to do this, select the "Arrow keys rotate scene" icon or hold down the [Ctrl] key at the same time as pressing the arrow key; - pressing← or→ and holding [Ctrl] will rotate left or right (without selecting [Ctrl] there will be a shift in those directions); - by pressing the arrow↑ or↓ and holding [Ctrl] rotates the camera up and down (without selecting [Ctrl], it will move forward or backward).
Zoom in / Zoom out	- occurs when moving the mouse forward/backward, with the [Shift] key and the left mouse button pressed, or with the middle mouse button pressed (the roller).
Camera angle	- in the right menu, in the "Scene" tab, in the "Camera" panel (Illustration 16), you can adjust the camera angle - using the ,,Angle" slider (from 30 to 85) (changing the angle changes the distance of the camera from the project).
Camera rotation	- in the "Camera" panel, you can also turn the camera sideways (tilt it from vertical), using the "Rotation" slider (to return to the vertical position, click on the center point marked on the slider) (Illustration 16).
Camera speed	- in the same place, the user can change the speed at which the camera moves (moves and rotates) by changing the setting of the slider "Speed" (Illustration 16).
Depth of focus	- causes blurring of the image beyond the specified point indicated using the "Autofocus" option or the "Distance" slider"; - when "Autofocus" is active, a red marker appears in the center of the scene preview, which can be set on the selected piece of equipment (it can be hidden using the button); - the level of blurriness is set with the slider "Blur"; - moving the above sliders each time automatically refreshes the displayed view. *Illustration 16 Camera" panel expanded "Depth of field" panel*

5. Saving view in visualisation

Before you start working with the renderer, it's a good idea to prepare a list of views that can then be rendered using **Path tracing**. to do this, position the camera in a suitable position, favourably presenting the room or selected element in the project, then go to the **"Scene settings"** tab in the right menu and in the **"Views"** panel, select the **"Add view"** icon (Illustration 18). Any number of views can be saved, each of which can be given any name and assigned a different resolution (Illustration 20). To give a view its own name, select the icon **"Edit the name of the view"**, which appears next to the thumbnail of the given shot (Illustration 17), and then type the text and confirm it with **[Enter]** or the **"Save the name"** icon, which appears in the text editing field (Illustration 19).
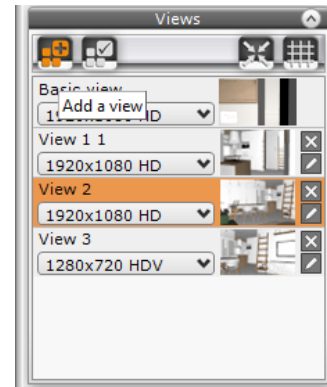

Illustration 17 "Views" panel, default state

The resolution of a given view can be selected from a drop-down list, available next to each added item (Illustration 21). You can also change (assign a different) shot for a given view by placing the camera in the desired position, pointing to the view to be changed with a click, and clicking on the **"Save the view"** icon. To remove a view from the list, click on the **"Delete the view"** icon next to the view thumbnail.

When saving views, you can use two helper functions - **"Center the camera"** and **"Three-division grid"**. The first sets the camera so that you can see the entire room from the outside at the default distance (as long as no object was selected when the option was chosen) or so that the selected object is in the center of the view (if it was previously selected). The second icon displays an auxiliary grid to help you easily crop the view appropriately.
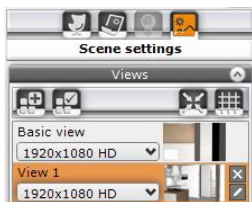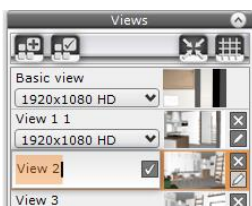

Illustration 18 Added view

Illustration 19 Edit view name
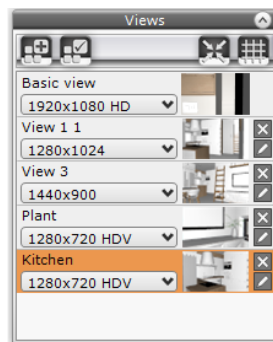
Illustration 20 Added views with different names and resolutions
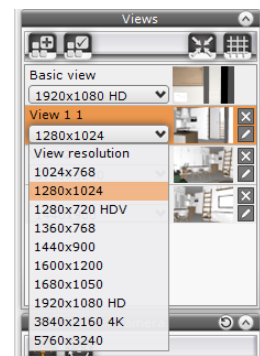
Illustration 21 Resolution list

Later, when working with the **Path tracing** algorithm, you can ask the program a number of views to recalculate and while the calculation is going on, take care of other tasks. The program will render the views one by one (after finishing the calculation for a given shot, it will automatically save the illustration to disk and proceed to recalculate the next view). To task the program with rendering multiple views, go to the **"Render"** tab in the left menu and select the **"Path tracing"** algorithm from the drop-down list at the top of the tab.

Illustration 22 "Path tracing" panel - rendering of the current view

Then, in the **"Path tracing"** panel, in the **"Render"** field, you can select one of two options:

- "**Current view**" - the current shot will be rendered, which can then be saved as an illustration; the quality can be set in the "Resolution" field**"** (Illustration 22).

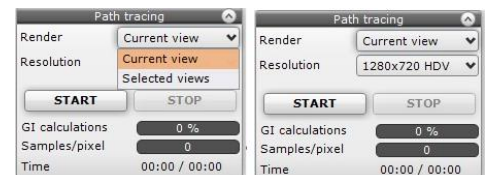- „**Selected views"** - the user can indicate which of the previously prepared snapshots are to be rendered by clicking in the boxes next to their names (items without crosses will not be rendered) (Illustration 23) the resolution of the resulting illustrations will be as indicated in the right panel for each view list item individually.
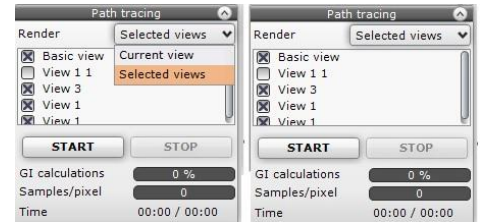

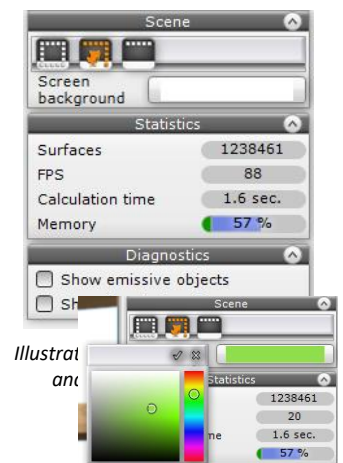*Illustration 23 "Path tracing" panel - rendering of selected views*

In addition, at the bottom of the left menu bar, there are view control icons - perpendicular projections for each wall, ceiling and floor (icons **"From above"**, **"From the left"**, **"From the front"**, **"From behind"** and **"From the right"**) and an icon **"Perspective"**, that turns on the orbital mode, in which the camera can be maneuverer freely. These icons are mainly used to create tile projections for tile workers, but in the current version of the program, these projections can be generated in a simpler and faster way in the new technical documentation, described in individual instructions.

Icon	Description
	• orbital view - you can maneuver the camera at will;
	• perpendicular top view;
	• west perpendicular view (left);
	• perpendicular eastern view (right);
	• north perpendicular view (behind);
	• perpendicular south view (front);

6. Other settings, statistics and scene diagnostics

In addition to the options described above that are available in the **"Views"** and **"Camera"** panels in the **"Scene Settings"** tab of the right menu:

- in the **"Scene** panel.**"** (Illustration 24): control the visibility of various elements of the project (walls, all equipment, ceiling) and change the background color of the screen (after clicking on the bar showing the color [white by default], a palette opens where you can indicate any shade and confirm it with the button [Illustration 25]; To close the palette without making changes, click),

- in panel **"Statistics"** (Illustration 24): check the statistics of the project: the number of surfaces (faces) of which it is built, the number of frames that the pro-gram can display per second (FPS), the expected calculation time for direct lights and **Radiosity**, and memory consumption;

- in panel **"Diagnostics"** (Illustration 24): Illuminate objects with emissive objects t or inverted surfaces.

These options are presented in the following tables.

Illustration 25 choice of background color

Icons in the "Scene" panel"	Description
„Show/hide walls from the outside"	- allows controlled on/off of wall visibility in the view from outside the room; - the walls of the room, which are between the camera and the interior (covering the interior), are automatically hidden by default, so that the user can follow what is happening inside the room to display them permanently, activate the icon.
„Show/hide equipment"	- is active by default; deactivating it allows you to quickly hide all the fixtures inserted into the project (coming from bases or added using the 3D Converter module) without having to point to them individually; - does not hide objects with assigned advanced emission, so you can more quickly determine the appropriate light intensity for emission objects by eliminating objects that slow down calculations; - does not hide arbitrary elements (platforms, enclosures, etc.).
„Show/hide automatically generated ceiling"	- allows you to hide and show the ceiling again in the interior view; - the above functions become unavailable during **Radiosity** and **Path tracing** calculations.

Fields in the panel "Statistics"	Description
Surfaces	- provides information about the number of surfaces in the project (from which the elements used in the project are built; the number varies depending on the method of dividing the scene).
FPS	- the number of frames the program is able to display per second; - the value shown here informs about the speed at which the user can move in the program (the more frames, the greater the fluidity of the work); - the number of frames is much higher before the renderer calculation is enabled, especially the **Radiosity** algorithm (it can drop from 350 to 2, for example; with **Path tracing**, the number of FPS can periodically drop by about half); - if during the calculation **Radiosity** the program shows that it is able to display, for example, two frames per second, that is, it will take the program 500 seconds to render 1000 frames of a recorded AVI movie track.
Calculation time	- specifies the calculation time for direct lights and, if **Radiosity** calculations are included, the elapsed time from the start of the calculation.
Memory	- indicator has two parts, showing total memory consumption; - the left part oscillates from green to red and shows the memory consumption of the .4CAD environment processes; - the right part (blue) shows the total load on the system by the **Radiosity** process and other programs, running on the computer; - if the share of the .4CAD environment in the overall memory usage exceeds the load of **Radiosity** and other processes, the appearance of the indicator changes - the blue part decreases and the bar becomes red; - if the consumption of system resources reaches a critically high level, also the subtitle **"Memory"** will turn red.

Functions in the panel "Diagnostics"		Description
„Show emissive objects”	-	causes the selection of objects that have been given light emission properties;
	-	useful when it is required to modify the distribution of light in the room, and it is not known to which objects the emission effect has been assigned.
„Show inverted surfaces”	-	indicates surfaces drawn in the opposite direction of the majority of surfaces in the project, which negatively affect the distribution of light;
	-	surfaces can be drawn right- or left-handed, and for proper light distribution it is important that they are all drawn in the same direction;
	-	to repair the scene (reverse erroneous drawn surfaces), select the "Scene diagnostics and repair " option in the "Radiosity" panel and start the calculation process by selecting the START button.

7. Pop-up menu functions

When you select an object (double-click with the left mouse button) and then click with the right button, you get access to the context menu (Illustration 26), where you can:

- select simultaneously all objects belonging to the layer to which the selected object belongs (**"Select layers."**);
- deselect all objects (**"Deselect everything"**);
- group the selected items (**"Group selected"**);
- point the sunlight at the marked object (**"The sun shines at the object"**);
- canter the camera on the selected object(s) (**"Center selected"**).
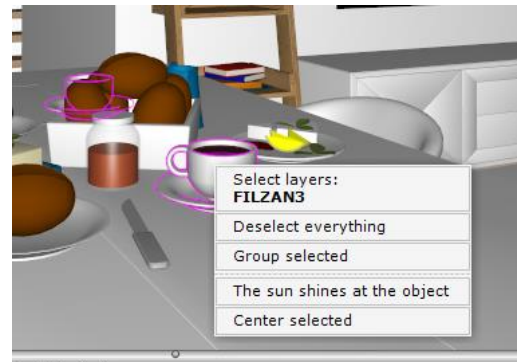

Illustration 26 Pop-up menu

Additional information

1.　Instructional videos

- Playlist, Visualization | Render"

2.　Shortcuts and commands

The document compares keyboard shortcuts in the .4CAD and visualization environments and lists the most frequently used commands in versions up to 3.Xi/7.X and version 4.X/8.X (both 34 and 64 bit versions of the environment). Find the document at: https://www.cadprojekt.com.pl/zasoby/pdf/opisy-techniczne/shortcuts-4-0-8-0-eng.pdf

This document provides an overview of keyboard shortcuts and commonly used commands in the .4CAD environment for visualization. The shortcuts and commands can be issued using either the mouse or keyboard. It can be accessed at: https://www.cadprojekt.com.pl/zasoby/pdf/opisy-techniczne/shortcuts-4-0-8-0-64bit-eng.pdf

In the above list, LPM and RMB stand for left and right mouse buttons, respectively. A command notation with a + sign (e.g. [Ctrl] + [Z]) indicates that both keys should be pressed simultaneously, while a notation with a >> symbol (e.g. [E] >> [Enter] or [Space]) means that you should first type E and then press [Enter] or the space bar.

Technical support
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Contact form

We would like to inform you that we provide training in the use of our programs. For more information, please visit our website: https://www.en.cadprojekt.com.pl/trainings/

Training section
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tel. +48 505 138 863